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Emerging Technology's Language Wars: Cryptocurrency

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EMERGING TECHNOLOGY'S LANGUAGE WARS: CRYPTOCURRENCY

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ABSTRACT

Work at the intersection of blockchain technology and law suffers from a distinct linguistic disadvantage. As a highly interdisciplinary area of inquiry, legal researchers, lawmakers, researchers in the technical sciences, and the public all talk past each other, using the same words, but as different terms of art. Evidence of these language wars largely derives from anecdote. To better assess the nature and scope of the problem, this Article uses corpus linguistics to reveal the inherent value conflicts embedded in definitional differences and debates related to developing regulation in one specific area of the blockchain technology ecosystem: cryptocurrency. Using cryptocurrency as a case study reveals the delicate balance necessary to develop law in even the best popularly understood area of blockchain technology. In doing so, the Article demonstrates that corpus linguistics offers a tool for identifying specific linguistic ambiguities before they are embedded in law, ultimately enhancing the clarity,

predictability, and coherency of the regulatory regimes to which cryp-tocurrency is subject.

TABLE OF CONTENTS

INTRODUCTION

In legislative testimony, Senator Warren quipped that cryptocurrency places responsibility of the financial system into the hands of "some shadowy, faceless group of super-coders," urging increased regulation.[1] Almost immediately, t-shirts and declarations of solidarity with shadowy super-coders responded.[2] Although the spat is almost amusing, it represents anecdotal evidence of a deep disconnect between stakeholders in the cryptocurrency space and the lawmakers charged with setting cryptocurrency-related policy. In a less amusing, but equally evident example, President Joe Biden issued an executive order regarding digital assets on March 9, 2022, in which he decried the lack of privacy and security in cryptocurrency systems,[3] suggesting that a government-issued central bank digital currency (CBDC) would better preserve privacy and security.[4] Meanwhile, the cryptocurrency and blockchain technology community place a high emphasis on the privacy-enhancing and security-enhancing features of the technology they build,[5] and

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1. Will Gottsegen, *Senator Warren: Crypto Puts Financial System in the Hands of 'Shadowy Super-Coders,'* Decrypt (July 27, 2021), https://decrypt.co/76997/elizabeth-warren-crypto-big-banks-shadowy-super-coders [https://perma.cc/LYE3-UJ3J]; *see also Cryptocurrencies: What Are They Good For?: Hearing Before the S. Comm. on Banking, Hous., & Urb. Affs.*, 117th Cong. (2021), https://www.banking.senate.gov/hearings/cryptocurrencies-what-are-they-good-for [https://perma.cc/2ZSC-GEL4].

2. *See, e.g.*, Elan Halpern, *Alchemy Teams Up with Project Galaxy, Polygon, Gitcoin, and Others to Give $300 Million Worth of Rewards to Ethereum's "Shadowy-Super-Coders,"* Alchemy: Blog (Oct. 26, 2021), https://alchemy.com/blog/shadowy-super-coders [https://perma.cc/SCC8-SLG8] ("Last month, U.S. Senator Elizabeth Warren now famously expressed: 'Crypto Puts Financial System In The Hands of Shadowy Super-Coders', a term the crypto community positively embraced, proud of coders building useful decentralized applications."); *Featured Products Shopping List*, Coin Ctr., https://t.co/3wqoiF2Wqz [https://perma.cc/Y3C2-D3YU] (selling shadowy super-coder apparel); Andrew Hayward, *'Shadowy Super Coder' Pack Offers $315M of Perks for Ethereum NFT Devs*, Decrypt (Aug. 25, 2021), https://decrypt.co/79422/shadowy-super-coder-pack-315m-perks-ethereum-nft-devs [https://perma.cc/X89J-4XV6].

3. *See* Exec. Order No. 14,067, 87 Fed. Reg. 14,143 (Mar. 14, 2022).

4. *See id.*

5. *See* Jerry Brito, Coin Ctr., Report: The Case for Electronic Cash (2019), https://www.coincenter.org/the-case-for-electronic-cash/ [https://perma.cc/AL9D-KQRG] (explaining the need for electronic cash systems like those found in cryptocurrency systems because "a cashless economy is a surveillance economy"); Jerry Brito & Peter Van Valkenburgh, *U.S. Treasury Sanction of Privacy Tools Places Sweeping Restrictions on All Americans*, Coin Ctr.

harbor a deep suspicion of CBDCs and their potential use in government surveillance schemes.[6] For both positions to be even subjectively accurate, a clear disconnect exists. Although some of this disconnect may represent a true philosophical disagreement, a lot of it may be driven by something much more basic, and infinitely more curable: a clash of linguistic meaning.

The long history of digital asset regulation reveals an equally long misunderstanding of the technology upon which digital assets exist and operate.[7] Take, for example, the 2013 virtual currency guidance issued by the U.S. Treasury's Financial Crimes and Enforcement Network (FinCEN) in March 2013.[8] That guidance relied upon terminology such as "administrator" and "centralized repository" to apply regulation to an emerging decentralized industry.[9] No one knew what FinCEN was talking about, and many law firms and lawyers expended significant time trying to decode the guidance.[10] Nearly ten years later, agency statements, guidance, and executive orders continue to use terminology in ways substantially different than those building the technology use the same terms.[11] This persistent

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(Aug. 8, 2022), https://www.coincenter.org/u-s-treasury-sanction-of-privacy-tools-places-sweeping-restrictions-on-all-americans/ [https://perma.cc/35C5-LF5N].

6. *See* Matthew Green & Peter Van Valkenburgh, *Without Privacy, Do We Really Want a Digital Dollar?*, COIN CTR. (Apr. 30, 2020), https://www.coincenter.org/without-privacy-do-we-really-want-a-digital-dollar/ [https://perma.cc/5FR9-KXCP].

7. *See generally* Carla L. Reyes, *Moving Beyond Bitcoin to an Endogenous Theory of Decentralized Ledger Technology Regulation: An Initial Proposal*, 61 VILL. L. REV. 191 (2016).

8. FIN. CRIMES ENF'T NETWORK, U.S. DEP'T OF THE TREASURY, GUIDANCE FIN-2013-G001: APPLICATION OF FINCEN'S REGULATIONS TO PERSONS ADMINISTERING, EXCHANGING, OR USING VIRTUAL CURRENCIES (2013).

9. *Id.* at 2, 4.

10. *See, e.g.*, Joseph Cutler, J. Dax Hansen & Carla Reyes, *New FinCEN Guidance Changes Regulatory Landscape for Virtual Currencies and Some Prepaid Programs*, JDSUPRA (Mar. 22, 2013), https://www.jdsupra.com/legalnews/new-fincen-guidance-changes-regulatory-1-58878 [https://perma.cc/3PJJ-PP4R]; Reyes, *supra* note 7, at 211-12 (documenting the confusion resulting from early enforcement actions).

11. *See, e.g.*, Keep Your Coins Act, H.R. 6727, 117th Cong. (2022) (retaining terms from the 2013 FinCEN guidance like "convertible virtual currency"); Stablecoin Innovation and Protection Act of 2022, S. 3867, 117th Cong. (2022) (creating a term "qualified stablecoin" and purporting to distinguish them from more volatile cryptocurrencies); Digital Asset Sanctions Compliance Enhancement Act of 2022, 117th Cong. (2022) (attempting to impose sanctions on creation of software); Gary Gensler, Chairman, SEC, Prepared Remarks of Gary Gensler on Crypto Markets: Penn Law Capital Markets Association Annual Conference (Apr. 4, 2022), https://www.sec.gov/news/speech/gensler-remarks-crypto-markets-040422 [https://perma.cc/T8PS-BZHR] (misstating the role of stablecoins in the industry and treating tokens as one monolithic type of crypto—"most crypto tokens involve a group of entrepreneurs raising

linguistic mismatch evidences a significant disconnect between those who make, enforce, and advise about law related to crypto-currency and those to whom the law applies. Indeed, the linguistic difficulty points to at least three separate areas of disconnect: (1) the technical meaning of certain words, (2) what that meaning conveys about how the technology works, and (3) the values built into technology. That is to say, the misunderstanding between the governing and the governed reveals both a definitional conflict and a misalignment of values.

Indeed, a lingering intuition that interdisciplinary language barriers impact questions at the intersection of cryptocurrency, law, and policy galvanized initial academic commentary.[12] For example, some scholars highlight difficulties surrounding specific terms such as immutable and decentralization, concluding that technologists mislead the public by using these words to mean anything other than what a common, nontechnologist would understand them to mean.[13] Meanwhile, the scholars contributing to the vast literature on smart contracts investigate the continuing confusion surrounding that term.[14] Indeed, these scholarly efforts to separate the realities of technology's capabilities from the hype that often surrounds it

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money from the public in anticipation of profits").

12. *See, e.g.*, Rebecca Crootof, *Autonomous Weapon Systems and the Limits of Analogy*, 9 HARV. NAT'L SEC. J. 51, 55-56 (2018) (showing the limitations of using weapon and combatant analogies for autonomous weapons); Neil M. Richards & William D. Smart, *How Should the Law Think About Robots?*, *in* ROBOT LAW 3, 16 (Ryan Calo, A. Michael Froomkin & Ian Kerr eds., 2016) ("In designing and implementing new technologies, we must be mindful of the metaphors we use to understand the technologies."); Jonathan H. Blavin & I. Glenn Cohen, *Gore, Gibson, and Goldsmith: The Evolution of Internet Metaphors in Law and Commentary*, 16 HARV. J.L. & TECH. 265, 268 (2002) ("By failing to adopt appropriate metaphors in regulating new technologies, courts risk creating bad law.").

13. *See, e.g.*, Angela Walch, *The Path of the Blockchain Lexicon (and the Law)*, 36 REV. BANKING & FIN. L. 713, 735 (2017).

14. *See, e.g.*, Shaanan Cohney, David Hoffman, Jeremy Sklaroff & David Wishnick, *Coin-Operated Capitalism*, 119 COLUM. L. REV. 591, 598, 604, 604 n.55 (2019) (documenting how even users of smart contracts clearly do not always understand what they mean or how they work); Carla L. Reyes, *Emerging Technology's Language Wars: Smart Contracts*, 2023 WIS. L. REV. FORWARD 85 (2023) (documenting the linguistic confusion using the corpus linguistic techniques developed in this Article).

echoes a similar ongoing discussion in the broader law and technology field.[15] But much of the discussion, whether cryptocurrency-specific or not, draws on either anecdotal or theoretical concerns about the meaning of terms and potential use cases.[16]

In three parts, this Article uncovers the impact of mismatched language use on policymaking priorities, statutory text, and judicial public discourse more broadly. Specifically, this Article argues that when attempting to regulate a new, highly technical, nearly trillion-dollar industry, those in the legal profession, whether lawyer, lawmaker, legal arbiter, or legal academic, have a duty to account for situations in which the words they use represent different terms of art in different disciplines. Further, this Article argues that understanding, and at times deferring to, the technical meaning of certain cryptocurrency-related terms of art can improve the law's ability to responsibly regulate this quickly growing sector of the economy. Part I introduces the problem of interdisciplinary language use by lawyers, lawmakers, and legal academics, highlighting that legal interpretation canons such as ordinary meaning[17] lull lawyers, lawmakers, and regulators into a false sense of linguistic security. Often those in law fail to inquire as to possible technical

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15. *See, e.g.*, Rebecca Crootof & BJ Ard, *Structuring Techlaw*, 34 HARV. J.L. & TECH. 347, 365-66 (2021) (discussing how ambiguity in legal fields, caused by technology, can lead to problematic results); Juliet M. Moringiello & Christopher K. Odinet, *The Property Law of Tokens*, 74 FLA. L. REV. 607, 607 (2022) (explaining how misunderstandings around NFTs and tokenization are leading to misdirected policy concerns); Andrew Verstein, *The Misregulation of Person-to-Person Lending*, 45 U.C. DAVIS L. REV. 445, 487-88 (2011) (arguing that misunderstanding P2P lending led the SEC to inappropriately assert its jurisdiction); Deven R. Desai & Joshua A. Kroll, *Trust but Verify: A Guide to Algorithms and the Law*, 31 HARV. J.L. & TECH. 1, 4 (2017) ("Put simply, current calls for algorithmic transparency misunderstand the nature of computer systems.... We believe this problem is aggravated because although algorithms are decidedly *not* mystical things or dark magic, algorithms are not well understood outside the technical community.").

16. *See, e.g.*, Ryan Calo, *Robots as Legal Metaphors*, 30 HARV. J.L. & TECH. 209, 210 (2016) (arguing that judges use the term "robot" to justify removing agency from people); Neil M. Richards & Jonathan H. King, *Three Paradoxes of Big Data*, 66 STAN. L. REV. ONLINE 41, 45 (2013) (concluding that those in the debate around the promises and perils of big data use "rhetoric of big data, in which utopian claims are being made that overstate its potential and understate the values on the other side of the equation").

17. As discussed further below, the ordinary meaning form of statutory interpretation requires that the reader interpret a statute by looking "at the statutory structure and hear[ing] the words as they would sound in the mind of a skilled, objectively reasonable user of words." Frank H. Easterbrook, *The Role of Original Intent in Statutory Construction*, 11 HARV. J.L. & PUB. POL'Y 59, 65 (1988).

meanings of words that serve as terms of art in the substantive area the law seeks to address.[18] Indeed, lawyers and legal academics often co-opt language from other disciplines to enhance the persuasiveness of their own legal analysis rather than letting the tools from the borrowed discipline stand on their own.[19] The result is that much of the current scholarship considering the linguistic pain points between law and technology relies on a largely anecdotal approach, without offering much in the way of concrete data.[20]

Part II argues that the clashes of linguistic meaning that have long plagued the interactions between law and other disciplines are playing out in the context of cryptocurrency regulation. To move beyond an argument based on mere anecdotal evidence, Part II uses corpus linguistics[21] to provide a data-driven critique of lawmaking in the cryptocurrency space. In doing so, this Article makes two core contributions: First, when regulating highly technical industries and technology, the use of presumptively ordinary language with reference to technical artifacts[22] may make the legal landscape more

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18. *See* Carla L. Reyes, *Emerging Technology's Language Wars: AI and Criminal Justice*, 5 J. INNOVATION & L. 1, 15 (2023).

19. Indeed, even the application of corpus linguistics, the very technique employed in this Article, comes under fire as a tool from a different discipline that is often co-opted to advance a legal argument for which it was not designed—understanding original meaning. Anya Bernstein, *Technologies of Language Meet Ideologies of Law*, 2020 MICH. ST. L. REV. 1241, 1243. Notably, this Article does not employ corpus linguistics for that purpose. Admittedly, however, the author is not a linguist, and attempts to tread rather carefully with regard to the extent of the claims that can be made as a result of the corpus analysis undertaken here.

20. *See generally* Walch, *supra* note 13; Carla L. Reyes, *A Unified Theory of Code-Connected Contracts*, 46 J. CORP. L. 981 (2021).

21.

