Law and the Blockchain

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ABSTRACT: All contracts are necessarily incomplete. The inefficiencies of bargaining over every contingency, coupled with humans' innate bounded rationality, mean that contracts cannot anticipate and address every potential eventuality. One role of law is to fill gaps in incomplete contracts with default rules. Emerging technologies have created new, yet equally incomplete, types of contracts that exist outside of this traditional gap-filling legal role. The blockchain is a distributed ledger that allows the cryptographic recording of transactions and permits "smart" contracts that self-execute automatically if their conditions are met. Because humans code the contracts of the blockchain, gaps in these contracts will arise. Yet in the world of "smart contracting" on the blockchain, there is no place for the law to step in to supply default rules—no "legal intervention point." The lack of a legal intervention point means that law on the blockchain works in a fundamentally different way from law in the corporeal world. Business organizational law provides a prime example of how the law uses default rules to fill gaps in an incomplete contract and how the law works differently in the blockchain context.

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I. INTRODUCTION

In 2016, a decentralized autonomous organization ("DAO") launched on Ethereum, a platform that permits layering programs called "smart contracts" on top of a cryptocurrency.[1] This DAO was "decentralized" because no one person or entity controlled it; it was "autonomous" because it ran itself, and it was an "organization" of a type the world had not seen before. More of a "virtual venture capital fund" than a corporation, the 2016 DAO (as I will term this particular DAO) sold tokens in cyberspace that entitled the holders to certain voting rights, including the right to vote on proposals for projects that the DAO would fund.[2]

The 2016 DAO might sound like unintelligible science fiction, but businesses organized in the virtual world of the blockchain have raised millions of dollars over the past eighteen months using this platform.[3] For purposes of this introduction, all the reader needs to understand is that blockchain technology permits "smart contracts" that allow coders to layer on top of currency exchanges particular conditions under which those exchanges will occur.[4] In other words, these contracts are self-executing. The Ethereum blockchain can record not only "X paid Y nine ether," but also "X

1. Kevin Werbach & Nicolas Cornell, *Contracts* Ex Machina, 67 DUKE L.J. 313, 350 (2017).

2. *Id.*; dat81, *What If the Whole World Was Operated by Blockchain?*, STEEMIT, https://steemit.com/crypto/@dat81/what-if-the-whole-world-was-operated-by-blockchain (last visited Oct. 31, 2018).

3. Giulio Prisco, *The DAO Raises More Than $117 Million in World's Largest Crowdfunding to Date*, BITCOIN MAG. (May 16, 2016, 2:09 PM), https://bitcoinmagazine.com/articles/the-dao-raises-more-than-million-in-world-s-largest-crowdfunding-to-date-1463422191.

4. Antonio Madeira, *The DAO, The Hack, The Soft Fork and The Hard Fork*, CRYPTOCOMPARE (July 26. 2016), https://www.cryptocompare.com/coins/guides/the-dao-the-hack-the-soft-fork-and-the-hard-fork.

will pay nine ether Y if the Dow Jones Industrial Average reaches 30,000" (ether being the unit of cryptocurrency on the Ethereum blockchain).[5] These smart contracts enabled the 2016 DAO to implement fairly sophisticated governance and exit rules autonomously on the blockchain.

The 2016 DAO was an enormous success—raising $150 million worth of ether in just a few months.[6] It was also a tremendous failure: Because of a flaw in its code, an unknown individual was able to siphon about $50 million into a private account, before being foiled by a technological fix that unwound the DAO and restored all DAO participants' ether to its original holders.[7] Although the 2016 DAO failed, entrepreneurs following its lead launched 235 initial coin offerings ("ICO") in 2017, raising a total of $3.7 billion from the public.[8]

DAOs may represent a dead-end in the history of business organizations—that remains to be seen.[9] What matters for the purposes of this Article is what the 2016 DAO can tell us about the nature of contract law and business law, and the potential for the blockchain to upset fundamental expectations about the role of law in both fields.

Academic literature teaches, quite correctly, that all contracts are incomplete.[10] For one thing, it would be inefficient for two parties to try to anticipate each and every future contingency and hash out an appropriate contractual response.[11] But even if two parties *were* ambitious and patient enough to attempt such a feat, it would prove impossible. Given the bounded rationality of humans and the uncertainties of life, one simply cannot contract for every future possibility.[12]

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5. The astute reader may wonder how the blockchain knows when the Dow Jones Industrial Average reaches 30,000. This question of how the blockchain receives reliable input from the outside world is a key problem blockchain businesses must address. Artem, *How Do Oracle Services Work Under the Hood?*, STACK EXCHANGE: ETHEREUM, https://ethereum.stackexchange.com/questions/11589/how-do-oracle-services-work-under-the-hood (last visited Oct. 31, 2018).

6. Madeira, *supra* note 4.

7. To be precise, the Ethereum blockchain forked, creating two parallel Ethereum blockchains, Ethereum and Ethereum Classic. On the more popular (and valuable) Ethereum, the code was rewritten as if the DAO had not launched. But in the alternate reality of Ethereum Classic, the DAO continues to exist and the $50 million transfer of funds did, in fact, occur. *What Is Ethereum Classic? Ethereum vs Ethereum Classic*, BLOCKGEEKS, https://blockgeeks.com/guides/what-is-ethereum-classic (last visited Oct. 31, 2018).

8. *Cryptocurrency ICO Stats 2017*, COINSCHEDULE, https://www.coinschedule.com/stats.html?year=2017 (last visited Oct. 31, 2018). Note, however, that not all ICOs are DAOs.

9. Although, more DAOs are organizing. *See infra* Section V.A.2.

10. Ian Ayres & Robert Gertner, *Filling Gaps in Incomplete Contracts: An Economic Theory of Default Rules*, 99 YALE L.J. 87, 92–93 (1989).

11. Robert E. Scott & George G. Triantis, *Incomplete Contracts and the Theory of Contract Design*, 56 CASE W. RES. L. REV. 187, 190 (2005) ("A contract is incomplete if it fails to provide for the *efficient* set of obligations in *each* possible state of the world.").

12. *See* Scott Baker & Kimberly D. Krawiec, *Incomplete Contracts in A Complete Contract World*, 33 FLA. ST. U. L. REV. 725, 725 (2006) ("Contracts are never fully complete, because some

A key role of contract law is to fill the gaps humans wittingly and unwittingly leave in their consensual dealings.[13] Much of the incomplete-contracting literature deals with how the law should fill these gaps.[14] Some rules are default rules that the law supplies when the parties are silent.[15] Others are immutable rules that fix certain rights, duties, and obligations regardless of the parties' designs.[16] In both cases, the pattern is the same. Step one: Either there is a dispute regarding the interpretation of a term or an unforeseen event occurs. Step two: A court determines what legal rule will fill the gap.

In the blockchain, there is no step two. Step one occurs as it always has. After all, it is humans who code the contracts of the blockchain, and so gaps arise. But in the blockchain world, step two does not occur. Because the smart "contract" is code alone, there is no gap, in the sense of an entry point, for the law to step in to fill. Indeed, the case of the blockchain reveals an ambiguity in the language that never before created a problem. The "gap" in an incomplete contract is both the topic that the contract never explicitly addressed, and the place in the contract where the default law steps in to fill the breach. The blockchain has no gap, in the second sense of the term. Put differently, there is no room, no *place* for default law on the blockchain, unless the blockchain affirmatively lets it in. There is, to use my terminology, no *legal intervention point*.