> Academic corpus linguistics uncovers widely shared speech patterns. Researchers compile data sets (corpora) of language use. These ... are often specified by particular genres, registers, speech participants, or other parameters, and populated with examples of utterances produced in the natural course of things—whatever the natural course of things is for that genre, register, speech participant, and so on.

Bernstein, *supra* note 19, at 1254.

22. Consistent with my other work, I use the term "technical artifact" to refer to technology purposefully created by humans in a specific social context in order to serve some further purpose. Carla L. Reyes, *Autonomous Corporate Personhood*, 96 WASH. L. REV. 1453, 1460 n.29 (2021) (defining artifact as "a discrete material object, consciously produced or transformed by human activity, under the influence of the physical and/or cultural environment" (quoting Mark C. Suchman, *The Contract as Social Artifact*, 37 LAW & SOC'Y REV. 91, 98 (2003))); Jeffrey M. Lipshaw, *The Persistence of "Dumb" Contracts*, 2 STAN. J. BLOCKCHAIN L. & POL'Y 1, 8-9 (2019) ("A technical artifact is one, like a tool or a machine, that

confusing rather than less. Second, while corpus linguistics is often touted as a tool for use by judges in legal interpretation of statutes after their enactment, this Article demonstrates the usefulness of linguistic tools in the process of lawmaking.[23] Having used corpus linguistics to investigate the way different relevant communities use the following key terms: cryptocurrency, token, digital assets, and nonfungible tokens, Part III unpacks the implications and consequences of the results.

I. Interdisciplinary Language and Conflicting Claims of Legal Meaning

Viewing themselves as master wordsmiths, lawyers, legislators, and the law itself use specialized language to create legal ideas and legal doctrine, and to advocate for clients.[24] As a result, law, as a discipline, contains numerous terms of art—words or phrases that represent a specific idea, rule, or concept.[25] Law is not alone in this practice. Other disciplines employ terms of art as well. As a result, some words can convey different meanings and conjure different values to speakers with different backgrounds and professional training. Nowhere is this truer than in the context of the disciplines that contribute to emerging technology: computer science, engineering, and math, among others.[26]

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serves a utilitarian, productive purpose.").

23. Indeed, this Article is part of a series of four projects that seeks to demonstrate a new area of use for legal corpus linguistics, one which does not focus on determining the ordinary meaning of a word but rather simply seeks to uncover and acknowledge where words and phrases have highly technical meanings, when those meanings clash with legal understandings of the same terms, and how sometimes those clashes represent more than definitional disagreements, but rather reflect deep value conflicts. For the study on artificial intelligence in the criminal justice context, see Reyes, *supra* note 18. For the study on smart contracts, see Reyes, *supra* note 14. A fourth study is underway, which considers the impact of interdisciplinary language conflict on legal international harmonization efforts.

24. Daniel Martin Katz, Michael J. Bommarito II, Julie Seaman, Adam Candeub & Eugene Agichtein, *Legal N-Grams? A Simple Approach to Track the 'Evolution' of Legal Language*, *in* Proceedings of JURIX 2011: The 24th International Conference on Legal Knowledge & Information Systems (2011) (citing E. Mertz, The Language of Law School (2007)).

25. *See id.*

26. *See, e.g.*, *infra* Part III.

Because of the limits of law's ability to accurately accommodate the terms of art used in many highly technical disciplines, the law generally places strong importance on using functional, technology-neutral language in statutes.[27] To apply those technology-neutral statutes to new and emerging technologies, lawyers and regulators often turn to analogy and analogical reasoning.[28] Recognizing that uses of anecdote and metaphor can only take legal discussions so far, some legal scholars and judges look to the use of corpus linguistics as a mechanism for greater evidence-based application of law.[29] Although most attention in legal corpus linguistics centers on determining the ordinary meaning of an ambiguous statute,[30] this Article seeks to apply corpus linguistics techniques in a different context: the law- and regulation-making process. Recognizing that limits exist to the efficacy of a legal researcher employing tools from

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27. *See* Brad A. Greenberg, *Rethinking Technology Neutrality*, 100 Minn. L. Rev. 1495, 1495 (2016) ("Scholars and legislators have overwhelmingly adopted the latter mode—'technology neutrality'—based on the assumption it promotes statutory longevity and equal treatment of old and new technologies.").

28. *See, e.g.*, Crootof, *supra* note 12, at 55-56; Lex Gill, *Law, Metaphor, and the Encrypted Machine*, 55 Osgoode Hall L.J. 440, 455-56 (2018) (arguing that the metaphors used in law are emotionally and ideologically loaded, and that over time it becomes less clear that the terms are metaphors); Amy E. Sloan & Colin Starger, *New Wine in Old Wineskins: Metaphor and Legal Research*, 92 Notre Dame L. Rev. Online 1, 2 (2016) (showing dangers of using metaphors in law through the example of the "War on Drugs"); Lyria Bennett Moses, *Recurring Dilemmas: The Law's Race to Keep Up with Technological Change*, 2007 U. Ill. J.L. Tech. & Pol'y 239, 242 (commenting that there is no literature to explain why the use of metaphors are appropriate to reify technology and law); Blavin & Cohen, *supra* note 12, at 268.

29. *See, e.g.*, Stephen C. Mouritsen, Note, *The Dictionary Is Not a Fortress: Definitional Fallacies and a Corpus-Based Approach to Plain Meaning*, 2010 BYU L. Rev. 1915, 1919 (advocating for the use of a corpus-based approach to interpret legal language when contextual cues and legislative definitions are insufficient); Thomas R. Lee & Stephen C. Mouritsen, *Judging Ordinary Meaning*, 127 Yale L.J. 788, 795-96 (2018) (proposing the use of corpus linguistics to resolve the indeterminacy of ordinary meaning); Thomas R. Lee & James C. Phillips, *Data-Driven Originalism*, 167 U. Pa. L. Rev. 261, 267 (2019) (using corpus linguistics to uncover the "original communicative content of the Constitution"); Jennifer L. Mascott, *Who Are "Officers of the United States"?*, 70 Stan. L. Rev. 443, 453 (2018) (using corpus linguistics to determine whether the term "officer" is consistent with the term's original public meaning); Lawrence M. Solan, *Can Corpus Linguistics Help Make Originalism Scientific?*, 126 Yale L.J. F. 57, 57-58 (2016) (proposing corpus linguistics as a research tool to analyze the original public meaning during the Founding Era); Lawrence M. Solan & Tammy Gales, *Corpus Linguistics as a Tool in Legal Interpretation*, 2017 BYU L. Rev. 1311, 1312-13 (arguing that corpus linguistics is a useful tool in constructing ordinary meaning when such meaning is legally relevant).

30. *See supra* note 29 and accompanying text.

other disciplines, Part I begins by examining the potential pitfalls of using interdisciplinary methods in a legal academic undertaking. This Part then specifically considers the debated merits of using corpus linguistics in legal inquiries, which have largely focused on its use in legal interpretation. Finally, this Part makes the case that using corpus linguistics at an earlier point in the legal cycle—during study, debate, and drafting legislation and regulation—can offer insight that strengthens law and regulation related to highly technical subject matters.

A. Law's Troubled History with Interdisciplinarity

It should probably not come as a surprise that those trained in the technical disciplines required to create cryptocurrency systems feel their craft is misunderstood by law. Law's uneasy status in relation to other academic disciplines derives from a historical tension around the status of law as an academic discipline.[31] Indeed, the question of what constitutes the "discipline" of law remains a disputed question.[32] Some argue that, standing on its own, the scholarly study of law "has been solidly anchored in the internal point of view.... [I]t was concerned with the scholarly elucidation of texts and doctrines accepted by the scholar as authoritative."[33] Because of the subjectivity inherent in this kind of scholarly endeavor, law as a discipline somewhat lacked an anchor for making objective, empirical judgments about the state of the law.[34] This generated one of the key questions still under discussion around law as an academic discipline: "whether the canon of standard-form legal materials is sufficient to do good work in law."[35]

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31. Jack M. Balkin & Sanford Levinson, Essay, *Law and the Humanities: An Uneasy Relationship*, 18 YALE J.L. & HUMANS. 155, 155-57 (2006) (discussing differences of opinion between Judge Learned Hand and Oliver Wendell Holmes).

32. *Id.* at 158; *see also* Finn Makela, *Is Law an Academic Discipline?*, 50 RJTUM 433, 437 (2016); Sanne Taekema, *Relative Autonomy: A Characterisation of the Discipline of Law*, *in* LAW AND METHOD: INTERDISCIPLINARY RESEARCH INTO LAW 33 (Bart van Klink & Sanne Taekema eds., 2011). *See generally* Hanoch Dagan, *Law as an Academic Discipline*, *in* STATELESS LAW: EVOLVING BOUNDARIES OF A DISCIPLINE 43 (Helge Dedek & Shauna Van Praagh eds., 2016).

33. Makela, *supra* note 32, at 446.

34. *See id.* at 447.

35. Balkin & Levinson, *supra* note 31, at 158.

Perhaps because of this perception of the limitations imposed on scholarly inquiry by staying within law, legal scholars increasingly turn to other disciplines as a source of empirical, objectively rigorous methodologies.[36] This turn to interdisciplinarity gives rise to a second pressing question regarding law as a discipline: does law have "its own distinctive methodologies and standards of argument and proof; or is law, on the contrary, merely a 'subject matter'... that can be approached in any number of ways?"[37] Understanding the impact of the internal and external approaches to law and the resulting debate that played out during law's troubled history with interdisciplinarity illuminates some of the impetus behind the hypothesis tested in this Article and the reasons that this Article treads carefully in using corpus linguistics to test that hypothesis.

Specifically, the internal and external approaches to law divide across two key issues: the tools used in the study of law, and the perspective from which the scholar approaches the study of law.[38] An internalist views law and its methods as sufficient for the core task of deciding legal questions.[39] An externalist views the study of law as incomplete without interdisciplinary methods, particularly methods from "the natural sciences, social sciences, and the humanities."[40] Even as interdisciplinary work increasingly integrates into legal scholarship, some argue that the nature of legal education—that is, of preparing students to become lawyers—will keep law rooted in an internalist view.[41] This, in turn, impacts how law puts interdisciplinary methods to use.[42] Law commonly takes tools, methods, or theories from other disciplines and puts them to use for purposes unique to law: making an argument about the nature of law, the need for legal reform, or a specific interpretive outcome.[43] Co-opting tools from other disciplines opens some interdisciplinary

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36. Makela, *supra* note 32, at 448.

37. Balkin & Levinson, *supra* note 31, at 158-59.

38. *See id.* at 161.

39. *See id.*

40. *Id.* at 161-62.

41. *See id.* at 176.

42. *See id.* at 178 ("Ironically, though, law's very foundations in rhetoric also limit its absorption of other disciplines in the humanities.").

43. *See id.*

work up to critiques for the way law alters the other disciplines in order to pursue its own ends.[44]

Routinely co-opting methods and tools from other disciplines also blurs law's view to problematic practices in creating law. For example, from time to time, law co-opts terms of art with a specific meaning in one discipline, and remakes them into a legal term of art with a different meaning altogether, creating regulatory confusion.[45] On other occasions, law foregoes the use of existing terms altogether and instead creates new definitions and then demands that the other discipline fit their existing terms of art into a new, ill-fitting mold.[46]

B. A New Role for Corpus Linguistics in Law: Improving the Lawmaking Process

Law exists through, and depends upon, language.[47] Indeed, "language is *the* vehicle by means of which law is transmitted, interpreted, and executed in all cultures."[48] At base, law communicates the rules by which society operates, and researchers often, therefore, view legislation as "an act of communication" in which a "legal 'message' is 'transported' in a one-sided 'flow model' of information, that is, from 'law-giver' to 'law-taker', from sender to receiver."[49] For

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44. *See id.* ("[W]hen lawyers adopt knowledge and skills from other disciplines, the latter must be altered (some would say simplified or distorted) for the purpose of lawyerly persuasion.").

45. *See generally* Reyes, *supra* note 18 (examining conflicting meanings of fairness, explainability, transparency, and accountability in law and computer science).

46. *See* FIN. CRIMES ENF'T NETWORK, *supra* note 8, at 2.

47. *See* Deborah Cao, *Legal Speech Acts as Intersubjective Communicative Action*, *in* INTERPRETATION, LAW AND THE CONSTRUCTION OF MEANING: COLLECTED PAPERS ON LEGAL INTERPRETATION IN THEORY, ADJUDICATION AND POLITICAL PRACTICE 65, 65 (Anne Wagner, Wouter Werner & Deborah Cao eds., 2007) ("Law relies on language and particularly, it relies on the performative nature of language use.").

48. Judith N. Levi, *The Study of Language in the Judicial Process*, *in* LANGUAGE IN THE JUDICIAL PROCESS 3, 4 (Judith N. Levi & Anne Graffam Walker eds., 1990); *see also* Nicola Langton, *Cleaning Up the Act: Using Plain English in Legislation*, *in* LEGAL LANGUAGE AND THE SEARCH FOR CLARITY 361, 361 (Anne Wagner & Sophie Cacciaguidi-Fahy eds., 2006) ("At the heart of any legal system is a legal tradition which is reflected to some degree in the language used in and the legal culture that underpins a set of rules of law, and the way in which the system manifests itself in the society within which it operates.").

49. Hanneke Van Schooten, *Law as Fact, Law as Fiction: A Tripartite Model of Legal Communication*, *in* INTERPRETATION, LAW AND THE CONSTRUCTION OF MEANING: COLLECTED

legislation to effectively communicate the law, both the sender and receiver must share a common understanding of the words used.[50] Law, for its part, has a documented propensity for using unknown and uncommon words,[51] which can make it difficult for "law-takers" to understand the messages that "law-givers" send their way.[52] Even attempts to make legal language simpler suffer from drawbacks, however, because the fundamental difficulty in understanding law derives from the dual meaning of many legal words.[53]

Law uses a word to mean one thing, when nonlawyers commonly use the word to mean something else.[54] Much research investigates the impact on law's effectiveness when the legal meaning of a word conflicts with the lay meaning of a word.[55] Other types of linguistic conflicts occur as well—namely, conflicts between words that have been given specific legal meaning and the same words that have been given specific computer science, engineering, or other technical meaning.[56] To put it another way, when laws seek to govern emerging technologies by imbuing discipline-specific words with legal meaning, the laws seeking to govern emerging technologies and those that build emerging technologies may have widely different understandings of the applicable legal rules, leading to confusion and inefficiency. Under such circumstances, when shared understandings of language do not exist, meaningful rule of law— where "governing rules provide advance notice to enable people to plan their affairs with knowledge of the legal consequences of their

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PAPERS ON LEGAL INTERPRETATION IN THEORY, ADJUDICATION AND POLITICAL PRACTICE 3, 4 (Anne Wagner, Wouter Werner & Deborah Cao eds., 2007).

50. *See id.*

51. *See* Langton, *supra* note 48, at 362.

52. *See* Van Schooten, *supra* note 49, at 4. Indeed, an entire movement encouraging the use of more simplistic writing—the Clarity Movement—attempted to reduce the obstacles to understanding law imposed by overuse of terms of art. *See* Langton, *supra* note 48, at 362.

53. HAROLD J. BERMAN, LAW AND LANGUAGE: EFFECTIVE SYMBOLS OF COMMUNITY 87 (John Witte, Jr. ed., 2013) ("The language of law, as we have seen, is forged in the fires of legal procedures: of law-making, judging, regulating, negotiating, and other processes of creating, changing, or terminating rights and duties. However, the words used in these processes are historically derived from nonlegal speech and usually retain nonlegal connotations.").

54. *See id.* (using the example of the word "property" as a word commonly used outside of law, but which has a highly specific meaning within law).

55. *See* Kevin P. Tobia, *Testing Ordinary Meaning*, 134 HARV. L. REV. 726, 766 (2020); Evan C. Zoldan, *Corpus Linguistics and the Dream of Objectivity*, 50 SETON HALL L. REV. 401, 433 (2019).

56. *See* Reyes, *supra* note 18, at 4-5.

actions"[57]—becomes difficult to uphold.[58] As a result, when advancing new or changed law for emerging technologies, law and policymakers could benefit from a deeper understanding of how those engaged in the development of such technologies use terms of art before creating new legal meanings for the same terms. Herein lies the potential for the use of corpus linguistics to improve lawmaking around emerging technologies.

Generally speaking, "corpus linguistics gives researchers a way to track patterns in various genres of language usage."[59] More specifically, corpus linguistics allows researchers to perform text analysis on a very large data set.[60] "Corpus analysis is especially useful for testing intuitions about texts,"[61] making it well suited for testing intuitions about the drivers of anecdotal stories of miscommunication in specific subject matter, such as cryptocurrency. Corpus linguistics focuses on accuracy in describing language,[62] and, as a result, expects "complexity and variation as inherent in language."[63] Indeed, corpus linguistics generally views language as a communicative tool,[64] and thus developed specific techniques for evaluating how language use differs by speaker or context—genre variation studies.[65] In the context of making law designed specifically for emerging technologies, then, corpus linguistics might help uncover different uses of the same word across different genres—different professional disciplines. Understanding such differences may help build more robust, clear, and efficient law—law targeted to actual harms rather than illusory ones,[66] and law that

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57. Stefan Th. Gries & Brian G. Slocum, *Ordinary Meaning and Corpus Linguistics*, 2017 BYU L. REV. 1417, 1427.

58. *See* Van Schooten, *supra* note 49, at 4.

59. Bernstein, *supra* note 19, at 1257.

60. Heather Froehlich, *Corpus Analysis with Antconc*, PROGRAMMING HISTORIAN (Jan. 29, 2022) ("Corpus analysis is a form of text analysis which allows you to make comparisons between textual objects at a large scale.").

61. *Id.*

62. CHARLES F. MEYER, ENGLISH CORPUS LINGUISTICS: AN INTRODUCTION 4 (2002) (ebook).

63. *Id.* at 3.

64. *See id.* at 5.

65. *See id.* at 18.

66. *See* BERMAN, *supra* note 53, at 101; Carla L. Reyes, *Conceptualizing Cryptolaw*, 96 NEB. L. REV. 384, 441 (2017).

can actually be implemented at a technical level without destroying entire industries or unnecessarily burdening the public at large.[67]

Legal corpus linguistics is not new, and it is quite contested. Over the last fifteen years, a debate erupted among legal academics regarding the propriety of using corpus linguistics in legal interpretation.[68] In particular, some scholars encouraged using corpus linguistics to uncover the "ordinary meaning" of ambiguous words in statutes.[69] The goal of introducing corpus linguistics to the quest for uncovering the "ordinary meaning" of a statute centers on providing judges a more empirical, transparent, neutral, and consistent method for interpreting and applying statutes.[70] The value of this approach to legal interpretation remains hotly contested.[71] Some scholars argue that plain meaning cannot be uncovered by merely

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67. *See* BERMAN, *supra* note 53, at 101; Reyes, *supra* note 66, at 387.

68. *See, e.g.*, Thomas R. Lee & Stephen C. Mouritsen, *The Corpus and the Critics*, 88 U. CHI. L. REV. 275, 282, 285 (2021).

69. *See, e.g.*, Mouritsen, *supra* note 29, at 1919 (advocating for the use of a corpus-based approach to interpret legal language when contextual cues and legislative definitions do not help); Gries & Slocum, *supra* note 57, at 1421 (arguing that corpus analysis and similar empirical-based study should be used to help judicial interpretation of legal language); Lee & Mouritsen, *supra* note 29, at 795-96 (proposing the use of corpus linguistics to resolve the indeterminacy of ordinary meaning); Lee & Phillips, *supra* note 29, at 267 (using corpus linguistics to uncover the "original communicative content of the Constitution"); Mascott, *supra* note 29, at 453 (using corpus linguistics to determine whether the term "officer" is consistent with the term's original public meaning); Matthew Jennejohn, Samuel Nelson & D. Carolina Núñez, *Hidden Bias in Empirical Textualism*, 109 GEO. L.J. 767, 781-82 (2021) (proposing corpus linguistics as a research tool to analyze the original public meaning during the Founding Era); Solan & Gales, *supra* note 29, at 1312-13 (arguing that corpus linguistics is a useful tool in constructing ordinary meaning when such meaning is legally relevant).

70. *See* Lee & Mouritsen, *supra* note 68, at 282-85 (illustrating the importance of having a common linguistic legal directive and the deficiencies of using pure intuitions in interpretation).

71. *See, e.g.*, Carissa Byrne Hessick, *Corpus Linguistics and the Criminal Law*, 2017 BYU L. REV. 1503, 1511 (arguing against the use of corpus linguistics as a new interpretive theory in criminal adjudication because the tool impedes the public notice requirement inherent in certain law (like criminal statutes)); Zoldan, *supra* note 55, at 430-35 (challenging the validity of speech community selection when analyzing legal text); Tobia, *supra* note 55, at 753-77 (using survey results to argue that corpus linguistics incorrectly focuses on prototypical meaning); Jennejohn et al., *supra* note 69, at 771 (arguing that the Corpus of Historical American English (COHA) is sexist); Francis J. Mootz III, *Corpus Linguistics and Vico's Lament: Against Vivisectional Jurisprudence*, 20 NEV. L.J. 845, 845-47 (2020) (arguing that use of corpus linguistics to devise plain meaning reinforces an incorrect theory of the relationship between lawmaking and law enforcement); Anya Bernstein, *Democratizing Interpretation*, 60 WM. & MARY L. REV. 435, 444 (2018) (challenging the claim that corpus linguistics eliminates all manner of discretion in determining ordinary meaning).

focusing on the frequency with which words appear in a corpus.[72] Others argue that the problem lies not in frequency analysis itself, but in inferential errors made to move from frequency to plain or ordinary meaning.[73] Each of these critiques harkens back to the general pitfalls experienced in law's long-troubled history with interdisciplinarity.[74] When law attempts to co-opt other disciplinary tools in order to advance arguments for which those tools were not designed, researchers miss important nuances, or overclaim inferences from results.[75]

Gratefully, this Article need not take a position in the debate over the use of corpus linguistics to identify the plain meaning of words in a statute. This Article tests a research question quite different than uncovering the plain meaning of a word.[76] Specifically, this Article uses corpus linguistics to simply identify, in a data-driven way, how different stakeholders use the same terms—cryptocurrency, cryptoassets, virtual currency, tokens, digital assets, NFTs, and stablecoins—without attempting to make any judgment about which use represents the "ordinary meaning" of the terms. This Article modestly aims to confirm on a wider basis the anecdotal intuition that actors in the cryptocurrency law and policy space talk past each other in ways that harm legal outcomes. Simply by knowing that different stakeholders mean different things when engaged in a conversation using a common vocabulary can improve law and policy in the cryptocurrency arena. Long before a judge will ever

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72. *See, e.g.*, Hessick, *supra* note 71, at 1514 ("Corpus linguistics tells us that the ordinary meaning of a statutory term ought to be resolved by looking to the frequency with which a term is used a certain way. This is a problematic theory for the interpretation of criminal laws because it creates problems of notice and accountability." (footnote omitted)).

73. *See, e.g.*, Tobia, *supra* note 55, at 794-98.

74. *See supra* Part I.A.

75. *See, e.g.*, Bernstein, *supra* note 19, at 1243 (arguing that by turning linguistics into a technology of law, the legal corpus linguistics movement misses important features of linguistic methods and overclaims the import of legal corpus linguistic studies).

76. This Article is part of a four-part series of linguistic studies on the impact of language on the lawmaking process when the law relates to issues of emerging technology. My hope is that the four studies will: (1) move the discussion forward with regard to the question of whether new law is required to address emerging technology and (2) illustrate an alternative use case for corpus linguistics in law. For two of the other studies, see generally Reyes, *supra* note 18 (investigating the misunderstandings at the intersection of AI and criminal justice around the words "fairness," "explainability," "accountability," and "transparency"); Reyes, *supra* note 14 (investigating the misunderstandings around the term "smart contracts").

consider the plain or ordinary meaning of a term, the term must first be used in a statute. If, at the time that lawmakers write, discuss, and vote to adopt a statute containing that term, they rely upon incoherent discussions with stakeholders using the same words but different meanings, then the resulting law will likely underperform in its role as communicator of clear rules in an effective rule of law system.

II. ANECDOTAL EVIDENCE OF CRYPTOCURRENCY-RELATED CLASHES OF LINGUISTIC MEANING

Blockchain technology, one type of distributed database known broadly as distributed ledger technology (DLT),[77] allows parties that remain unknown to each other to transact on a peer-to-peer basis by using networked computers to reach consensus about the state of a ledger of transactions shared between them.[78] Researchers describe a distributed ledger as a "type of distributed database that assumes the possible presence of malicious users (nodes)."[79] Although commonly used interchangeably with DLT, the term "blockchain" more precisely refers to a subset of DLT protocols that structure their

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77. GARRICK HILEMAN & MICHEL RAUCHS, GLOBAL BLOCKCHAIN BENCHMARKING STUDY 11 (2017).

78. Richard Gendal Brown, *Introducing R3 Corda: A Distributed Ledger Designed for Financial Services* (Apr. 5, 2016), https://gendal.me/2016/04/05/introducing-r3-corda-a-dis tributed-ledger-designed-for-financial-services/ [https://perma.cc/SK7R-EGG4]; DANIEL T. STABILE, KIMBERLY A. PRIOR & ANDREW M. HINKES, DIGITAL ASSETS AND BLOCKCHAIN TECHNOLOGY: US LAW AND REGULATION 16 (2020); DEL WRIGHT, JR., A SHORT & HAPPY GUIDE TO BITCOIN, BLOCKCHAIN, AND CRYPTO 1 (2020).

79. HILEMAN & RAUCHS, *supra* note 77, at 11. As I have explained before, I am aware of the ongoing debate as to appropriate terminology, and in particular, the discussion around the terms "blockchain technology" versus "distributed ledger technology." *See, e.g.*, Reyes, *supra* note 66, at 391. Without intending to weigh in on the substance of that debate, I use the term "distributed ledger technology" as the broader, umbrella term to encompass both permissioned and permissionless blockchains, as well as protocols such as R3's Corda that do not strictly fit the definition of a "chain of ... 'blocks.'" HILEMAN & RAUCHS, *supra* note 77, at 11. Meanwhile, I use the term "blockchain technology" to refer specifically to those distributed ledgers that use data structures composed of a cryptographically linked chain of blocked data. *See id.* Adopting these terms is not a statement about the technical accuracy of this or any other terminology. I use these terms, consistently with other researchers such as Hileman & Rauchs, as a legal academic, grounded in the premise that all of these protocols exist and are in use, and that any legal and policy discussion of such systems should account for the full range of implementations or explain why the analysis only matters for a specific imple- mentation.

data in a literal "chain of ... blocks" by linking blocks of validated transactions together using one-way cryptographic hashes.[80] The combination and implementation of specific technological elements, such as the type of consensus mechanism used to verify transactions, vary by implementation among various DLT and blockchain protocols.[81] Generally speaking, however, blockchain protocols, and most DLT protocols, track transitions in state in order to allow participants in the network to reach agreement about the existence and evolution of shared facts.[82] In particular, blockchain technology tracks changes to records regarding what is commonly referred to broadly as "cryptocurrency."[83] Although often used as a catch-all term to refer to any store of value transferred via DLT, the nature and type of cryptocurrency varies significantly, and certain classes of cryptocurrency employ different names and terminology.[84] Those names and terms hold significant technical meaning, and often also reveal important values of the communities that employ a specific cryptocurrency. This Part offers two anecdotal examples of the law's failure to sufficiently account for technical differences among types of cryptocurrency, and the industry's resulting confusion.

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80. HILEMAN & RAUCHS, *supra* note 77, at 11.

81. There are, for example, any number of different ways to achieve consensus. Ethereum currently uses proof-of-work, but is moving toward a proof-of-stake consensus. ANDREAS M. ANTONOPOULOS & GAVIN WOOD, MASTERING ETHEREUM: BUILDING SMART CONTRACTS AND DAPPS 320 (Rachel Roumeliotis et al. eds., 2018). Ripple and Stellar use "a *unique node list* of at least one hundred nodes they can trust in voting on the state of affairs." DON TAPSCOTT & ALEX TAPSCOTT, BLOCKCHAIN REVOLUTION: HOW THE TECHNOLOGY BEHIND BITCOIN IS CHANGING MONEY, BUSINESS, AND THE WORLD 32 (2016). There are many other mechanisms as well, including proof of activity, proof of capacity, and proof of storage. *Id.* DLT protocols may also vary in what activity must be cryptographically signed. As alluded to above, the Bitcoin blockchain requires transactions to be cryptographically signed, while in the Ethereum protocol, computations and programs are also cryptographically signed. Other variations abound.

82. *See supra* note 78 and accompanying text.

83. *See* HILEMAN & RAUCHS, *supra* note 77, at 20.

84. *See infra* Parts II.A-B (detailing various types of cryptocurrency).

A. *Native Cryptocurrency Versus Nonintrinsic Tokens*

Arguably, the Bitcoin blockchain[85] and the Ethereum protocol[86] are the two most well-known blockchain protocols, although other variations abound.[87] Increasingly referred to as "cryptoeconomic protocols,"[88] or "cryptoeconomic systems,"[89] blockchain protocols, including the Bitcoin blockchain and Ethereum, rely on intrinsic tokens (bitcoin in the case of the Bitcoin blockchain, and ether in the case of the Ethereum blockchain protocol) to incentivize the operation of the ledger's consensus mechanism and act as a security tool.[90] In Ethereum, for example, developers use ether to limit smart contract operations by the cost required to run the operation.[91] This

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85. *See* ARVIND NARAYANAN, JOSEPH BONNEAU, EDWARD FELTEN, ANDREW MILLER & STEVEN GOLDFEDER, BITCOIN AND CRYPTOCURRENCY TECHNOLOGIES: A COMPREHENSIVE INTRODUCTION, at xxii (2016) ("Bitcoin combines the idea of using computational puzzles to regulate the creation of new currency units with the idea of secure timestamping to record a ledger of transactions and prevent double spending."). Generally speaking, the Bitcoin software, protocol, and network are referenced using the uppercase "Bitcoin" while the lowercase "bitcoin" refers to individual units of cryptocurrency. Angela Walch, *The Bitcoin Blockchain as Financial Market Infrastructure: A Consideration of Operational Risk*, 18 N.Y.U. J. LEGIS. & PUB. POL'Y 837, 846 n.41 (2015) (citing *Vocabulary*, BITCOIN.ORG, https://bitcoin.org/en/vocabulary).