This is the case because the DAO organizers made clear that their code contained the entire agreement between the participants, including all means of enforcement.[17] To be sure, that code could and did produce problems —bugs, questions of interpretation, call them what you will. Outside the blockchain universe, the parties would have dealt with these matters by advancing arguments before courts as to which interpretation was the one the parties had intended. A judge would have listened, evaluated both parties' arguments as to the law's application to the facts at hand, and issued a ruling. On the blockchain, however, there is no such chance for law to intervene because by design the code is self-contained. Once the code is released into the world, its programmers can no longer unilaterally alter it—unless the widely-dispersed, anonymous blockchain community can be convinced to do so. Because of the decentralized, distributed nature of the blockchain ledger, changes in the code will be rejected unless the code itself contemplates subsequent modifications. The only possible legal intervention point is not

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contractual incompleteness is inevitable, given the costs of thinking about, bargaining over, and drafting for future contingencies.").

13. *See* Ayres & Gertner, *supra* note 10, at 93.

14. *See id.* at 89–92.

15. *Id.* at 87.

16. *Id.* at 88–89.

17. Bryant Joseph Gilot, *Code != Law*, MEDIUM: CRYPTOIQ (July 4, 2016), https://medium.com/@Crypt oIQ.ca/code-law-58b6e39dd626.

upon the blockchain itself, but rather identifiable humans that promote blockchain enterprises and can be held liable for their workings.

This Article is the first to identify and explore the radical transformation of the relationship between contract and law that the blockchain represents.[18] As we will see, the resistance of the blockchain to the workings of the law represents both a strength and a weakness. Although the implications of the blockchain for general contract law are profound, the bulk of this Article will focus its attention on business entities as incomplete contracts. Economists and legal academics alike have followed the lead of Frank Easterbrook and Dan Fischel in treating the corporation as a contract,[19] and this literature is particularly relevant to the DAO.

To illustrate the blockchain's transformative relationship with business association law, we start with a simple observation: fundamentally, business association law fills gaps. Business association law supplies default rules that participants tailor to their needs.[20] This feature explains why U.S. corporate law is often described as "enabling" in nature,[21] providing relatively few mandatory rules.[22] But for entities organized purely on the blockchain, there are no legal intervention points for default rules to fill unless coders affirmatively create them. There is no space for default law; law has no purchase on the blockchain.[23]

The lack of a legal intervention point is a double-edged sword. The blockchain grants its entities a power that corporeally organized entities do not have—the power to avoid the dangers of partnership without resorting to

18. The literature on the blockchain is growing at a rapid clip, but so far has focused on its applications. *See generally* Carla L. Reyes, *Conceptualizing Cryptolaw*, 96 NEB. L. REV. 384 (2017) (discussing cryptocurrency's potential to alter the law); Werbach & Cornell, *supra* note 1 (discussing the potential and limitations of smart contracts); David Yermack, *Corporate Governance and Blockchains*, 21 REV. FIN. 7 (2017) (examining the impact of blockchain technology on parties involved in corporate governance); Randolph A. Robinson II, *The New Digital Wild West: Regulating the Explosion of Initial Coin Offerings*, 86 TENN. L. REV. (forthcoming 2019), *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3087541 (describing initial coin offerings and the regulatory problems they create); Jonathan Rohr & Aaron Wright, *Blockchain-Based Token Sales, Initial Coin Offerings, and the Democratization of Public Capital Markets* (Cardozo Legal Studies Research, Paper No. 527, 2018), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3048104 (discussing token sales and their status under U.S. securities laws).

19. *See generally* Frank H. Easterbrook & Daniel R. Fischel, *The Corporate Contract*, 89 COLUM. L. REV. 1416 (1989) (describing the contractual structure of corporations).

20. Larry E. Ribstein, *Why Corporations*, 1 BERKELEY BUS. L.J. 183, 187–88 (2004).

21. Easterbrook & Fischel, *supra* note 19, at 1417.

22. *Id.* at 1418.

23. As I will explain further in Part V, I am not claiming that the law should not regulate in this space, the "cyber-separatist" position. *See* Viktor Mayer-Schönberger, *The Shape of Governance: Analyzing the World of Internet Regulation*, 43 VA. J. INT'L L. 605, 618–19 (2003). Instead, I am claiming as a descriptive matter that an entity organized solely on the blockchain would not be susceptible to regulation, as long as its corporeal-world organizers remained anonymous.

organizational law.[24] In the physical world, entrepreneurs have every incentive to make use of business association law to avoid the partnership form. While corporations, LLCs, and other limited liability entities,[25] must file with the state and pay fees, there is nothing one need affirmatively do to form a partnership.[26] All one needs is an "association of two or more persons to carry on as co-owners a business for profit."[27] As business association casebooks recount, the law is full of entrepreneurs who unwittingly form partnerships.[28]

The 2016 DAO was an association of two or more individuals carrying on as co-owners of a business for profit. It did not formally organize under any state's jurisdiction. Therefore, under business association law it was a partnership, and its tokenholders, in theory, faced unlimited liability. Also, in theory, the tokenholders' creditors had a claim on the DAO's assets. But, as Part IV will detail, the blockchain is a pseudonymous space, and that pseudonymity, coupled with the "code is law"[29] nature of the blockchain, provides participants a kind of protection unavailable in the real world. Thus, the blockchain removes both the penalty and the default from the workings of partnership law. The blockchain can, all by itself, perform via contractual means what before now only organizational law could do.

But the other edge of the sword remains. The incomplete contracting literature reminds us that all contracts are incomplete.[30] And so a question arises: When gaps appear in the blockchain's nexus of contracts, what will happen? The answer to that question turns first, as Part V explains, on the extent to which an entity is organized strictly on the blockchain. If the entity exists on the blockchain alone, then the law simply fails—it has no entry point into the code. But as long as identifiable individuals organize entities on the blockchain, a legal intervention point *does* exist—not in the blockchain itself, but rather in the intersection of the blockchain and the corporeal world. Sovereign states around the globe are grappling with the question of how to

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24. I prefer the term *corporeal world* to *real-world* to distinguish the physical world where business associations have traditionally dwelt from the world of the blockchain. "Real world" implies that the blockchain is fake or imaginary.

25. *See, e.g.*, DEL. CODE ANN. tit. 6, § 18-201(a) (West 2011 & Supp. 2018).

26. *See, e.g.*, REVISED UNIF. P'SHIP ACT § 202(a) (UNIF. LAW COMM'N 2013); Larry E. Ribstein, *Limited Liability and Theories of the Corporation*, 50 MD. L. REV. 80, 108 (1991) ("Any company that has not been formally organized under a nonpartnership statute could be considered a partnership."); Paul R. Tremblay, *The Ethics of Representing Founders*, 8 WM. & MARY BUS. L. REV. 267, 276 (2017) ("It is an elementary principle of business organizations doctrine that a partnership arises by default, through an 'association of two or more persons to carry on as co-owners a business for profit . . . whether or not the persons intend to form a partnership.'" (alteration in original) (quoting REVISED UNIF. P'SHIP ACT § 202(a))).