86. "Ethereum is a platform for decentralized applications, smart contracts and decentralized, autonomous organizations." HENNING DIEDRICH, ETHEREUM: BLOCKCHAINS, DIGITAL ASSETS, SMART CONTRACTS, DECENTRALIZED AUTONOMOUS ORGANIZATIONS 30 (2016); *see also* ANTONOPOULOS & WOOD, *supra* note 81, at 1 ("Ethereum is designed to be a general-purpose programmable blockchain.").

87. *See* TAPSCOTT & TAPSCOTT, *supra* note 81, at 32.

88. *See generally* Brandon Ramirez, *Modeling Cryptoeconomic Protocols as Complex Systems: Part 1*, THE GRAPH (Jan. 14, 2020), https://thegraph.com/blog/modeling-cryptoeconomic-protocols-as-complex-systems-part-1 [https://perma.cc/E5PF-MT35]. Blockchain technology is a protocol technology. Carla L. Reyes, *(Un)Corporate Crypto-Governance*, 88 FORDHAM L. REV. 1875, 1878 n.12 (2020). A protocol is "a set of instructions for the compilation and interaction of objects." ALEXANDER R. GALLOWAY, PROTOCOL: HOW CONTROL EXISTS AFTER DECENTRALIZATION 75 (2004). Generally, a "network protocol" simply sets the rules that allow networked computers (nodes) to communicate with each other. *See* Will Warren, *The Difference Between App Coins and Protocol Tokens*, MEDIUM: 0X BLOG (Feb. 2, 2017), https://blog.0xproject.com/the-difference-between-app-coins-and-protocol-tokens-7281a428348c [https://perma.cc/A69V-G8PR].

89. *See generally* CRYPTOECONOMIC SYS. J., DIGIT. CURRENCY INITIATIVE: MIT MEDIA LAB, https://dci.mit.edu/cryptoeconomicsystems [https://perma.cc/J436-P86H].

90. NARAYANAN ET AL., *supra* note 85, at 51.

91. *See* DIEDRICH, *supra* note 86, at 43 ("Ether is the native token of Ethereum, its 'bitcoins'.... This is the official definition of Ether: it's the currency in which to pay the fee to be allowed to run your calculations, make your transactions and store your data on the

prevents the launch of an unwieldy smart contract that consumes all of the Ethereum protocol's computing power, which would be like the cryptoeconomic equivalent of a denial of service attack.[92] Sometimes referred to as "protocol tokens," tokens intrinsic to cryptoeconomic protocols represent base layer tokens, or tokens for "native ... protocols."[93] Native cryptocurrency such as bitcoin and ether, then, offer much more functionality than the currency and medium of exchange functionality for which they are popularly known. Indeed, even though industry pivots popularized the idea of separating blockchain from cryptocurrency as two separate concepts, the truth is that native cryptocurrency serves an important role in ensuring the proper function of the blockchain protocol.[94]

Certain cryptoeconomic protocols allow users to build nonintrinsic tokens on top of the base layer protocol.[95] In particular, the Ethereum protocol enables users to build such nonintrinsic tokens in just fifty-seven lines of code through what is known as the ERC-20 token standard.[96] ERC-20 is a technical standard for a specific smart contract.[97] Despite many misconceptions among lawyers, lawmakers, academics, and the media, a smart contract, at base, is merely a "stored procedure" or "persistent script"—a standing computer program—that says "if event x happens, then execute result y."[98] In other words, "[a] smart contract is just a fancy name

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[Ethereum] blockchain." (emphasis omitted)); *see also* NARAYANAN ET AL., *supra* note 85, at 266 ("More generally, we need some way to limit contracts that take a long time to run, even if that time is finite. Ethereum uses a mechanism called *gas* to achieve this. Essentially, executing each virtual-machine instruction costs a small amount of money (gas). Different operations cost different amounts.").

92. *See* ANTONOPOULOS & WOOD, *supra* note 81, at 207.

93. *See* Warren, *supra* note 88.

94. *See* NARAYANAN ET AL., *supra* note 85, at 65-66; *see also* ANTONOPOULOS & WOOD, *supra* note 81, at 2.

95. *See, e.g.*, ANTONOPOULOS & WOOD, *supra* note 81, at 127.

96. Jonathan Rohr & Aaron Wright, *Blockchain-Based Token Sales, Initial Coin Offerings, and the Democratization of Public Capital Markets*, 70 HASTINGS L.J. 463, 464 n.1, 474 (2019); FERDINAND REGNER, ANDRÉ SCHWEIZER & NILS URBACH, FORTIETH INT'L CONF. ON INFO. SYS., NFTS IN PRACTICE—NON-FUNGIBLE TOKENS AS CORE COMPONENT OF A BLOCKCHAIN-BASED EVENT TICKETING APPLICATION 2 (2019) (describing the ERC-20 standard as a "standard, which specifies a common interface for fungible tokens that are divisible and not distinguishable").

97. *See* Rohr & Wright, *supra* note 96, at 474.

98. *See* DIEDRICH, *supra* note 86, at 167 ("Smart contracts are decentralized code that [executes] *after a condition* is fulfilled."); *see also* WILLIAM MOUGAYAR, THE BUSINESS

for code that runs on a blockchain, and interacts with that block-chain's state."[99] Indeed, every single bitcoin transaction is a simple smart contract—computer code (a locking script) that interacts with the state of the Bitcoin blockchain.[100]

When a developer creates an ERC-20 token, the developer essentially creates a smart contract that contains a map of account addresses and their balances.[101] The balance represents a value that is defined by the contract creator.[102] The balance might represent physical objects,[103] or the balances might be pegged to the U.S. dollar,[104] or perhaps the balance may reflect the reputation of the holder.[105] The unit of the "balance" is popularly referred to as a "token."[106] When a holder transfers a token to the holder of another account, the token contract updates the balance of the two ac-counts.[107] Note then, that while native cryptocurrency depends upon the developers of the blockchain protocol to maintain the code that makes the cryptocurrency function, nonintrinsic tokens like ERC-20 tokens that sit at a higher level in the technology stack rely on other developers to maintain the token contract code.[108] Further

BLOCKCHAIN: PROMISE, PRACTICE, AND APPLICATION OF THE NEXT INTERNET TECHNOLOGY 46 (2016) (ebook) ("Smart contracts are software code representing business logic that runs a blockchain, and they are triggered by some external data that lets them modify some other data."); Gideon Greenspan, Opinion, *Why Many Smart Contract Use Cases Are Simply Impossible*, COINDESK (Sept. 11, 2021, 8:13 AM), http://www.coindesk.com/markets/2016/04/17/why-many-smart-contract-use-cases-are-simply-impossible/ [https://perma.cc/QPT7-PK4D] ("A smart contract is a piece of code that is stored on an [sic] blockchain, triggered by block-chain transactions and which reads and writes data in that blockchain's database.").

99. Greenspan, *supra* note 98.

100. *See, e.g.*, NARAYANAN ET AL., *supra* note 85, at 63-64.

101. *See* ANTONOPOULOS & WOOD, *supra* note 81, at 227-30.

102. *See id.* at 227.

103. *See* Kara Bruce, Christopher K. Odinet & Andrea Tosato, *The Private Law of Stablecoins*, ARIZ. ST. L.J. (forthcoming 2023) (manuscript at 58-59), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4191646 [https://perma.cc/TN5N-DAKM] (describing placing re-serve assets in stablecoin and creating balances based off of quantities of gold).

104. *See id.* at 15.

105. *See What Are ERC-20 Tokens?*, BITCOIN.COM, https://www.bitcoin.com/get-started/what-are-erc-20-tokens/ [https://perma.cc/5PMJ-E6LK].

106. *See* ANTONOPOULOS & WOOD, *supra* note 81, at 227.

107. *See id.*

108. *See* Raina S. Haque, Rodrigo Seira Silva-Herzog, Brent A. Plummer & Nelson M. Rosario, *Blockchain Development and Fiduciary Duty*, 2 STAN. J. BLOCKCHAIN L. & POL'Y 139, 152 (2019) (naming the type of developers that manage ERC-20 tokens "smart contract developers" and distinguishing them from developers who contribute code to managing the layer one protocol ("protocol developers")).

ERC-20 tokens do not serve any necessary function required to make the underlying blockchain protocol work.[109] The underlying blockchain and its related native cryptocurrency will continue to operate whether ERC-20 tokens run on top of the protocol or not.

In 2018 and 2019, Commissioners of the U.S. Securities & Exchange Commission (SEC) publicly tied the test for whether a cryptocurrency constitutes a security to the level of decentralization enjoyed by that cryptocurrency.[110] According to Professor Yuliya Guseva, decentralization matters to the analysis of whether an asset is a security because "the more decentralized a system is, the less 'control' a developer has over the assets or the platform, and the fewer expectations investors in the project have about the efforts of the promoter generating their profit from the investment."[111] And while Professor Guseva's rationale backfills the test nicely for the SEC, bringing a concern about decentralization into the analysis as a semiformal element of the legal test confused many industry participants and drew criticism from others.[112] Indeed, the SEC's concern with the level of decentralization of a cryptocurrency, and the ensuing confusion in industry, provides anecdotal evidence of an agency using words generally associated with the industry without truly understanding the technical import of those words. The differences between ether and bitcoin and other cryptocurrencies have more to do with the fact that ether and bitcoin are protocol tokens and not nonintrinsic tokens. Any differences in decentralization stem from the core technical and functional difference between native cryptocurrency and nonintrinsic tokens. What would the

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109. *Ethereum Token*, PCMAG, https://www.pcmag.com/encyclopedia/term/ethereum-token [https://perma.cc/7Z63-JU6N] (listing the various functions that ERC-20 tokens may be programmed to perform, none of which are required for the Ethereum protocol to continue operating).

110. SEC STRATEGIC HUB FOR INNOVATION & FIN. TECH., FRAMEWORK FOR "INVESTMENT CONTRACT" ANALYSIS OF DIGITAL ASSETS 1-5 (2019), https://www.sec.gov/files/dlt-framework.pdf [https://perma.cc/WW8J-6Y87] (noting the connection between the "efforts of others" prong of the *Howey* test and decentralization).

111. Yuliya Guseva, *The SEC, Digital Assets, and Game Theory*, 46 J. CORP. L. 629, 677 n.311 (2021).

112. *See generally, e.g.*, Angela Walch, *Deconstructing "Decentralization": Exploring the Core Claim of Crypto Systems*, *in* CRYPTOASSETS: LEGAL, REGULATORY, AND MONETARY PERSPECTIVES 39 (Chris Brummer ed., 2019).

market look like if securities regulation focused on technical and functional aspects beyond the flashy issue of "decentralization"?

B. *Nonnative Protocol Tokens, Governance Tokens, and Stablecoins*

Nonnative protocol tokens function like native cryptocurrency, except nonnative protocol tokens exist as part of a protocol that runs on top of a blockchain protocol.[113] In other words, imagine that developers build and launch a blockchain-like protocol on top of Ethereum. Such a protocol would be nonnative or nonintrinsic, because it sits on top of Ethereum, a base layer, or native, block-chain protocol.[114] However, this new nonnative protocol relies upon protocol tokens for certain functionality, just as Ethereum relies on ether for certain functionality.[115] Thus, the non-native protocol can be said to have protocol tokens. To be more precise, consider a real-world example: Metronome and its token "MET 1.0."[116] Metronome was a cryptocurrency protocol that was built to run on top of any blockchain protocol.[117] Once launched, the Metronome protocol automatically produced, stored, and sold its intrinsic token, MET 1.0, via smart contracts.[118] The Metronome protocol set the price of MET 1.0 via a descending price algorithm.[119] Metronome held any proceeds from the sale of MET 1.0 in a smart contract to be used by Metronome according to the requirements of the protocol.[120] Meanwhile, MET 1.0 itself acted as a cross-chain portability tool.[121] One version of the Metronome protocol ran on top of the Ethereum protocol.[122] If other versions of the Metronome protocol launched on other native protocols, like the Bitcoin blockchain, the Dash

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113. *See* Warren, *supra* note 88 (explaining nonnative protocols).

114. *See id.*

115. *See id.* (noting functions of protocol tokens in nonnative protocol).

116. Metronome, *Owner's Manual*, https://github.com/autonomoussoftware/documentation/blob/master/owners_manual/owners_manual.md [https://perma.cc/C2F5-9JW4] (last updated Aug. 15, 2019).

117. *See id.*

118. *See id.*

119. *See id.*

120. *See id.*

121. *Id.*

122. *See id.*

protocol, or others, MET 1.0 could have transacted across protocols that were previously not interoperable.[123] Metronome, then, was designed as interoperability rails for native cryptocurrencies.[124] Meanwhile, MET 1.0 itself represented a nonnative protocol token: MET 1.0 was not native to Ethereum or essential to its functioning—ether is; MET 1.0 was, however, produced according to the cryptoeconomic logic programmed into a protocol—the Metronome protocol; and MET 1.0 served a functional role in Metronome—to enable self-governance and interoperability.[125] Thus, MET 1.0 remained intrinsic to Metronome, while simultaneously remaining nonnative to Ethereum, leading to the label nonnative protocol token. MET 1.0 is currently undergoing a system overhaul that will enable a software upgrade.[126]

A governance token is a nonintrinsic token that gives its holder some type of governance rights.[127] Indeed, some schools of thought attribute part of a governance token's value to the governance rights associated with the tokens.[128] The 0x protocol, for example, operates through a system of smart contracts on top of the Ethereum protocol.[129] The 0x protocol itself aims to enable the decentralized exchange of tokens using open sourced and fully public smart contracts.[130] The 0x protocol token (a nonnative protocol token), ZRX, grants holders governance rights concerning ongoing maintenance and updates to the 0x protocol (called ZEIPs).[131] Participants in the 0x protocol may also use ZRX for payment of transaction fees

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123. *See id.*

124. *See id.*

125. *See id.*

126. *Owner's Manual*, METRONOME, https://docs.metronome.io/metronome-1.0/owners-manual [https://perma.cc/588J-2GXH]. MET 2.0 will be managed by a DAO. *Id.* The funds previously held in the Metronome 1.0 will now form part of the DAO Treasury. *Id.*

127. *See* Benedict George, *What Is a Governance Token?*, COINDESK (Jan. 12, 2022, 11:23 AM), https://www.coindesk.com/learn/what-is-a-governance-token/ [https://perma.cc/5TCA-UGND].