27. REVISED UNIF. P'SHIP ACT § 202(a).

28. *See, e.g.*, D. GORDON SMITH & CYNTHIA A. WILLIAMS, BUSINESS ORGANIZATIONS: CASES, PROBLEMS, AND CASE STUDIES 55–56 (2d ed. 2008).

29. LAWRENCE LESSIG, CODE: VERSION 2.0, at 5 (2006), http://codev2.cc/download+remix/Lessig-Codev2.pdf.

30. *See* Ayres & Gertner, *supra* note 10, at 91.

regulate the blockchain, necessarily focusing on this intersection as a legal intervention point.[31] Securities law provides a prime example of such a legal intervention point on the blockchain—more precisely, *between* the blockchain and the corporeal world.[32]

This Article proceeds as follows: Part II provides an account of business association law as default law and the partnership form as the default business organizational form. It focuses careful attention on the various attributes scholars have identified as being peculiar to business organizations that affirmatively organize as corporations, limited liability companies, and the like: limited liability and asset partitioning. Part III moves to the story of the 2016 DAO, describing its launch, governance, and the catastrophic "hack" which led to its unwinding. It concludes that, under a conventional business law analysis, the 2016 DAO was clearly a partnership. However, Part IV describes how the nature of the blockchain frustrates the application of conventional business law. Indeed, despite their partnership status, entities organized on the blockchain itself enjoy *de facto* limited liability from contract claims, and pseudonymity provides at least some protection from the currently remote chance of tort claims. Part V moves to discuss potential legal intervention points. Purely blockchain organizations—with no identifiable human organizers—have no legal intervention point, and thus can exist outside the law. Nevertheless, DAOs are creating governance structures that replicate some of the mandatory and default rules of corporeal law, and thus are creating intervention points of their own. These are not *legal* intervention points, susceptible to governmental action, but they are points where private ordering can intervene to fill the gaps that arise in the inevitably incomplete contract. In contrast, most Initial Coin Offerings ("ICOs"), are currently being launched by identifiable human organizers, and the law is quite prominently intervening to shape them.

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31. Andrew Nelson, *Cryptocurrency Regulation in 2018: Where the World Stands Right Now*, BITCOIN MAG. (Feb. 1, 2018, 2:42 PM), https://bitcoinmagazine.com/articles/cryptocurrency-regulation-2018-where-world-stands-right-now.

32. The Securities and Exchange Commission issued a July 2017 report labeling the 2016 DAO tokens securities under the *Howey* test, "a common enterprise with profits to come solely from the efforts of others." *See* SEC v. W.J. Howey Co., 328 U.S. 293, 301 (1946); U.S. SEC. & EXCH. COMM'N, REPORT OF INVESTIGATION PURSUANT TO SECTION 21(A) OF THE SECURITIES EXCHANGE ACT OF 1934: THE DAO, EXCHANGE ACT RELEASE NO. 81,207, at 11–15 (July 25, 2017), https://www.sec.gov/litigation/investreport/34-81207.pdf. If the tokens are securities, then the DAO's organizers violated U.S. securities laws by conducting a public offering without registering with the SEC or qualifying for an exemption from registration. *See id.* at 15–16. Because the 2016 DAO was unwound, the SEC did not prosecute the 2016 DAO organizers. *See id.* at 1. But the SEC has engaged in subsequent enforcement actions. *See* Order Instituting Cease-&-Desist Proceedings, Munchee, Inc., Securities Act Release No. 10445, at 10 (Dec. 11, 2017), https://www.sec.gov/litigation/admin/2017/33-10445.pdf; Complaint at 2, 5–6, Sec. & Exch. Comm'n v. PlexCorps, No. 17 CIV. 7007, 2017 WL 6398722 (E.D.N.Y. Dec. 4, 2017); Press Release, SEC, SEC Exposes Two Initial Coin Offerings Purportedly Backed by Real Estate and Diamonds (Sept. 29, 2017), https://www.sec.gov/news/press-release/2017-185-0.

II. ORGANIZATIONAL LAW AS A GAP FILLER

A. THE FIRM AS AN INCOMPLETE CONTRACT

This Article will focus on the blockchain's interaction with the default rules supplied by business associations law, but a brief review of the more general incomplete-contracting literature is in order. A complete contract would anticipate every possible contingency—an impossible feat: "There is an infinite number of possible future states and a very large set of possible partner types. When the sum of possible states and partner types is infinite and contracting is costly, contracts must contain gaps. Parties cannot write contracts about everything."[33] Given that gaps are inevitable, the question becomes how best to fill them. The incomplete-contracting literature weighs such issues as how to factor in the possibility of litigation,[34] renegotiation, judicial competence,[35] and whether gap-filling rules should be "majoritarian" or "penalty default" (of which more will be discussed in a moment). The focus of this Part, however, is on how the incomplete contracting literature relates to business forms.

Frank Easterbrook and Daniel Fischel developed "a contractual way of looking at the corporation."[36] Their insight is simple and profound: The myriad choices that entrepreneurs make when structuring a corporation form a web of contracts, both by explicit private ordering and by implicit use of the default rules and the principles of corporate law.[37] This corporation-as-contract metaphor formed the basis of an influential book, *The Economic Structure of Corporate Law*, in which the authors offered justifications for corporate-law doctrine based on economically efficient default rules.[38]

Fiduciary duty offers a familiar example of such a default principle.[39] Each decision a firm's executives make impacts the value of the firm. No explicit contract could govern all these decisions effectively. Such a contract "would be hopelessly incomplete, given the myriad complex decisions that firm managers must make in order to run the company. Instead, corporate

33. Alan Schwartz & Robert E. Scott, *Contract Theory and the Limits of Contract Law*, 113 YALE L.J. 541, 595 (2003).

34. Scott & Triantis, *supra* note 11, at 816.

35. *See* Gillian K. Hadfield, *Judicial Competence and the Interpretation of Incomplete Contracts*, 23 J. LEGAL STUD. 159, 162–64 (1994).

36. Easterbrook & Fischel, *supra* note 19, at 1433.

37. *Id.* at 1418 ("The corporation is a complex set of explicit and implicit contracts, and corporate law enables the participants to select the optimal arrangement for the many different sets of risks and opportunities that are available in a large economy.").

38. *See* FRANK H. EASTERBROOK & DANIEL R. FISCHEL, THE ECONOMIC STRUCTURE OF CORPORATE LAW 36 (1991).

39. *See* Ribstein, *supra* note 20, at 201.

fiduciary duty supplies a general gap-filling standard: firm managers should run the firm for shareholders' benefit."[40]

The bulk of *The Economic Structure of Corporate Law* analyzes other examples of corporate law contractual terms, such as the business judgment rule, procedures regarding derivative suits, appraisal remedies, laws related to corporate control transactions, and more.[41] Corporate law's function, in short, is:

> [A] set of terms available off-the-rack so that participants in corporate ventures can save the cost of contracting. There are lots of terms, such as rules for voting, establishing quorums, and so on, that almost everyone will want to adopt. Corporate codes and existing judicial decisions supply these terms "for free" to every corporation, enabling the venturers to concentrate on matters that are specific to their undertaking. Even when they work through all the issues they expect will arise, they are apt to miss something. All sorts of complexities will arise later. Corporate law—and in particular the fiduciary principle enforced by courts—fills in the blanks and oversights with the terms that people would have bargained for had they anticipated the problems and been able to transact costlessly in advance.[42]

In sum, corporate law fills the gaps of the necessarily incomplete contract of the corporation.

But the firm need not necessarily take the corporate form. For the metaphor of the firm as a nexus-of-contracts to apply, a corporation need not be at its center. As Easterbrook and Fischel point out, the first choice entrepreneurs make is to select a business form.[43] Today's would-be entrepreneurs face a relatively settled menu of firm choices: the partnership, the corporation, the limited partnership, the limited liability partnership, the limited liability company ("LLC") and, more recently, the benefit corporation and its cousins.[44] These forms are not all created equal. The default organization rules have always tilted in favor of the limited liability forms, and against the partnership.[45] Indeed, the law uses default rules to push entrepreneurs to the limited liability entity forms.[46] Easterbrook and Fischel

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40. Frederick Tung, *Gap Filling in the Zone of Insolvency*, 1 J. BUS. & TECH. L. 607, 612 (2007) (footnote omitted).

41. EASTERBROOK & FISCHEL, *supra* note 38, at 2.

42. Easterbrook & Fischel, *supra* note 19, at 1444–45.

43. *Id.* at 1417 ("Consider the domain of choice. The founders and managers of a firm choose whether to organize as a corporation, trust, partnership, mutual or cooperative.").

44. These include the flexible purpose corporation and L3C. Margaret M. Blair, *Reforming Corporate Governance: What History Can Teach Us*, 1 BERKELEY BUS. L.J. 1, 19 (2004).

45. *See* Frank H. Easterbrook & Daniel R. Fischel, *Limited Liability and the Corporation*, 52 U. CHI. L. REV. 89, 93–93 (1985).

46. *See id.* at 90.

suggested that these gap-fillers those forms afford are useful, but other scholars have made a more emphatic argument for them: Only organizational law can create impermeable barriers to protect the firm's participants from claims outside the firm.[47]

To understand the penalty default nature of the partnership form, one should start with a basic observation: In order to form a limited liability entity like a corporation or LLC, entrepreneurs must file required paperwork and pay a fee to the state under whose laws they intend to organize.[48] Once the entrepreneur receives confirmation of a successful filing, the limited liability entity is formed.[49] In contrast, the partnership, "probably the oldest form of business organization,"[50] does *not* require any official filing with a government entity or agency. All that the Revised Uniform Partnership Act requires for partnership formation is "the association of two or more persons to carry on as co-owners a business for profit."[51] Parties can create partnerships without even intending to do so.[52] Law school casebooks for the Business Associations course generally feature the story of hapless partners who formed a partnership without even knowing that they had done so.[53] All two people need to do is carry on as co-owners a business for profit—they need not even utter the words "partner" or "partnership" to be treated as such by the law.[54] Thus, the general partnership is the default form.[55]

What's more, the default form is unstable and porous, bringing with it considerable risks both to the individual and to the entity itself. The partnership form offers unlimited liability, meaning that the firm's creditors can reach the assets of its owners.[56] While a corporation's shareholder can

47. Henry Hansmann & Reinier Kraakman, *The Essential Role of Organizational Law*, 110 YALE L.J. 387, 393 (2000).

48. *See, e.g.*, DEL. CODE ANN. tit. 6, § 18-201(a) (West 2011 & Supp. 2018); REVISED UNIF. LTD. LIAB. CO. ACT § 201(a) (UNIF. LAW COMM'N 2013).

49. *See, e.g.*, DEL. CODE ANN. tit. 8, § 103.

50. Margaret M. Blair, *Locking in Capital: What Corporate Law Achieved for Business Organizers in the Nineteenth Century*, 51 UCLA L. REV. 387, 409 (2003) (quoting Robert W. Hillman, *Private Ordering Within Partnerships*, 41 U. MIAMI L. REV. 425, 428 (1987)).

51. REVISED UNIF. P'SHIP ACT § 202(a) (UNIF. LAW COMM'N 2013).

52. For example, the receipt of profits raises a presumption of partnership under section 202(c)(3) of the Revised Uniform Partnership Act.

53. *See, e.g.*, SMITH & WILLIAMS, *supra* note 28, at 55.

54. *See, e.g.*, REVISED UNIF. P'SHIP ACT § 202(a).

55. Ribstein, *supra* note 26, at 108 ("Any company that has not been formally organized under a nonpartnership statute could be considered a partnership."); Tremblay, *supra* note 26, at 276 ("It is an elementary principle of business organizations doctrine that a partnership arises by default, through an 'association of two or more persons to carry on as co-owners a business for profit . . . whether or not the persons intend to form a partnership.'" (alteration in original) (quoting REVISED UNIF. P'SHIP ACT § 202(a))).

56. REVISED UNIF. P'SHIP ACT § 306; Ribstein, *supra* note 20, at 192.

lose the full amount of her investment, her losses are capped at that amount.[57] In contrast, a partner of a general partnership can invest only $1,000, yet risks being jointly and severally liable for the full amount of the partnership's losses.[58]

General partnerships are also fragile creatures. The voluntary exit of a single partner triggers dissolution of the entire partnership.[59] Even worse, the creditors of any individual owner have a claim on the firm's assets as well —and traditionally can trigger dissolution to liquidate them.[60] The only protection the partnership form offers its partners is "weak entity shielding": Firm creditors have priority in the partnership assets over the personal creditors.[61] Still, the personal creditors of investors do have a claim on partnership assets, and have the power to dissolve the firm entirely.[62] Contracting to protect the firm from the claims of individual partners' creditors was difficult in practice because of moral hazard.[63]

The partnership form offers other default rules that differ greatly from the more familiar corporate framework. For example, the default partnership governance structure allots to each and every partner an equal vote—whether they contribute $100 or $1,000,000.[64] Majority vote governs ordinary partnership decisions, and a unanimous vote is required for extraordinary ones.[65] One's investment in a partnership is not freely transferable—a partner may only sell her share with the consent of all other partners.[66] While these rules may be unpalatable, parties can contract around them with relative ease. Those unsuspecting partners in the casebooks serve as cautionary tales to

57. Setting aside the risk of the corporate veil being pierced, a relatively rare occurrence when the corporate form is not sufficiently respected. Easterbrook & Fischel, *supra* note 45, at 89 ("Courts occasionally allow creditors to 'pierce the corporate veil,' which means that shareholders must satisfy creditors' claims. 'Piercing' seems to happen freakishly. Like lightning, it is rare, severe, and unprincipled.").

58. While it is true that partnerships also enjoy the benefit of pass-through taxation, this feature provides small comfort when one considers that the LLC form can furnish the same benefit while affording limited liability and asset segregation to boot.

59. REVISED UNIF. P'SHIP ACT § 801(1).

60. Henry Hansmann et al., *Law and the Rise of the Firm*, 119 HARV. L. REV. 1335, 1339 (2006).

61. *Id.* at 1337–38.

62. *Id.* at 1390–91. Under the Revised Uniform Partnership Act, this liquidation right is transformed into a mandatory buyout, where the creditors can require the firm to buy out the bankruptcy partner's interest. REVISED UNIF. P'SHIP ACT §§ 401(h), 701; *see also* UNIF. P'SHIP ACT § 18(e) (UNIF. LAW COMM'N 1914) ("All partners have equal rights in the management and conduct of the partnership business.").