128. *See id.*

129. *See* WILL WARREN & AMIR BANDEALI, 0X: AN OPEN PROTOCOL FOR DECENTRALIZED EXCHANGE ON THE ETHEREUM BLOCKCHAIN 11 (2017), https://0x.org/pdfs/0x_white_ paper.pdf [https://perma.cc/A3LD-Q7K3] ("While 0x is fundamentally a network protocol used to facilitate signalling between buyers and sellers (rather than a cryptoeconomic protocol), it is intended to serve as an open standard for dApps that incorporate exchange functionality.").

130. *Id.* at 3.

131. *See What is 0x? (ZRX)*, KRAKEN, https://www.kraken.com/en-us/learn/what-is-0x-zrx [https://perma.cc/2L6A-HD8L].

and other services offered within a separate proprietary platform.[132] Other experiments with nonintrinsic protocols that incorporate governance tokens include Aragon's ANT[133] and Gnosis's OWL.[134] One governance token recently became famous when its cryptocurrency flamed out overnight.[135] Users managed the Terra network via a governance token called Luna, which gave its holders the right to vote on Terra protocol policy changes.[136] The main asset trading on the Terra protocol was TerraUSD (UST), a stablecoin that went from a $60 billion ecosystem to almost nothing in less than a twenty-four-hour timespan.[137]

Stablecoins, for their part, are a cryptocurrency that maintains a stable price by design. Like all of the cryptocurrency discussed here, different stablecoins feature different technical design elements. Some stablecoins represent a centralized cryptocurrency complete with an issuer and a permissioned blockchain protocol.[138] In other cases, a complicated web of smart contracts issues a stablecoin backed by an algorithmically monitored basket of other cryptocurrencies.[139] In the wake of the Terra-Luna collapse, and subsequent collapses of centralized cryptocurrency intermediaries,[140] calls for

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132. *See* WARREN & BANDEALI, *supra* note 129, at 11.

133. *See* ARAGON NETWORK, ARAGON WHITEPAPER, https://github.com/aragon/whitepaper [https://perma.cc/3AN3-SEKB].

134. *See Build on Gnosis*, GNOSIS, https://gnosis.io/tokens [https://perma.cc/UT7B-DLFE].

135. *See* Prateek Arora, *What Is Terra LUNA—Explaining the LUNA Crash*, INSIDE BITCOINS (May 22, 2022), https://insidebitcoins.com/news/explaining-the-luna-crash [https://perma.cc/D5CZ-FFZA].

136. *See* George, *supra* note 127.

137. *See* Krisztian Sandor & Ekin Gens, *The Fall of Terra: A Timeline of the Meteoric Rise and Crash of UST and LUNA*, COINDESK (Aug. 19, 2022, 1:20 PM), https://www.coindesk.com/learn/the-fall-of-terra-a-timeline-of-the-meteoric-rise-and-crash-of-ust-and-luna/ [https://perma.cc/85F3-2W29].

138. See, for example, USDC, issued by Circle with a permissioned protocol operated by Centre Consortium. USDC CIRCLE, https://www.circle.com/en/usdc [https://perma.cc/9EH8-7Y7T].

139. See, for example, DAI, minted by individual users of services provided by MAKERDAO, https://makerdao.com/en/ [https://perma.cc/U8KZ-3DHQ].

140. *See, e.g.*, Nikhilesh De, *Crypto Lender Celsius' Collapse Into Bankruptcy Should Be Probed, US Says*, COINDESK (Aug. 19, 2022, 11:27 AM), https://www.coindesk.com/policy/2022/08/18/crypto-lender-celsius-needs-independent-examiner-us-government-entity-says/ [https://perma.cc/R5KH-VZ64]; Emma Roth, *$150 Million 'Much Wow' Yacht Left Behind by Crypto Hedge Fund's Collapse*, THE VERGE (Aug. 15, 2022, 1:38 PM), https://www.theverge.com/2022/8/15/23306349/three-arrows-capital-3ac-collapse-kyle-davies-su-zhu-cryptocurrency [https://perma.cc/M7MB-R5SK].

greater stablecoin regulation reverberated through the policy spheres.[141] In particular, calls to prevent systemic risk pointed to the Terra-Luna crash as evidence that cryptocurrencies are a sham and should be met with heavy regulation.[142] Such opportunistic calls for regulation typically ignore important technical and economic differences between stablecoins, threatening overbroad regulation to deal with specific behaviors only exhibited by certain stablecoin implementations. To be effective, regulatory policy for governance tokens, stablecoins, and other nonnative protocol tokens needs to arrive at a place where comparisons can be made between the goal of the proposed regulation and the function of each cryptocurrency on its own technical merits.

Securities regulation and stablecoin regulation represent just two of many anecdotal stories of law sowing confusion for industry by co-opting terms and giving them new legal meanings. While these examples point to confusion around the meanings, uses, and nature of the myriad assets included in the "cryptocurrency" ecosystem, anecdotal evidence only advances the discussion so far. Determining the extent to which technical misunderstandings impact policy and lawmaking requires a larger set of data. That need for a deeper understanding of the miscommunications hinted at by current anecdotal evidence suggests the potential usefulness of corpus linguistics.

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141. *See generally, e.g.*, Gary B. Gorton & Jeffery Y. Zhang, *Taming Wildcat Stablecoins*, 90 U. CHI. L. REV. (forthcoming 2023); Ryan Clements, *Built to Fail: The Inherent Fragility of Algorithmic Stablecoins*, 11 WAKE FOREST L. REV. 131 (2021); Hilary J. Allen, *DeFi: Shadow Banking 2.0?*, 64 WM. & MARY L. REV. 919 (2023).

142. *See* Dan Runkevicius, *'More Systemic Risk'—The Stablecoin Fallout Could Be Just Starting as the Price of Bitcoin, Ethereum, Terra's Luna, Solana, Cardano, XRP Sink*, FORBES (May 26, 2022, 8:19 AM), https://www.forbes.com/sites/danrunkevicius/2022/05/26/more-sys temic-risk-the-stablecoin-fallout-could-be-just-starting-as-the-price-of-bitcoin-ethereum-terras-luna-solana-cardano-xrp-sink/?sh=1af2756313e4 [https://perma.cc/5MTJ-6JDT].

III. Regulation of Cryptocurrency Suffers from Failures to Establish Shared Linguistic Meaning and Value Misalignment

Using a common method of corpus linguistics, genre variation, this Part starts to uncover the deep disconnect between stakeholders in the regulatory and policy spheres with regard to the actual words used in making law related to cryptocurrency. Specifically, the discussion that follows presents the results of a genre variation study of cryptocurrency and a group of words often used interchangeably with cryptocurrency: virtual currency, cryptoassets, tokens, digital assets, NFTs, and stablecoins. Every corpus linguistic research investigation evolves out of a core research goal and linguistic hypothesis.[143] The analysis presented here is a product of efforts to test the linguistic hypothesis that each of these terms is not interchangeable, but rather represents a distinct technical artifact, and to show that failure to appreciate the technical differences leads to clashes of meaning, value conflicts, and ultimately deficiencies in the lawmaking process related to cryptocurrencies.

To test my hypothesis, I conducted a collocation analysis[144] and concordance line analysis[145] of each of the terms "cryptocurrency," "virtual currency," "cryptoassets," "digital assets," "tokens," "NFTs," and "stablecoins" using corpora representing each of five different stakeholder groups involved in the development of law and cryptocurrency: legal academia, computer science and engineering

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143. *See* Meyer, *supra* note 62, at 102. Corpus linguistics is often criticized for simply counting how frequently a given linguistic construction occurs in any corpus. *See id.*

> To move beyond simply counting features in a corpus, it is imperative before undertaking a corpus analysis to have a particular research question in mind, and to regard the analysis of a corpus as both "qualitative" and "quantitative" research—research that uses statistical counts or linguistic examples to test a clearly defined linguistic hypothesis.

Id.

144. Collocation analysis gives the linguist "a sense for which words tend to occur next to or close to your search term and sort those results by frequency." McGraw Ctr. for Teaching and Learning, Quickstart Guide to AntConc 3, https://mcgrawect.princeton.edu/guides/Quickstart-Guide-AntConc.pdf [https://perma.cc/89HJ-XRNQ].

145. "A concordance lists the occurrences of certain words in the corpus ordered by how frequently those words are used as well as the context in which those terms appear." *Id.*

academia, lawmakers, judges, and the general public.[146] The collocation analysis offers insight into "which words tend to occur next to or close to [the] search term and sort[s] those results by frequency."[147] The concordance line analysis, for its part, provides further insight into the collocation results by providing evidence of the context in which the words appear.[148]

In terms of the data studied, considering the approaches of various stakeholders requires the study of various corpora.[149] To uncover how legal academics use these terms, I sourced and created my own corpus. The legal academic corpus contains the text of every law review article using one or more of the terms "cryptocurrency," "digital assets," "tokens," and "NFTs" since 2008.[150] To consider the use of these terms by researchers in the field that build blockchain protocols, cryptocurrencies, tokens, and the systems that interact with them, I created a separate corpus of academic papers and white-papers from computer science and engineering researchers.[151]

146. Every corpus linguistics investigation must begin by answering certain threshold questions: "(1) What is the relevant speech community I want to investigate?" and "(2) What is the relevant time period I want to investigate?" Lee & Mouritsen, *supra* note 68, at 293-94 (emphasis omitted).

147. MCGRAW CTR. FOR TEACHING & LEARNING, *supra* note 144.

148. *See id.*

149. *See* MEYER, *supra* note 62, at 18 (explaining that genre variation compares how language is used in different contexts by creating corpora of material representing different contexts (for example, "speech vs. writing, scientific writing vs. broadcast journalism")).

150. The year 2008 was chosen as the cut off because that was the year that the Bitcoin white-paper was released by Satoshi Nakamoto (on October 31, 2008, to be precise). *See generally* SATOSHI NAKAMOTO, BITCOIN: A PEER-TO-PEER ELECTRONIC CASH SYSTEM (2008), http://satoshinakamoto.me/bitcoin.pdf [https://perma.cc/2PEL-ZJYH]. As to the mechanics of sourcing the corpus, I searched Westlaw for law review articles using the terms "cryptocur-rency," "virtual currency," "cryptoassets," "digital assets," "tokens," "NFTs," and "stablecoins." The end date of the Westlaw search was July 2022. I downloaded all the articles that hit on those terms, all 2,391 of them, as pdfs, and then uploaded them to *AntFile Converter*. Laurence Anthony, *AntFile Converter Homepage*, https://www.laurenceanthony.net/software/antfilecon verter [https://perma.cc/87ED-MWD7]. I then used the *AntFile Converter* software to convert each document into a plain text format compatible with the *AntConc* corpus linguistics software. Laurence Anthony, *AntFile Converter (Windows)* (June 4, 2022), https://www.laurenceanthony.net/software/antfileconverter/releases/AntFileConverter202/help.pdf [https://perma.cc/PEJ5-8SRG].

151. To create this corpus, I used *AntCorGen* to collect computer science and computer engineering research from the PLOS ONE research database.

    AntCorGen is a freeware corpus generation tool. *AntCorGen* lets you search for documents in the PLOS ONE research database via search queries and/or subject category browsing and decide which sections (e.g. title, abstract,

To consider how lawmakers use the same seven cryptocurrency-related terms, I separated the inquiry between two levels: state and federal. For state-level legislative discussions, I created a corpus consisting of all proposed or adopted legislation relating to the seven cryptocurrency terms at the state level since 2009.[152] For federal-level legislative discussions, I performed the analysis using the Corpus of the Current U.S. Code (COCUSC).[153] In the wake of high-profile bankruptcies in the cryptocurrency ecosystem in 2022,[154] a noticeable uptick in proposed federal cryptocurrency investigation and debate occurred at the federal level.[155] As a result, I also created a corpus of federal legislation enacted in August 2019 or later, and federal legislation proposed in August 2019 or later, but not adopted, that used one of the seven cryptocurrency-related terms.[156]

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introduction) of these documents should be stored. *AntCorGen* then accesses the database, downloads the sections, and saves each one as a text file in an appropriate folder.

LAURENCE ANTHONY, ANTCORGEN HELP FILE VERSION: 001, at 2 (2021), http://www.laurence anthony.net/software/antcorgen/releases/AntCorGen120/help.pdf [https://perma.cc/L73P-GY QR].

152. As to the mechanics of this, I pulled every adopted or proposed bill from Westlaw and Legiscan that hit on cryptocurrency, cryptoassets, digital assets, tokens, NFTs, and stablecoins since 2009, through July 2022, at the state level, including both enacted and con-templated-but-not-enacted legislation. The year 2009 was determined as the date cutoff because the Bitcoin Network did not launch until 2009, making it the first year crypto-currency-specific legislation would have been possible. I used *AntFile Converter* in the same manner as described *supra* note 150 to convert the files from pdfs to plain text that *AntConc* could use.

153. For current federal law, I used the Corpus of Current U.S. Code (COCUSC), https://lawcorpus.byu.edu/cocusc/concordances/ [https://perma.cc/5LZT-2QCN]. Recognizing the de-bate about the extent to which the metric is useful at all, I note here that the terms in the study are used with the following frequency in the COCUSC in order to offer a sense of the sample size: cryptocurrency—0; virtual currency—0; cryptoassets—0; digital assets—0; tokens—33; NFTs—0; stablecoins—0.

154. Andrew Goudsward, *Crypto Meltdown a Boon for Bankruptcy Lawyers*, REUTERS, Dec. 2, 2022, 6:51 AM, https://www.reuters.com/technology/crypto-meltdown-boon-bankruptcy-lawyers-2022-12-02/ [https://perma.cc/U7DL-3M5F] (discussing "[h]igh-profile bankruptcies involving crypto exchange FTX, hedge fund Three Arrows Capital and crypto lenders BlockFi, Celsius Network and Voyager Digital Ltd").

155. Tony Romm, *Congress Took Millions from FTX. Now Lawmakers Face a Crypto Reckoning.*, WASH. POST (Nov. 17, 2022, 5:00 PM), https://www.washingtonpost.com/us-policy/ 2022/11/17/congress-crypto-ftx-regulations-law/ [https://perma.cc/8JW4-RBSC].

156. Rather than only pull the legislation proposed after the high-profile cryptocurrency bankruptcy actions were filed, I included everything enacted and proposed, but not adopted, starting in August 2019, which is when the COCUSC corpora ends. As of December 2022, the seven cryptocurrency-related terms appeared with the following frequency in this second

To look at the way judges use these terms when deciding cases involving cryptocurrency, I sourced and created a corpus containing every judicial decision, reported or unreported, that hit on any of the cryptocurrency-related terms since 2009.[157] To uncover whether the general public's understanding of cryptocurrency and related terms resemble that of the other language communities, I turned to an analysis of the News on the Web (NOW) Corpus[158] and the Corpus of Contemporary American English (COCA).[159] Lastly, to investigate the way practicing lawyers use the seven cryptocurrency terms, I sourced and created a corpus of announcements, alerts, and lawyer and industry newspapers that hit on the terms since 2009.[160] The below discussion presents the results of the analysis of each stakeholder group and its related corpus, demonstrating the breadth of the linguistic misunderstandings and the value clashes embedded in cryptocurrency's ongoing language wars.