63. *See* REVISED UNIF. P'SHIP ACT § 701; Hansmann et al., *supra* note 60, at 1340. In theory, each partner could negotiate a waiver preventing each of his or her personal creditors from recourse to the partnership, but each individual partner would be tempted to omit the waiver in order to lower the cost of credit. *Id.* at 1340–41.

64. REVISED UNIF. P'SHIP ACT § 401(a), (h); UNIF. P'SHIP ACT § 18(e).

65. REVISED UNIF. P'SHIP ACT § 401(k); UNIF. P'SHIP ACT §§ 9(2), 18(h).

66. REVISED UNIF. P'SHIP ACT § 401(k); *see id.* § 402(b)(3).

aspiring lawyers and entrepreneurs because of the two big risks partners cannot contract out of: unlimited liability and inherent entity instability.

The limited liability forms (and for simplicity's sake, I will use the corporate form as a stand-in for all of these forms) in contrast, mean more protection and stability than a partnership can afford. Most notably, the corporate form offers limited liability: While owners of these forms may lose money, their losses are capped at the amount they have invested in the firm.[67] Their personal assets are not "on the hook," as they are in the partnership form. Conversely, while a bankrupt shareholder will have to surrender her shares to her personal creditors, those creditors will have no recourse or rights with respect to the corporation itself.[68]

We can thus call the fact that the law supplies partnership as the default business organizational form a "penalty default" rule. The question as to what kind of default rules the law should supply to fill the gaps in incomplete contracts is a crucial one. Easterbrook and Fischel argued for majoritarian gap rules that supply terms that the parties would generally have bargained for had they considered a particular eventuality.[69] The term "penalty default rules," which was coined by Ayres and Gertner, denotes gap-filling rules that, rather than follow majoritarian preferences, impose penalties.[70] In theory, the specter of this penalty motivates the affected party to affirmatively state her preference, for fear of otherwise living with the penalty the law supplies.

Couple the many negative, or at least counter-intuitive, features of partnership law, with the fact that it is the default business association form, and we can characterize the partnership as a species of penalty default rule —a penalty default business form, if you will. A trap for the unwary, it incentivizes people to affirmatively make their preferences—for limited liability, entity stability, or voting rules—known by opting into a limited liability form. Indeed, in a piece defending the existence of penalty default rules in real life, Ayres himself referred to the partnership as a species of penalty default: "[I]t is possible to understand the general partnership as a 'penalty default.' That is, many, if not most, organizers of business firms may prefer characteristics that cannot be achieved through a general partnership; the structure of general partnership law creates incentives to choose other

67. *See, e.g.*, DEL. CODE ANN. tit. 6, § 18-303(a) (West 2011); Ribstein, *supra* note 20, at 189. While the LLC and other new forms also offer many of these features, for the sake of simplicity I focus solely on the corporate form.

68. Hansmann et al., *supra* note 60, at 1340. As an example of other attractive features of corporate law, in the corporate form, management is centralized in a board of directors. Ribstein, *supra* note 20, at 188. Shares are freely transferable, and the death or exit of its owners does not dissolve the corporation. *Id.* at 189.

69. *See* Ribstein, *supra* note 20, at 187–89.

70. Ayres & Gertner, *supra* note 10, at 91, 95.

organizational forms."[71] To the extent that partnership law offers entrepreneurs a penalty default, they can opt out of it in two different ways. First, there are certain default partnership rules—such as, for example, the democratic one-partner-one-vote rule—that they can contract out of amongst themselves.[72] But there are partnership features that one can only obtain, or most cheaply obtain, by way of adopting one of the limited liability forms.[73]

Indeed, as corporate law scholarship in the 1980s and 1990s came to be dominated by the nexus of contracts metaphor,[74] corporate law scholars searched for the raison d'etre of the business entity. This question arises anew when we confront the blockchain's world of self-enforcing contracts. Before approaching that question, background on the debate about what, if anything, corporate law provides that contract alone cannot will provide context for an appreciation of the unique promise of the blockchain for business associations.

B. THEORIES OF THE CORPORATE FORM

Corporate and business law scholars have written extensively on different characteristics of the corporate form, each trying to identify the essential function of organization law.[75] These scholars have articulated important theories, arguing that there are unique features of entity law in general, and corporate law in particular that cannot be replicated by contract alone.[76]

The main contenders for the "difference" of corporate law are partitioning of assets and limited liability.[77] These functions, it is argued, cannot be achieved except through the corporate form.[78] Interestingly, all of these theories require entity form not for the purposes of those *inside* the entity—who can presumably deal with their concerns via contract. Instead, it is the threat of those *outside* the firm, who cannot be reliably bound by contract that necessitates the corporate form.[79] The common thread in all of these justifications for the uniqueness of the corporate form is a basic limitation of traditional organizational law: It cannot reliably bind intra-firm assets for the protection of outside creditors, walling them off from the claims

71. Ian Ayres, *Ya-Huh: There Are and Should Be Penalty Defaults*, 33 FLA. ST. U. L. REV. 589, 604–05 (2006) (alteration in original) (quoting Deborah A. DeMott, *Transatlantic Perspectives on Partnership Law: Risk and Instability*, 26 J. CORP. L. 879, 892 (2001)).

72. *See* Hansmann et al., *supra* note 60, at 1392.

73. Hansmann & Kraakman, *supra* note 47, at 429.

74. William W. Bratton, Jr., *The "Nexus of Contracts" Corporation: A Critical Appraisal*, 74 CORNELL L. REV. 407, 409 (1989) ("This notion has achieved wide currency, showing up even in contexts in which the rest of the theory has little or no influence.").

75. *See generally, e.g.*, Hansmann & Kraakman, *supra* note 47 (arguing that effective management of creditors' rights is the primary role of organizational law).

76. *Id.* at 433–39.

77. *Id.* at 432–33.

78. *Id.* at 432–35.

79. *Id.* at 433.

of its owners' creditors (entity shielding, a form of asset partitioning).[80] Nor can it reliably protect investor-owners from the claims of the firm's own creditors' claims (limited liability).[81] Nor can it dependably safeguard the firm assets against liquidation, either voluntarily from one of the owners or involuntarily at the behest of an owner's creditors (lock-in).[82] Corporate law alone can shield assets and aggregate claims in the way necessary to facilitate capital formation and growth.[83]

Because the blockchain offers a self-enforcing contract that credibly binds and segregates assets, it has the potential to solve the problems of asset-partitioning and limited liability by means of contract alone. By laying bare all of its contracts on the blockchain, it drastically reduces the risk that third parties from outside the firm can make claims upon it. This transparency represents its challenge to business associations law: It can use contract to provide corporate-like functions in a new way. It is also nearly impervious to the default-supplying function that is so basic to business associations law, but that holds as much in the way of problem as in the way of promise. Before we can explore the general default function of business association law, however, let's review the different features of the corporate form scholars have identified as irreplicable by contractual means alone.

1. Limited Liability

Traditionally, the corporation's chief virtue was seen to lie in the unique protection against liability that it provides for shareholders.[84] Protecting the corporation's owners from its debts was an innovation designed to entice wary outside investors to risk their capital in new ventures. In the partnership form, investors were on the hook for any and all of the corporation's debts. In contrast, the corporation's limited liability protections effectively capped investor losses at the amount of capital invested.[85]

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80. Hansmann et al., *supra* note 60, at 1337.

81. *Id.* at 1340–41.

82. *Id.* at 1340–43.

83. Notably, the partnership form's drawbacks are the mirror image of features posited as the defining characteristics of the corporate form: (1) the partnership's creditors can reach the assets of its partner owners; (2) the individual partners' creditors can reach the assets of the firm, to the point of liquidating it; and (3) any partner's exit can force liquidation. Blair, *supra* note 50, at 409–12.

84. Ribstein, *supra* note 20, at 193. The author explains how limited liability became the chief advantage of incorporation:

> Thus, it has been said that "limitation or elimination of liability of the shareholders is not merely the chief single advantage of a business corporation but it is the advantage which in the estimation of legislatures and also in the estimation of the public is of more importance than all the other advantages put together. It is the main thing.

Id. (quoting EDWARD H. WARREN, CORPORATE ADVANTAGES WITHOUT INCORPORATION 399 (1929)).

85. *Id.* at 192.

While limited liability is traditionally viewed as a chief attraction of the corporate form, some scholars have questioned this premise.[86] At first blush, it might seem that because contract law is essentially enforceable only between the two contracting parties, the contractual relationship on its own cannot shield a party from the claims of the creditors of its counterparty.[87] The limited liability provided by the corporate form, via the asset partitioning mechanism, alone can provide a wall that shields the corporation's shareholders from corporate creditors and the corporation from its shareholders' creditors.[88] Yet unlike entity shielding, owner shielding can be obtained via contract "by requiring firm agents (including the owners themselves when they act on behalf of the firm) to negotiate clauses in the firm's contracts whereby firm creditors agree to limit or waive their right to levy on the owners' personal assets."[89]

Such contractual provisions would, however, be ineffective with respect to tort claims against the firm. Tort claimants by definition are free from any contractual limitation on their power to levy on the firm investor assets (because tort victims do not generally anticipate falling victim to future torts, particularly those inflicted upon them by specific tortfeasors).[90] Tort claimants thus would remain a constant threat for businesses that choose not to use the corporate form.[91] As a result, only business associations law, by providing state-provided limitation of liability from both a firm's tort creditors and its contract creditors, affords entrepreneurs with indemnity from losses in excess of initial investments.[92]

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86. Margaret Blair offers a historically based critique of the proposition that limited liability is the defining characteristic of the corporate form, observing that: "Although limited liability became one of the defining characteristics of the corporate form in the early and mid-twentieth century, many early corporations were organized under charters that did not grant limited liability." Blair, *supra* note 50, at 437.

87. Hansmann & Kraakman, *supra* note 47, at 407.

88. *Id.*

89. Hansmann et al., *supra* note 60, at 1341. Firm owners can enhance the effectiveness of this strategy by using a term such as "limited" in the firm's name to signal clearly to third parties that firm agents act without the authority to bind the owners' personal assets. Hansmann & Kraakman, *supra* note 47, at 430.

90. Ribstein, *supra* note 20, at 193.

91. John Morley has argued that, as a historical matter, this theoretical vulnerability to tort claims had little practical effect because "[t]ort liability was extremely rare prior to the mid-nineteenth century, and the doctrines of tort law remained poorly developed up through at least the early twentieth century." John Morley, *The Common Law Corporation: The Power of the Trust in Anglo-American Business History*, 116 COLUM. L. REV. 2145, 2182 (2016) (footnote omitted). He similarly discounts potential entity tax liability as a threat to would-be owners: "Tax liability was also relatively insignificant. Although the United Kingdom adopted a corporate income tax in 1803, its rates remained low for at least a century. And the United States did not successfully tax corporate income until 1909—even then, the rates were very low by modern standards." *Id.* (footnote omitted).

92. Ribstein, *supra* note 20, at 193.

While limited liability or "owner shielding" focuses on the risk that the entity's liabilities pose to investors, another candidate for the key defining characteristic of corporate law flips that rationale on its head. It focuses not on the risks that the debts of the entity pose to its owners, but instead on the risks that the debts of individual owners pose to the entity itself.

2. Asset Partitioning

Several scholars have focused on the corporate form's unique ability to insulate firm assets from the claims of the investors' creditors. In particular, Hansmann, Kraakman and Squire deem this characteristic of the corporate form to be a feature contract law cannot replicate.[93] Triantis highlights the ability of the firm to match, by means of subsidiaries, particular assets to the claims of particular creditors.[94] And Blair focuses on the fact that historically only the corporate form allowed for permanence in the face of claims within and outside the firm.[95]

According to Hansmann, Kraakman, and Squire, the "universal characteristic" of modern business firms is "entity shielding,"[96] that is, "the legal power to commit assets that bond their agreements with their creditors and, correlatively, to shield those assets from the claims of their owners' personal creditors."[97] These scholars deem it "practically impossible" to use contract to create effective entity shielding because each owner would have to require his or her personal creditors to waive any claims on firm assets.[98] If each partner were to negotiate a waiver in all contracts with each of his or her personal creditors, then in theory contractual entity shielding might be possible. But such a solution would entail not only high transaction costs but also, and more importantly, impose a high degree of moral hazard.[99] In particular, while having these waivers in place would benefit firm owners collectively by reducing borrowing costs, "each waiver would also increase personal borrowing costs, and that cost would be borne entirely by the owner who negotiated the waiver. Each owner would thus face an incentive to act opportunistically by omitting the waivers from personal dealings."[100] Policing the omission of such waivers would prove difficult, particularly as the number

93. *See* Hansmann et al., *supra* note 60, at 1340–41.

94. *See* George G. Triantis, *Organizations as Internal Capital Markets: The Legal Boundaries of Firms, Collateral, and Trusts in Commercial and Charitable Enterprises*, 117 HARV. L. REV. 1102, 1104, 1106 (2004).

95. Blair, *supra* note 50, at 429–30.

96. Hansmann et al., *supra* note 60, at 1336. "Entity shielding" replaced the earlier (and clunkier) description "affirmative asset partitioning," which Hansmann and Kraakman used in their prior article, *The Essential Role of Organizational Law. Id.* (citing Hansmann & Kraakman, *supra* note 47, at 393–95).

97. *Id.*

98. *Id.* at 1340.

99. *Id.*

100. *Id.*

of owners increases. "[T]he policing problem is further compounded if ownership shares are freely transferable. These problems can be solved only by impairing the rights of personal creditors without their contractual consent (and often even without notice). Doing that requires a special rule of property law for assets committed to the firm."[101] They conclude that "[e]ntity law provides that rule."[102] Thus, Hansmann, Kraakman, and Squire conclude that it is entity shielding, not owner shielding that is the "sine qua non" of the legal entity.[103]

Another scholar, George Triantis, focuses on other aspects of asset partitioning as unique to the corporate form. He posits that corporate law functions to demarcate firm boundaries.[104] According to him, internal capital markets increase the flexibility and discretion of corporate managers to allocate capital between projects, and the corporate form's ability to separate these internal capital markets into distinct entities via subsidiaries creates "barriers to capital movements across the boundaries of such entities, even when they are subject to common control."[105] The corporate form alone can create these durable divisions in the corporate family.