A. Legal Academics

Since 2008, the legal issues presented by blockchain technology and cryptocurrency evolved into a topic heavily explored in the legal

corpora of federal legislation: cryptocurrency—28; virtual currency—114; cryptoassets—0; digital assets—874; tokens—87; NFTs—0; and stablecoin—77. When I conducted these queries using the materials available for the corpus in July 2022, the frequency of the terms appearing in the corpus differed substantially: cryptocurrency—0; virtual currency—28; cryptoasset—0; digital asset—261; token—55; NFT—0; and stablecoin—9. The increase in the use of nearly all the terms in the wake of several large crypto-collapses indicates both heightened interest and some discernment—the two that did not change are cryptoasset and NFTs—the nonsense catchall term and a type of token that had no direct relationship to the looming crypto-bankruptcies initiated in the summer and fall of 2022.

157. As to the mechanics of this, I pulled every judicial decision since 2009 at both the federal and state level that hit on a search of each of the seven terms on Westlaw, with the end date of the search as July 2022. I downloaded the decisions as pdf files, and then used *AntFile Converter* in the same manner as described *supra* note 150 to convert the files to plain text that *AntConc* could use.

158. NOW CORPUS (NEWS ON THE WEB), https://www.english-corpora.org/now/ [https://perma.cc/MDD8-67CQ].

159. CORPUS OF CONTEMPORARY AMERICAN ENGLISH, https://www.english-corpora.org/coca/ [https://perma.cc/Q5KP-GUD4].

160. As to the mechanics of this, I pulled every practice commentary and legal newspaper article since 2009 that hit on a search of each of the seven terms on Westlaw, with the end date of the search set as July 2022. I downloaded the results as pdf files, and then used *AntFile Converter* in the same manner as described *supra* note 150 to convert the files to plain text that *AntConc* could use.

academic literature.[161] The literature varies significantly in its use of the terms "cryptocurrency," "virtual currency," "cryptoasset," "digital asset," "token," "NFT," and "stablecoin," even as some measure of consensus seems to coalesce around some of the terms. In order to obtain a more complete sense of how legal academics use these terms, I performed a collocation analysis of these terms across any law review article in which they appeared beginning in 2008: all 2,391 law review articles.[162] The results of the analysis, presented in Table 1 below, reveal, with one exception, that those in the legal field often associate a specific archetypal technical artifact in the cryptocurrency space with a specific term, ignoring the multiplicity of implementations those terms actually represent.

For legal academics, the broadest of the seven terms appears to be "digital assets." The term "digital assets" appears most frequently in association with the Uniform Fiduciary Access to Digital Assets Act, a model law that seeks to help those charged as fiduciaries in the execution of an estate obtain access to the deceased's digital assets in order to properly wind down the deceased's affairs.[163] In the context of estate planning, the term "digital asset" is used broadly to refer to information held in a password-protected online account, such as Facebook and mobile banking applications.[164] From there, the terms "cryptocurrency" and "virtual currency" appear interchangeable to legal academics, who associate those terms with currency, exchanges, transactions, and tax, and worry about applicable regulation. Quite interestingly, legal academics associate bitcoin with both cryptocurrency and virtual currency. This makes clear that the archetypal technical artifact for both terms is a

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161. I note that much of the explosion of interest in this topic in legal academia began around 2016 and later. As an entrant to the legal academy around that time, I was among the first to present papers on crypto-related topics, at a time when skepticism of the cryptocurrency ecosystem in legal academy was even higher than at present.

162. The corpus that resulted from the procedure explained *supra* note 150 remains on file with the author. Note that within this corpus, the term "cryptocurrency" appeared 34,400 times, the term "cryptoassets" appeared 678 times, the term "digital asset" appeared 10,103 times, the term "virtual currency" appeared 16,683 times, the term "token" appeared 11,316 times, the term "NFT" appeared 1,644 times, and the term "stablecoin" appeared 1,331 times.

163. Suzanne Brown Walsh, Naomi Cahn & Christina L. Kunz, *Digital Assets and Fiduciaries*, *in* RESEARCH HANDBOOK ON ELECTRONIC COMMERCE LAW 91, 107 (John A. Rothchild ed., 2016).

164. *See id.* at 92-93.

decentralized payment mechanism.[165] As discussed below in Part III.B, those developing these technical artifacts maintain widely different views about what fits within the category of cryptocurrency as opposed to the category of virtual currency. Perhaps tellingly, for legal academics, the definition of virtual currency is associated with the term "convertible." In other words, FinCEN's treatment of cryptocurrency as "'convertible' virtual currency"[166] heavily influences the way those in legal academia use the term.

Legal academics associate the term "token" with initial coin offerings and considerations of whether securities laws apply to the sale of tokens and token offerings, holding onto the DAO token as the archetypal technical artifact for this category.[167] Meanwhile, legal academics tend to associate NFTs with the Ethereum protocol and markets for, ownership of, and sales of art and digital art.[168] NFTs, can, however, represent any number of intangible or tangible items, and focusing solely on one implementation may cause the law to develop suboptimally.[169] Lastly, although legal academics associate the term "stablecoin" with the term "cryptocurrency,"[170] the archetypal technical artifact for stablecoins is centralized and provided through an issuer, like Facebook's Libra, or Tether's USDT.[171] This focus on stablecoins issued by a centralized entity and pegged to the value of a commodity the issuer holds in reserves confirms that the anecdotal focus is on one model of stablecoins without considering the variety in their technical implementations. It also signals the likelihood that regulation created based on this archetypal model of stablecoins is unlikely to translate well to other types of stablecoins.

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165. Bitcoin is the second-highest ranked collocate for cryptocurrency and the third-highest collocate for virtual currency in Table 1. For an example of literature examining whether bitcoin is, in fact, a decentralized payment mechanism, see William J. Luther & Sean Stein Smith, *Is Bitcoin a Decentralized Payment Mechanism?*, 16 J. INSTITUTIONAL ECON. 433, 433 (2020).

166. *See* FIN. CRIMES ENF'T NETWORK, *supra* note 8, at 1.

167. *See infra* Table 1.

168. *See infra* Table 1.

169. *See* REGNER ET AL., *supra* note 96, at 3-4 (noting that NFTs may represent digital assets such as virtual card games and real-world assets such as luxury goods).

170. *See infra* Table 1.

171. *See infra* Table 1 (in which Libra, Tether, and Facebook are all specifically among the most frequent collocates for the term "stablecoin").

The term used that appears the least frequently in the corpus of the seven cryptocurrency-related terms also exhibits the least clarity of use: cryptoassets. In some instances, legal academics connect the term "cryptoassets" to tokens, and in others, simply to the term "asset."[172] This suggests that the term is intended to have a broad meaning. Other associations such as global, study, new, and landscape, however, also suggest some confusion, as though perhaps authors use the term "cryptoassets" when unsure of which technical artifact should actually be the object of discussion.[173]

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172. *See infra* Table 1.
173. *See infra* Table 1.

Table 1. Collocates of Cryptocurrency Terms Used by Legal
   Academics

Cryptocurrency					
2507	exchange(s)	1299	tax	1095	educational
2207	bitcoin	1286	transactions	1001	how
1687	regulation(s)	1133	currency	797	law
1461	blockchain	1113	market	733	what
Virtual Currency					
1637	currency	1014	regulation	660	IRS
1360	business(es)	833	use	607	money
1076	bitcoin	797	exchange	572	guidance
1032	transactions	688	convertible	537	tax
Digital Assets					
1856	access	492	estate	355	accounts
1199	fiduciary	480	planning	308	revised
582	uniform	376	death	272	electronic
537	use	372	property	237	decedent
Cryptoasset					
72	market(s)	29	regulatory	17	landscape
37	global	24	study	16	tokens
35	transactions	18	network	15	asset
33	new	18	exchanges	15	management
Token					
1166	holders	593	digital	493	blockchain
1179	sale(s)	588	dao	455	offerings
835	security	507	based	392	value
808	utility	504	coin	365	ICO
NFT					
94	art	67	ownership	47	first
91	market	50	fungible	39	value
85	digital	50	sale	37	sold
67	work	49	token	33	ethereum
Stablecoin					
87	global	59	libra	51	issuers
69	value	58	cryptocurrency	46	digital
68	currency	58	backed	45	tether
62	market	52	report	44	facebook

Taken together, the collocation analysis of legal academic use of the seven cryptocurrency-related terms reveals the interchangeable use of cryptocurrency and virtual currency to both reference technical artifacts like bitcoin, focusing stablecoins on a centralized, commodity-reserve implementation, centering NFT discussions on their use in art, and using a vague catch-all phrase like cryptoassets as a placeholder when unsure which technical artifact should be the object of law. Each of these observations confirm the anecdotal concern that law and regulation treats all cryptocurrency-related technical artifacts the same, causing confusion for those developing cryptoeconomic systems. To further confirm this interpretation requires considering the way nonlegal researchers—those from the fields of computer science and computer engineering—use the seven cryptocurrency-related terms.

B. Nonlegal Researchers

To investigate the context in which researchers in the technical sciences use the terms "cryptocurrency," "cryptoassets," "digital assets," "virtual currency," "token," "NFT," and "stablecoin," I conducted collocation queries against a corpus of materials written by computer science and computer engineer researchers.[174] As presented in Table 2 below, the collocation queries generated some interesting results. It is worth noting that for two of the terms—token and NFT—the collocation analysis did not reveal anything related to cryptocurrency. Rather, the terms "token" and "NFT" are used widely and in a variety of technical contexts completely unrelated to cryptocurrency and blockchain technology,[175] such as geo-tokens or neurofibrillary tangle.[176] However, results for "cryptocurrency," "virtual currency," "digital assets," and "stable-coins" helped to confirm the earlier interpretation of the legal academic corpus. The term "digital assets," for its part, referred as

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174. The corpus that resulted from the procedure explained *supra* note 151 remains on file with the author. Note that within this corpus, the term "cryptocurrency" appeared 388 times, the term "cryptoassets" appeared 0 times, the term "digital asset" appeared 10 times, the term "virtual currency" appeared 57 times, the term "token" appeared 2,874 times, the term "NFT" appeared 1,282 times, and the term "stablecoin" appeared 3 times.

175. *See infra* Table 2.

176. *See infra* Table 2.

much to books and other digitally available research materials as to anything else, confirming the legal use of the term "digital asset" as the broadest term referring to intangible, digital items that are valuable in some way.[177]

When technical researchers in this corpus used the term "cryptocurrency," the focus centered as much on the network and blockchain technology as it did on the market and price of the asset.[178] Further, technical researchers did not limit their attention only to bitcoin, but also included Ethereum—another native, or layer one, protocol—in the discussion.[179] Meanwhile, when technical researchers invoke the term "virtual currency," they refer to in-game virtual currency that can be used within the game environment as money to make purchases.[180] In other words, the correlation between the term "virtual currency" and cryptocurrency imposed on the legal field by FinCEN's creation of the concept of "convertible virtual currency" does not map to the actual development of the technical artifacts.[181] The term "cryptoassets," for its part, is not used at all in the writings by technical researchers that form the corpus, suggesting that the legal field created the term as a catchall for use in the face of uncertainty regarding the specific technical implementation of cryptocurrency that law needs to address.[182] Lastly, the only mention of stablecoins in the corpora came from testimony provided by computer science researchers to Congress, which focused on a call for regulatory clarity.[183] To investigate the current likelihood of legal and regulatory clarity, the study next turned to an investigation of whether and how lawmakers use the seven cryptocurrency-related words.

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177. *See infra* Table 2.

178. *See infra* Table 2.

179. *See infra* Table 2; *see also supra* note 93 and accompanying text.

180. *See infra* Table 2 (showing that science researchers use words such as "game" and "player" in reference to "virtual currency").

181. *See supra* note 11 (explaining that the Keep Your Coins Act contains language from FinCen's 2013 guidance which used the phrase "convertible virtual currency").

182. *See infra* Table 2.

183. *See infra* Table 2.

Table 2. Collocates of Cryptocurrency Terms Used by Technical Science Researchers

Cryptocurrency					
56	market	26	price(s)	17	use
43	network(s)	19	adoption	17	blockchain
34	bitcoin	18	intention	15	technology
29	users	18	adopt	13	ethereum
Virtual Currency					
10	fluctuations	6	player	5	demand
10	game(s)	5	money	4	experiment
9	endowments	5	user	4	retention
7	real	5	exchange	4	increase
Digital Assets					
2	enterprise	2	added		
2	form	1	reuse		
2	finally				
2	traffic				
Cryptoassets					
No Results					
Token					
160	geo	147	test	79	level
157	query	145	type	74	appreciation
157	CGI	82	exchange	70	ratio
156	gov	81	word	67	task
NFT					
128	neurofibrillary	96	TAU	69	score
128	tangle(s)	74	alpha	39	stage
119	effect(s)	74	group	35	plaques
107	formation	71	pathology	31	training
Stablecoins					
1	markets	1	providers		
1	clarity	1	issue		
1	interoperate	1	dollar		
1	prone	1	pegged		

C. Lawmakers

To consider the context in which federal lawmakers use the terms "cryptocurrency," "cryptoassets," "digital assets," "virtual currency," "token," "NFT," and "stablecoin," I used the collocation function of the Corpus of Current US Code (COCUSC).[184] Doing so provides a snapshot of the words that are statistically most likely to appear in the same context as cryptocurrency and its supposed synonyms in the entirety of the U.S. Code as it existed as of July 2019.[185] As presented in Table 3 below, only one of the cryptocurrency terms appeared in the U.S. Code as of July 2019: token.[186] A concordance line analysis of the collocates for the term "token" in the COCUSC reveals that the term appears in the context of laws related to the creation, payment, and counterfeit of money, the maintenance of privacy for children, and employee benefits.[187] No use of the term "token" appears in connection with cryptocurrency or blockchain technology.[188] As with the analysis of the technical researcher corpus, these results confirm the many uses of the concept of a token.[189]

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184. The COCUSC is available for anyone to use. To replicate the results presented here, navigate to COCUSC and take the following steps: (1) select "Collocates"; (2) enter "CRYPTOCURRENCY_n" (or whichever word you want to replicate results for) in the field for a word or phrase; (3) enter * in the collocates section, and (4) initiate the search. *See* Corpus of the Current US Code, *supra* note 153.

185. BYU L., Law & Corpus Linguistics, https://lawcorpus.byu.edu/ [https://perma.cc/ WMV2-5P8N].

186. It is worth noting that the term "token" appears 33 total times in the COCUSC.

187. *See infra* Table 3 showing that "paper," "other," "similar," "card," and "child" appeared among the collocates for the term "token" in the COCUSC.

188. *See infra* Table 3.

189. For a discussion of the way private law uses the concept of tokens and tokenization, see Moringiello & Odinet, *supra* note 15, at 3, 53-54.

Table 3. Collocates of Cryptocurrency Terms in the U.S. Code

Cryptocurrency					
No Results					
Cryptoasset					
No Results					
Virtual Currency					
No Results					
Digital Asset					
No Results					
Token					
12	any	5	device	4	such
8	paper	5	disk	3	announced
7	other	4	similar	3	card
7	tickets	4	special	3	child
NFT					
No Results					
Stablecoin					
No Results					

Recognizing that the lack of results from the U.S. Code likely reflects the emerging nature of cryptocurrency technologies, and to capture the regulatory discussions erupting after the events in the cryptocurrency industry in 2022, I performed further collocation analysis on a corpus of federal legislation enacted in August 2019 or later, or considered, but not adopted, since 2019. As presented in Table 4 below, the term "token" continues to be used in varied ways, often in contexts with no relation to cryptocurrency.[190] Meanwhile, the term "digital asset" appeared in the context of securities law and securities trading,[191] and the term "virtual currency" appeared in association with the sale of assets "convertible" to currency.[192] Lastly, when documents in the corpus referred to stablecoins, they connected the term "stablecoin" to concepts of being fiat-based or

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190. *See infra* Table 4 ("token" appeared near words such as "definition," "document," and "proxy").

191. *See infra* Table 4 ("digital asset" appeared near words such as "SEC," "securities," and "trading").

192. *See infra* Table 4.

currency-backed, and being issued by an issuer in connection with depository institutions.[193] Notably, in this corpus both digital asset and stablecoin centered on a centralized architecture.[194] Perhaps most interestingly, FinCEN's influence continues to appear, as the term "virtual currency" directly correlates to concepts first introduced by that agency in regulatory guidance.[195]

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193. *See infra* Table 4.

194. *See infra* Table 4 (corpus results showing digital asset and stablecoin connect with terms like "repository," "fiat," "based," "securities," and "security").

195. *See* FIN. CRIMES ENF'T NETWORK, *supra* note 8, at 1.

Table 4. Collocates of Cryptocurrency Terms in Federal Legislation Introduced or Adopted August 2019 or Later

Cryptocurrency					
17	legal	9	exchanges	5	provides
17	tender	6	El Salvador	5	impacts
13	mining	6	hearing	4	POW
12	adoption	5	blockchain	4	cleaning
Virtual Currency					
34	exchange(s)	19	convertible	10	trade
26	asset	17	term	10	means
20	virtual	15	sale	8	repository
19	currency	2	convertible	8	forked
Cryptoasset					
No Results					
Digital Asset					
214	asset(s)	128	repository	92	swap
202	digital	124	SEC	79	data
174	security(ies)	112	registered	77	term
173	trade(ing)	95	exchange	21	fiat
Token					
73	digital	10	offering	6	meaning
27	sale(s)(ing)	6	indirectly	6	given
14	definition	6	document	5	statement
14	term	6	directly	4	proxy
NFT					
No Results					
Stablecoin					
22	fiat	11	term	8	issued
17	asset	11	currency	7	depository
15	based	10	backed	6	required
13	issuer	9	institution	5	payment

To investigate the difference in usage of the seven cryptocurrency terms between state and federal lawmakers, I next constructed a corpus containing proposed or adopted legislation relating to the

terms at the state level since 2009.[196] State legislatures somewhat correlate the terms "cryptocurrency," "digital asset," and "virtual currency," and in general appear to be concerned with consumer protection and the regulation of custody and depository services.[197] State lawmakers connected the term "token" to initial offerings, and sought to distinguish between those that formed part of an "open blockchain," consumptive tokens, and those offered for an investment purpose.[198] These results for tokens represent the clearest acknowledgment from the legal field of the potential for varied technical architectures among tokens, and that those architectures may warrant different legal treatment. Meanwhile, state lawmakers appear to be taking a wait-and-see approach to stablecoins, with the term only appearing once in the corpus.[199] Similar to their federal counterparts, state legislators do not appear to widely use the term "cryptoassets."[200] State regulators also do not, as of yet, seem particularly concerned with NFTs.[201]

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196. The corpus constructed in the manner described *supra* note 151 remains on file with the author.

197. *See infra* Table 5.

198. *See infra* Table 5.

199. *See supra* note 151; *see also infra* Table 5.

200. *See infra* Table 5.

201. *See infra* Table 5.

Table 5. Collocates of Cryptocurrency Terms in State Legislation

Cryptocurrency					
18	digital	7	custody	2	strategies
12	asset	7	services	2	impact
7	blockchain	4	mining	2	enacting
7	techology	3	policy		
Cryptoasset					
No Results					
Digital Asset					
194	depository	17	authority	12	cryptocurrency
76	institution	13	provide	7	operating
43	business	12	value	7	depositories
40	asset	12	custody	7	deposits
Virtual Currency					
19	digital	2	exclude		
10	security	2	growing		
5	assets				
4	consumer				
Token					
19	open	9	buyer	5	purpose
19	blockchain	8	developer	5	reselling
10	available	6	seller	4	designing
9	initial	8	consumptive	3	processes
NFT					
No Results					
Stablecoin					
1	stored				
1	multiple				
1	computers				
1	designed				

D. Judges

To consider the context in which judges use the seven crypto-currency terms under study, I constructed a corpus of every case

since 2009 that hit on the seven cryptocurrency-related terms.[202] As indicated in Table 6 below, a collocation analysis of these cases reveals that, similar to legal academics, judges mix many of the terms together, keeping a specific archetypal technical artifact in mind, to the exclusion of the other many technical implementations that exist. Similar to legal academics, the sole use of the term "cryptoasset" in the judicial corpus was in reference to "various cryptoasset exchanges."[203] The term was used as a catchall. Unlike legal academics, however, the term "digital asset" did not arise in the context of the Uniform Fiduciary Access to Digital Assets Act.[204] Rather, the cases involving digital assets tended to involve online trading platforms for securities, including tokens deemed to be securities.[205] The term "token" appeared most frequently in the corpus, and reflected the most varied usage, with references to family law, securities laws, and traditional payments laws.[206] As with other actors in the legal system, the judicial corpus seemed to employ the terms "cryptocurrency" and "virtual currency" interchangeably, both centering on bitcoin as the archetypal technical artifact under analysis.[207] Stablecoins, meanwhile, continued to focus on those offered by a centralized issuer and whether the issuer could be trusted to actually maintain the reserves claimed to back the value of the offering.[208]

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202. The search for cases on these terms was conducted in Westlaw in July 2022 and produced a corpus containing 2,883 cases, which remains on file with the author. Within the corpus, the term "cryptocurrency" appeared 3,474 times, the term "cryptoasset" appeared one time, the term "virtual currency" appeared 1,215 times, the term "digital asset" appeared 352 times, the term "token" appeared 7,629 times, the term "NFT" appeared 317 times, and the term "stablecoin" appeared 93 times.

203. *See infra* Table 6.

204. *See infra* Table 6; Walsh et al., *supra* note 163, at 107.

205. *See infra* Table 6.

206. *See infra* Table 6.

207. *See infra* Table 6.

208. *See infra* Table 6.

Table 6. Collocates of Cryptocurrency Terms in U.S. Case Law
    Since 2009

Cryptocurrency					
305	exchange(s)	130	bitcoin	95	wallet
258	mining	113	trading	94	assets
225	account(s)	102	miners	94	blockchain
139	transactions	100	investment	88	currency
Cryptoasset					
1	promoted	1	since		
1	sold	1	fallen		
1	various				
1	exchanges				
Virtual Currency					
100	bitcoin	69	virtual	50	transactions
90	currency	66	services	47	business
86	trading	62	money	44	accounts
83	exchange	56	purchase	43	other
Digital Asset					
28	trading	19	second	15	market
24	including	17	user	15	least
24	management	17	instance	14	devices
22	securities	17	coin	14	security
Token					
1045	support	770	efforts	296	child
859	visitation	628	more	296	communicate
828	same	472	made	289	court
781	only	375	code	241	payments
NFT					
41	litigation	20	standing	9	family
22	metro	17	settlement	9	argues
22	parcel	12	trademark	9	application
20	LLC	11	trust	8	lacks
Stablecoin					
31	issuer	20	unbacked	8	prices
29	market	12	secretly	8	share
28	exchange	11	cryptocommodity	8	issued
23	crypto	9	investors	7	against

Up to this point, the legal-related corpora reveal that those in the legal field tend to view cryptocurrency and virtual currency as decentralized and modeled after bitcoin, while tokens relate to securities law, and stablecoins reflect centralized virtual currency allegedly backed by a commodity held in reserves by the issuer. The relative continuity of use of these terms across the legal corpora stands in stark contrast to the way those actually developing the technology use and understand the same terms. The developers of the technology do not represent the only constituency subject to cryptocurrency-related regulation, however. Users of cryptocurrency must also understand the legal framework for cryptocurrency in order to comply with whatever laws may govern their transactions. As such, the next corpora studied aim to capture the way that popular media uses the seven cryptocurrency terms in order to assess their use by the general public.

E. General Public

Performing a collocate analysis on the News on the Web (NOW) corpus offers a sense of how the general public contextualizes the terms "cryptocurrency," "cryptoasset," "virtual currency," "digital asset," "token," "NFT," and "stablecoin."[209] "The NOW corpus … contains 15.8 billion words of data from web-based newspapers and magazines from 2010 to the present time."[210] Quite interestingly, the NOW corpus did not return any results for the terms "cryptocurrency," "cryptoasset," "virtual currency," or "digital asset."[211] The use of the terms "token" and "NFT," however, suggests a strong interest in investing in and using tokens and NFTs through marketplaces and platforms.[212] The public seems to recognize a wider use for NFTs than those in the legal field do, with interest in collectables and other projects as well as art-related NFTs.[213] Similarly, the general public enjoys a broader sense of the different technical implementations that may underlie stablecoins, with

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209. *See* NOW Corpus, *supra* note 158.
210. *Id.*
211. *See infra* Table 7.
212. *See infra* Table 7.
213. *See infra* Table 7.

references to both centralized stablecoins and algorithmic stable-coins, and some distinction between stablecoins that are "pegged" to assets and those that are "backed" by assets.[214]

Table 7. Collocates of Cryptocurrency Terms in the General Public—NOW

Cryptocurrency					
No Records					
Cryptoasset					
No Records					
Virtual Currency					
No Results					
Token					
12405	NFT(s)	7912	same	6187	appreciation
11672	supply	7896	using	5366	traded
11518	non-fungible	7469	digital	4997	total
8755	recovery	6885	circulation	4478	expired
Digital Asset					
No Results					
NFT					
5190	marketplace	2835	first	2255	art
4163	token	2796	market	1865	digital
3635	non-fungible	2750	platform	1849	new
3153	collection	2282	space	1818	project
Stablecoin					
849	Tether	504	UST	402	market
827	issuer(s)	468	USDC	376	dollar
614	TerraUSD	455	Terra	285	USDT
579	algorithmic	412	pegged	276	backed

To confirm that the NOW results reflect popular usage in the broadest possible sense, a collocate analysis of the seven terms was also performed on the Corpus of Contemporary American English (COCA).[215] COCA is a genre-balanced corpus of American English, meaning that its text is pulled from eight genres of language usage:

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214. *See infra* Table 7.
215. *See* Corpus of Contemporary American English, *supra* note 159.

"spoken, fiction, popular magazines, newspapers, academic texts, and ... TV and Movies subtitles, blogs and other web pages."[216] As detailed in Table 8 below, as with the collocate analysis of the NOW corpus, the COCA results suggest that the general public does not have occasion to use the terms "cryptocurrency" or "cryptoasset."[217] Perhaps somewhat surprisingly, the term "stablecoin" did not return any hits in the COCA corpus.[218] Indeed, the materials in COCA only use the term "virtual currency" as relating to cryptocurrency at all.[219]

Specifically, the general public views the term "virtual currency"[220] as the catch-all term that encompasses a huge variety of assets, everything from the decentralized bitcoin to the centralized Facebook Libra.[221] Given the origin of the use of virtual currency in reference to decentralized cryptocurrencies such as bitcoin, this result is particularly interesting. FinCEN took the term "virtual currency," which was most commonly used in reference to centralized in-game currency by software developers, and was the first to apply it in reference to decentralized cryptocurrencies.[222] To the extent that FinCEN views the general public as the main audience of its regulatory pronouncements, FinCEN is communicating well.

Meanwhile, in the materials included in COCA, the term "token"[223] represented little to do with virtual currency.[224] Rather, the term is used most frequently with regard to "tokens of appreciation" or of affection or of friendship.[225] Further, the term "digital asset"[226] refers mostly to library digital asset management, or to photos or other digital media that produce assets other than virtual currency.[227] Finally, the term "NFT," to the extent it appears at

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216. *Id.* The corpus contains more than one billion words of text.

217. *See infra* Table 8.

218. *See infra* Table 8.

219. *See infra* Table 8.

220. The term "virtual currency" appeared 679 times in the corpus.

221. *See infra* Table 8.

222. *See* Reyes, *supra* note 7, at 191-92 n.3; Sarah Jane Hughes & Stephen T. Middlebrook, Feature, *Advancing a Framework for Regulating Cryptocurrency Payments Intermediaries*, 32 Yale J. on Regul. 495, 506-07 (2015).

223. The term "token" appeared 4,928 times in the corpus.

224. *See infra* Table 8.

225. *See infra* Table 8.

226. The term "digital asset" appeared 419 times in the corpus.

227. *See infra* Table 8.

all,[228] appears in the context of medical studies related to the brain.[229]

Table 8. Collocates of Cryptocurrency Terms in the General
    Public—COCOA

Cryptocurrency					
No Results					
Cryptoasset					
No Results					
Virtual Currency					
20	Bitcoin(s)	4	ecommerce	4	music
7	Facebook	4	financial	4	reward
6	goods	4	Libra	3	create
5	users	4	management	3	digital
Token					
137	appreciation	58	affection	42	user
124	small	53	subway	42	friendship
91	love	44	gratitude	38	bus
64	format	42	buy	36	membership
Digital Asset					
13	management	2	media	2	protection
4	existing	2	preservation	2	system
2	desired	2	seen	1	program
2	brand	2	IT	1	products
NFT					
18	formation	3	accumulation	3	loss
5	number	3	brains	3	mice
4	neuronal	3	cause	3	PHF
4	neurons	3	LNA	3	reviewers
Stablecoin					
No results					

The differences in results between the two corpora designed to capture general public usage of the seven cryptocurrency terms may be explained by the source of the documents included in the

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228. The term "NFT" appeared 558 times in the corpus.
229. *See infra* Table 8.

corpora.[230] Recall that the NOW corpus is sourced from online newspapers and magazines, while COCA is a genre-balanced corpus, sourced from a variety of media.[231] Online newspapers and magazines represent sources more likely to specifically consider cryptocurrency-related issues, and thus employ the terms "stable-coin," "NFTs," and "tokens" in a blockchain context (although the term "token" also appears in the context of a token of appreciation in the NOW corpus, similar to its COCA counterpart).[232] Meanwhile, the broader range of media in COCA enables that corpus to reflect the more balanced use of the terms "token" and "NFT" that includes their use outside of the cryptocurrency context.[233] As a result, the collocation analysis for the two corpora do not contradict each other, but rather, offer complementary insights into the use of the terms by the general public, which seems to indicate a more nuanced understanding of the terms than the legal field, with a broader view of the varied technical implementations used by technical research-ers and software developers.[234]

Viewing law as a communicative tool that speaks directly from law-giver to law-receiver ignores an important intermediary: lawyers. Many software developers creating, companies issuing, and users holding or trading cryptocurrency will receive advice from lawyers on how to interpret the applicable legal framework. As a result, it remains important to consider the ways in which lawyers and law firms use the seven cryptocurrency terms in their practice.