Finally, Margaret Blair argues that the corporation's unique ability to lock in capital is what sets it apart as a historical matter. "When a corporation is formed, initial investors not only commit a pool of capital to be used in the business, but they also yield control over the business assets and activities to a board of directors that is legally independent of both shareholders and managers."[106] Blair argues that this surrender of legal control rights by equity investors and other corporate participants facilitates efficient team production.[107] The general partnership form, in contrast, is inherently unstable because the voluntary exit of any individual triggers the dissolution of the firm.[108]

3. Exceptions that Prove the Rule

Thus far, I have characterized the partnership form as a kind of penalty-default organizational form, that the existence of which serves to motivate entrepreneurs to opt for other business forms. Historically, this penalty default has forced firms into a corporate-like form, illustrating the limits of contract alone. Scholars like Hansmann, Kraakman, Squire, Triantis, and Blair have asserted various theories for what characteristic makes limited liability entities special, and the main contenders are limited liability, entity

101. *Id.* at 1340–41.
102. *Id.* at 1341.
103. *Id.* at 1338.
104. *See* Triantis, *supra* note 94, at 1105.
105. *Id.* at 1106.
106. Blair, *supra* note 50, at 393.
107. *Id.*
108. *See* Hansmann et al., *supra* note 60, at 1342.

shielding and asset segregation.[109] Two scholars have recently challenged this narrative.

Looking back in time, John Morley recently made the case for the trust as an early—and still viable—alternative to the corporate form in American legal history. According to Morley, the trust form resembles the corporation because it approximates the innovative "legal technologies" of limited liability, legal personhood, and the opportunity to create tradable shares.[110] We have seen that the entity shielding provided by the corporate form prevents the owners' creditors from forcing the entity to liquidate.[111] In similar fashion, the trust protects the trust's beneficiaries from instability because they transfer title of their property to the trust.[112] A borrower's creditor only has claims on the borrower's property, and if title of Blackacre has passed to a trust, it is shielded from the borrower's creditors because it is no longer technically the borrower's property at all.[113] This ancient and relatively simple mechanism is thus able to provide entity shielding. Finally, the law evolved to give trust beneficiaries limited liability from the claims of trust creditors and other corporate-like features.[114] The main point for our purposes is that the non-corporate form of the trust for centuries has exhibited many of the supposedly unique features of the corporation.

Another modern business firm—the reciprocal insurance exchange—fits the same mold. Andrew Verstein has described this business structure as an example of "enterprise without entity."[115] "A 'reciprocal exchange' is an insurance enterprise in which all insurance subscribers contract directly with one another, promising to pay a share of any losses the others suffer."[116] The unique world of the reciprocal exchange provides "no legal entity at the contractual core."[117] Instead, "[a] thick braid of contracts unites a circle of natural persons, each of whom participates as part of the enterprise."[118] Verstein argues that reciprocals have used a combination of contract law and insurance regulation to achieve asset partitioning.[119]

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109. *See supra* notes 84–108 and accompanying text.

110. Morley, *supra* note 91, at 2148.

111. *See* Hansmann et al., *supra* note 60, at 1337.

112. *See* Morley, *supra* note 91, at 2154.

113. *Id.* at 2169.

114. *Id.* at 2176–77. While trustees, the central governing body of the trust, did sometimes face liability, so did contemporaneous corporate directors. *Id.* at 2180.

115. *See generally* Andrew Verstein, *Enterprise Without Entities*, 116 MICH. L. REV. 247 (2017) (exploring the reciprocal exchange, an insurance company that exists apart from any legal entity).

116. *Id.* at 249.

117. *Id.*

118. *Id.*

119. *Id.* at 251.

Perhaps these examples teach us that claims to corporate law exceptionalism are, like Twain's death, greatly exaggerated.[120] On the other hand, these examples may prove the rule. Although the "essential" corporate law features may be subject to duplication, the real-world use of trusts and reciprocal exchanges to achieve these goals is rare. In general, to avoid the penalty default of partnership, entrepreneurs of have long opted for limited liability entities.[121]

But a new technology, the blockchain, offers the potential to change that. And critical steps in that direction have already taken place.

III. THE 2016 DAO

This Part shifts attention to the blockchain, including by describing the 2016 DAO's rise and fall in considerable detail. The story is fascinating in its own right, but its importance for this Article is twofold. First, it demonstrates the potential for business associations to exist on the blockchain, using smart contracts to effectuate the functions of business law. Without the constraints imposed by ordinary legal rules, DAOs can structure contractual relations in a way impossible in the corporeal world, unfettered by the partnership penalty default the law would otherwise impose. But the story of the DAO also demonstrates, in vivid manner, the peril of smart contracting. All contracts are necessarily incomplete.[122] The 2016 DAO is a cautionary tale about the limits of relying on a "code is law" model when (as inevitably happens) gaps in the nexus of contracts emerge without a legal intervention point on which the law can work.

A. BACKGROUND

Blockchain technology, also called distributed ledger technology ("DLT"), offers four primary and related benefits: it is decentralized, it is transparent, it is (or at least can be) anonymous, and it is nearly impossible to manipulate.[123] Ledgers are an ancient method of recording transactions —think clay tablets or papyrus.[124] Distributed ledgers are a record-keeping device that exist across a large, shared network.[125] Each network participant's computer (or node) stores a copy of the ledger, which is simultaneously updated across the network whenever any change occurs.[126] This

120. Laura I. Appleman, *Reports of* Batson*'s Death Have Been Greatly Exaggerated: How the* Batson *Doctrine Enforces A Normative Framework of Legal Ethics*, 78 TEMP. L. REV. 607, 607 n.1 (2005).

121. *See* Ayres & Gertner, *supra* note 10, at 91.

122. *Id.* at 92–93.

123. Patrick Murck, *Who Controls the Blockchain?*, HARV. BUS. REV. (April 19, 2017), https://hbr.org/2017/04/who-controls-the-blockchain.

124. Nolan Bauerle, *What is a Distributed Ledger?*, COINDESK, https://www.coindesk.com/information/what-is-a-distributed-ledger (last visited Nov. 1, 2018).

125. *Id.*

126. *Id.*

"distribution" is a key differentiator from typical "fiat" currency, where a single trusted authority validates each transaction.[127] Instead of a central authority authenticating and communicating transactions, each of the nodes independently verifies proposed additions to the ledger, or blockchain.[128] If a majority of the nodes verify the transaction, it is added to the blockchain.[129]

Bitcoin, the first widely publicized blockchain, was purely a virtual currency, facilitating simple purchases between parties.[130] But the next generation of blockchains were developed to layer "smart contracts" on top of the virtual currencies they offered.[131] Ethereum is a prominent example of such a "smart contract" blockchain that uses "ether" as a unit of currency.[132] The Ethereum blockchain permits the central recording not just of an exchange, but of contractual conditions and limits on the circumstances under which an exchange can occur.[133] Indeed, while Bitcoin was designed intentionally as a crypto-currency, Ethereum was created specifically for users to develop new app designs to layer on top of its blockchain to facilitate smart contracts.[134]

The concept of a "smart contract" merits close attention. As a historical matter, a contract is a promise that can be legally enforced.[135] First-year contracts students learn the difference between promised gifts and promises that are enforceable because they are supported by consideration. In contrast, a "smart contract" is one as to which enforcement is automatic, and does not depend on the law for enforcement.[136] These contracts need not be high-tech—Szabo, who first coined the term, used as his example the vending machine.[137] On blockchains like Ethereum, a "smart contract" generates an

127. *Id.*

128. Aleksandr Bulkin, *Explaining Blockchain—How Proof of Work Enables Trustless Consensus*, MEDIUM: KEEPING STOCK (May 3, 2016), https://keepingstock.net/explaining-blockchain-how-proof-of-work-enables-trustless-consensus-2abed27f0845.