F. Lawyers and Law Firms

To consider the context in which lawyers and law firms use the seven cryptocurrency terms under study, I constructed a corpus of every announcement, alert, and legal newspaper article since 2009 that hit on the terms "cryptocurrency," "cryptoasset," "virtual

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230. *See* NOW CORPUS, *supra* note 158; CORPUS OF CONTEMPORARY AMERICAN ENGLISH, *supra* note 159.

231. *See* NOW CORPUS, *supra* note 158; CORPUS OF CONTEMPORARY AMERICAN ENGLISH, *supra* note 159; *supra* notes 148-50 and accompanying text.

232. *See* NOW CORPUS, *supra* note 158.

233. *See* CORPUS OF CONTEMPORARY AMERICAN ENGLISH, *supra* note 159.

234. *See supra* Tables 7-8.

currency," "digital asset," "token," "NFT," and "stablecoin."[235] As indicated in Table 9 below, practicing lawyers spend a lot of time on securities laws analysis of digital assets and tokens.[236] Practicing lawyers also associate both cryptocurrency and virtual currency with an archetypal technical artifact—bitcoin.[237] FinCEN's influence on legal practioner's nomenclature remains evident, however, with the term "virtual currency" associated with "convertible," "currency," and "exchange."[238] Meanwhile, the term "stablecoins" represents centralized cryptocurrency, with the term appearing most frequently alongside the terms "issuers," "banks," "payments," "backed," "arrangements," and "customers."[239] Lastly, without focusing solely on digital or other art, lawyers worry about the legal rights, including ownership, conferred by the purchase of an NFT.[240] Crytpoasset remains the least used term of the seven, and in this corpus was only used in connection with news from a European regulator.[241]

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235. The search for these terms was conducted in Westlaw in July 2022 and produced a corpus containing 6,466 articles which remains on file with the author. The seven terms appeared in the corpus with the following frequency: digital asset—2,362; token—2,069; cryptocurrency—7,903; virtual currency—2,585; cryptoasset—75; stablecoin—945; and NFT—1,399.
236. *See infra* Table 9.
237. *See infra* Table 9.
238. *See infra* Table 9.
239. *See infra* Table 9.
240. *See infra* Table 9.
241. *See infra* Table 9.

Table 9. Collocates of Cryptocurrency Terms Used in the
   Legal Industry

Cryptocurrency					
681	exchange(s)	303	market	252	trading
455	blockchain	273	digital	235	industry
401	educational	257	enforcement	211	regulation
337	transactions	256	bitcoin	203	related
Cryptoasset					
9	service	6	watchdogs	4	recommended
8	providers	6	urge	3	interpretation
7	European	5	wide	3	package
7	European	4	headed	3	delivered
Virtual Currency					
197	transactions	135	other	106	state
196	convertible	121	bitcoin	105	CFTC
187	currency	119	new	98	IRS
159	exchange	113	business	97	involving
Digital Asset					
282	securities	149	transactions	83	platforms
188	market(s)	136	trading	78	custody
178	security	89	investment	72	Howey
163	SEC	84	regulation	63	exchanges
NFT					
306	marketplace(s)	46	token	42	non
78	legal	44	market	38	fungible
63	launching	43	guide	37	owner
51	rights	43	work	34	sales
Token					
382	offering(s)	160	securities	86	utility
295	digital	146	coin	83	fungible
279	security	105	initial	75	exchange
173	sale(s)	94	blockchain	73	holders
Stablecoin					
165	issuers	54	regulation	30	value
74	bank(s)	41	backed	29	legislation
65	report	34	arrangements	29	Tether
59	payment(s)	32	customers	27	risk

It is worth pausing here to explore lawyers' use of the term "cryptoasset." A concordance line analysis reveals that the use of the term "cryptoasset" by lawyers in this corpus refers to the European Union's Market in Crypto-assets Regulation (MiCA). MiCA aims to bring comprehensive regulation to cryptocurrency issuance and services in the EU.[242] An underappreciated obstacle to its success may be the terminology employed as its basic building blocks. The proposed text of MiCA released in October 2022 defines "cryptoasset" as a "digital representation of a value or a right which may be transferred and stored electronically, using distributed ledger technology or similar technology,"[243] where "distributed ledger technology" is defined by reference to the DLT Pilot Regime Regulation.[244] The DLT Pilot Regime Regulation, for its part, defines "distributed ledger technology" as "a technology that enables the operation and use of distributed ledgers" where a distributed ledger is "an information repository that keeps records of transactions and that is shared across, and synchronised between, a set of DLT network nodes using a consensus mechanism."[245] Taken together, these definitions cover a very broad range of assets,[246] including technical artifacts not intended to come within the regulation's

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242. Mark Simpson, Sarah Williams, Kimberly Everitt, Tim Alferink, Iris Barsan, Paula De Biase, Manuel Lorenz & Eugenio Muschio, *Crypto Regulation: The EU's MiCA Takes Its (Near) Final Shape*, Lexology (Nov. 11, 2022), https://www.lexology.com/library/detail. aspx?g=6e684632-ad4b-419b-a7ab-7866ae3b1513 [https://perma.cc/V7CG-LMBW].

243. Proposal for a Regulation of the European Parliament and of the Council on Markets in Crypto-assets, and Amending Directive (EU) 2019/1937 (MiCA), art. 3(1)(2), 13198/2022 (Oct. 5, 2022), at 56; https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CONSIL% 3AST_13198_2022_INIT&from=EN [https://perma.cc/E8M7-YZKY].

244. *Id.* art. 3(1)(1).

245. Council Regulation 2022/858 of 30 May, 2022, Pilot Regime for Market Infrastructures Based on Distributed Ledger Technology, and Amending Regulations (EU) No 600/2014 and (EU) No 909/2014 and Directive 2014/65/EU, art. 2(1)-(2), 2022 O.J. (L 151). A consensus mechanism is not very helpfully defined as "the rules and procedures by which an agreement is reached, among DLT network nodes, that a transaction is validated," and a DLT network node is "a device or process that is part of a network and that holds a complete or partial replica of records of all transactions on a distributed ledger." *Id.* art. 2(3)-(4).

246. Kai Zhang, Philip J. Morgan & Jeremy M. McLaughlin, *MICA—Overview of the New EU Crypto-Asset Regulatory Framework (Part 1)*, K&L Gates (Nov. 15, 2022), https://www. klgates.com/MiCA-Overview-of-the-new-EU-crypto-asset-regulatory-framework-Part-1-11-15-2022 [https://perma.cc/GY83-HQ25] ("This definition would appear to be much wider than crypto-assets as typically understood in the industry. In fact, it might even be a misnomer to have 'crypto' included in the term under this definition (digital asset may be a more appropriate term).").

ambit.[247] Nevertheless, MiCA limits its scope to "persons and other undertakings that are engaged in the issuance, offer to the public and admission to trading of crypto-assets or that provide services related to crypto-assets in the Union,"[248] and "is not applicable to crypto assets that qualify as financial instruments, electronic money, deposits, structured deposits or securitization."[249] In other words, MiCA applies to anything that might fall into the catch-all term "cryptoassets" and possibly more, except, of course, when it does not.

Fascinatingly, as part of the EU's process of creating EU-wide regulations,[250] a separate definition of crypto asset was proposed:

> a digital representation of a value or a right for direct investment or finance purposes that uses cryptography for security and is in the form of a coin or a token or any other digital medium of distributed ledgers, and which may be transferred and stored electronically, using distributed ledger technology or similar technology.[251]

That definition resembles very little of any of the technical artifacts discussed at length in this Article. Indeed, even the set of definitions in the final draft of MiCA that together purport to make clear to industry and the public which cryptocurrencies come within its ambit may reap more confusion than clarity. Anecdotally, then, the development of MiCA reaffirms the analysis of the corpora presented above: the term "cryptoasset" is a catch-all term used by those in law when they are not quite sure which technical artifact should be the subject of regulation. The likelihood that using such terms will help bring clarity to the intersection of law and

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247. Indeed, any distributed database that uses encryption as a security mechanism arguably falls within these definitions.

248. MiCA, *supra* note 243, art. 2(1).

249. Agata Ferreira, Philipp Sandner & Thomas Dünser, *Cryptocurrencies, DLT and Crypto Assets—The Road to Regulatory Recognition in Europe*, *in* HANDBOOK ON BLOCKCHAIN 22 (Duc A. Tran et al. eds., 2022).

250. Zhang et al., *supra* note 246 (describing the process of trialogue discussions between the EU Parliament, Council, and Commission).

251. Renate Prinz & Annabelle Juliette Rau, *Markets in Crypto-Assets Regulation*, MCDERMOTT WILL & EMERY (Mar. 22, 2022) (citing Article 3, paragraph 1, subparagraph 2 of the Final Compromises on behalf of MEP Berger v. March 9, 2022), https://www.mwe.com/insights/markets-in-crypto-assets-regulation [https://perma.cc/4DSL-MJGE].

cryptocurrency is quite low. Indeed, in light of the results of the genre variation studies reported in this Article, the likelihood of increasing confusion seems quite high.

G. Lessons from Comparing the Results

The results from the collocation and concordance line analysis of the corpora reflect six stakeholders in the discussion related to the legal framework applicable to cryptocurrency, cryptoassets, digital assets, virtual currency, tokens, NFTs, and stablecoins. Comparing these results leads to several interrelated conclusions. First, those in the legal field—legal academics, lawmakers, judges, and law-yers—tend to use cryptocurrency-related terms interchangeably, and often hold a specific archetypal technical artifact up as the key example around which to build and interpret the applicable legal framework. This results in failure to capture the true variety of cryptocurrencies and their technical architecture. In turn, that failure to recognize the variety in types and implementations of cryptocurrency leads to the creation of one-size-fits-all legal solutions that leave the industry calling for deeper clarity.

Second, the results make clear that stakeholders in the legal field sometimes create words for technical artifacts when they do not fully understand the technical details of those artifacts. The term "cryptoasset," for example, appears to be used by legal academics as a catch-all term. No other stakeholder seems to employ that term with any real frequency. But when the term "cryptoasset" does finally appear in law, it quickly becomes clear from attempts to define that term why using such a broad catch-all term that means nothing to those who must comply with the law poses a problem.[252] The term "virtual currency" offers another, but perhaps more

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252. *See supra* notes 242-48 and accompanying text. In another example, FINRA used the term "cryptoasset" to announce "a targeted exam of firm practices regarding retail com-munications concerning Crypto Asset products and services." FINRA, *Crypto Asset Commu-nications* (Nov. 2022) (footnote omitted), https://finra.org/rules-guidance/guidance/targeted-examination-letters/crypto-asset-communications [https://perma.cc/PXK2-XUYZ]. FINRA de-fines Crypto Asset as "an asset that is issued or transferred using distributed ledger or blockchain technology, including, but not limited to, so-called 'virtual currencies,' 'coins,' and 'tokens.'" *Id.* Even this definition confirms that the term "cryptoasset" is a catchall that does not really mean that much. How will covered entities and persons know if they have made a covered communication if they do not know what a cryptoasset is?

concerning example. FinCEN took that term, which technical researchers continue to use in reference to in-game currency, and gave it new meaning in the context of cryptocurrency in 2013. As of this writing, the corpus analysis results evidence that every other legal stakeholder studied uses that term in the same way FinCEN proposed, leaving those actually building the technology to figure out how to interpret the language mismatch.

Lastly, these terminology conflicts may represent more than mere definitional differences. Rather, the collision between legal and technical terms of art may represent core value conflicts that need to be reconciled before an effective legal framework for cryptocurrency can truly be created. Language is "always laden with value judgments and carr[ies] attitudes."[253] Developers of crypto-economic systems value financial privacy and freedom of speech, while stakeholders in the legal field worry about consumer protection, anti-money laundering, and capital market regulation. These values do not have to conflict. The difficulty lies in failing to understand how the values and the technology connect, and adjusting the tools in the policy and legislative toolbox to differentiate between the technological implementations that actually pose consumer protection, anti-money laundering, and systemic risk concerns. Failure to properly adjust the legal framework to account for the varied technical architectures found in the cryptocurrency ecosystem leads to overbroad legislation and regulation that harms as much, if not more, than it helps.

CONCLUSION

This Article presented linguistic evidence confirming the anecdotal intuition that interdisciplinary miscommunication impacts ongoing efforts to reform law and regulation to address the purportedly unique legal issues raised by cryptocurrency. Importantly, the evidence goes further, demonstrating that the miscommunication does not stem solely from definitional differences but rather the lack of technical knowledge on the part of some speakers, and that the lack of legal knowledge on the part of other speakers

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253. Clarke Rountree, *Kairos and American Legal Praxis*, 20 NEV. L.J. 855, 863 (2020).

inflames already existing value conflicts. The terms "cryptocurrency," "cryptoassets," "digital assets," "tokens," and "NFTs" each represent core technological differences and correspond to different use cases that belie important values of their developers and users. Armed with such knowledge, law and policymakers might consider devising new processes to account for such technical, economic, and value differences when creating new law and regulation for cryptocurrency-related activity. Indeed, legislative bodies, rulemaking authorities, legal academics, and lawyers might engage in a formal value-alignment analysis, considering the needs of the legal system alongside the needs of the technical system, in order to build more robust, more effective legal rules for cryptocurrency, specifically, and emerging technology more broadly.

Other communities participating in legal discussions at the intersection of cryptocurrency and law might also make use of this linguistic study. For example, lawyers practicing in this area might consider the import of this study on their duty of technological competence. Perhaps going forward, the duty of technological competence might require those practicing in emerging technologies to undertake a deep dive into technical definitions of the terms used by their client in order to mitigate both legal risk and value conflicts. Unless the miscommunication and value conflict evidenced by this study can be resolved at the law and policy making level, clients will look to their attorneys for strategies to further mitigate the risk of operating in a legal environment that does not understand their products and services and does not communicate compliance expectations effectively. Lawmaking and lawyering in the age of cryptocurrency—an area of high interdisciplinarity—requires moving forward purposefully and carefully, and keeping language wars front and center in the quest to communicate understandable and useful legal rules to a diverse set of recipients.