129. Bauerle, *supra* note 124. Each blockchain devises ways to authenticate and to reward the nodes for their work (e.g., mining), but these methods are irrelevant for the purposes of this Article.

130. Bernard Marr, *A Short History of Bitcoin and Crypto Currency Everyone Should Read*, FORBES (Dec. 6, 2017, 12:28 AM), https://www.forbes.com/sites/bernardmarr/2017/12/06/a-short-history-of-bitcoin-and-crypto-currency-everyone-should-read.

131. Madeira, *supra* note 4.

132. Ethereum was launched by Ethereum and accepted bitcoin payment at its ICO in exchange for a usage token running on a new protocol. Steven McKie, *Understanding the Ethereum ICO Token Hype*, BLOCKCHANNEL (June 14, 2017), https://medium.com/blockchannel/un derstanding-the-ethereum-ico-token-hype-429481278f45; *What is Ethereum? A Step-by-Step Beginners Guide*, BLOCKGEEKS, https://blockgeeks.com/guides/what-is-ethereum (last updated Sept. 12, 2018).

133. McKie, *supra* note 132.

134. *See* Marr, *supra* note 130.

135. 1 WILLISTON ON CONTRACTS § 1:1 (4th ed. 2018).

136. *See* McKie, *supra* note 132.

137. Werbach & Cornell, *supra* note 1, at 323 (citing Nick Szabo, *Formalizing and Securing Relationships on Public Networks*, FIRST MONDAY (Sept. 1, 1997), http://ojphi.org/ojs/index.php/fm/article/view/548/469).

automatically enforceable promise,[138] but one available without recourse to the law.

One of Ethereum's founders participated in an ambitious effort to use Ethereum's blockchain to create a business organization—although a business organization unlike any other.[139] He called it a "decentralized autonomous organization," or DAO.[140] In general, DAOs build upon two other concepts—autonomous agents and decentralized organizations:

> [I]n an autonomous agent, there is no necessary specific human involvement at all . . . while some degree of human effort might be necessary to build the hardware that the agent runs on, there is no need for any humans to exist that are aware of the agent's existence. One example of an autonomous agent that already exists today would be a computer virus.[141]

Decentralized organizations are intended to replace corporate organizations:

> Instead of a hierarchical structure managed by a set of humans interacting in person and controlling property via the legal system, a decentralized organization involves a set of humans interacting with each other according to a protocol specified in code, and enforced on the blockchain. A D[A]O may or may not make use of the legal system for some protection of its physical property, but even there such usage is secondary.[142]

The first DAO launched on April 30, 2016 ("2016 DAO").[143] Its central idea, articulated in a white paper authored by Slock.it Chief Technology Officer Christoph Jentzsch,[144] was to establish an "automated investment fund."[145] This began the "28-day Creation phase," or funding phase.[146] During this phase "investors" could send ether to the 2016 DAO's account on Ethereum, with early investors receiving more tokens for their ether than

138. Murck, *supra* note 123.

139. *See* Madeira, *supra* note 4.

140. *Id.*

141. Vitalik Buterin, *DAOs, DACs, DAs and More: An Incomplete Terminology Guide*, ETHEREUM BLOG (May 6, 2014), https://blog.ethereum.org/2014/05/06/daos-dacs-das-and-more-an-incomplete-terminology-guide.

142. *Id.*

143. David Siegel, *Understanding the DAO Attack*, COINDESK (June 25, 2016, 4:00 PM), http://www.coindesk.com/understanding-dao-hack-journalists.

144. Christoph Jentzsch, Decentralized Autonomous Organization to Automate Governance (unpublished white paper), https://download.slock.it/public/DAO/WhitePaper.pdf (last visited Nov. 1, 2018).

145. *The DAO of Accrue*, ECONOMIST (May 19, 2016), https://www.economist.com/finance-and-economics/2016/05/19/the-dao-of-accrue.

146. Kirk, Reply to *How Did "The DAO" Come About? What was the Process of its Formation?*, STACK EXCHANGE: ETHEREUM (Aug. 24, 2016, 12:15 PM), https://ethereum.stackexchange.com/questions/8250/how-did-the-dao-come-about-what-was-the-process-of-its-formation.

subsequent investors.[147] The 2016 DAO then converted ether to DAO tokens,[148] which were "divisible, indistinguishable" and "freely transferable."[149] The 2016 DAO initial offering was a tremendous success. It raised over $150 million, attracting almost 14% of all ether tokens then in existence.[150]

The DAO's organizers took great pains to ensure that it was, in fact, decentralized. The DAO's token creation code was open source code, where anyone could copy or modify the original code, and it was written by the Slock.it team.[151] Due to concerns over the creation of a centralized system, "the Slock.it team got behind an effort to release the code to the wild and thus facilitate the possibility of a 'pure DAO' rather than a Slock.it

147. Antonio Madeira, *How Does an ICO Work*, CRYPTOCOMPARE (Sept. 10, 2018), https://www.cryptocompare.com/coins/guides/how-does-an-ico-work.

148. *Id.*; s*ee also* Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO, Exchange Act Release No. 81,207, *supra* note 32, at 6 ("The token price fluctuated in a range of approximately 1 to 1.5 ETH per 100 DAO Tokens, depending on when the tokens were purchased during the Offering Period.").

149. Jentzsch, *supra* note 144, at 2.

150. Andrew Tar, *SEC Ruling on the DAO and ICO, Explained*, COINTELEGRAPH (July 27, 2017), https://cointelegraph.com/explained/sec-ruling-on-the-dao-and-ico-explained. Accounts of the distribution of tokens across accounts varies. According to one source, the largest owner of DAO tokens owned only up to 4% and the top 100 owners owned only 46%. Gertrude Chavez-Dreyfuss, *Virtual Company May Raise $200 Million, Largest in Crowdfunding*, REUTERS (May 17, 2016, 4:50 PM), https://www.reuters.com/article/us-blockchain-crowdfunding/virtual-company-may-raise-200-million-largest-in-crowdfunding-idUSKCNoY82LI. Another describes the number of investors and total investment as more concentrated:

> Investments arrived from about 22,500 different Internet addresses, but the same people could be using multiple address. Jentzsch guesses about 10,000 individual investors in all have contributed to the project. A few individuals seem to have an especially great interest in the project: About half of the $168 million came from around 70 addresses.

Cade Metz, *The Biggest Crowdfunding Project Ever—the DAO—is Kind of a Mess*, WIRED (June 6, 2016, 7:00 AM), https://www.wired.com/2016/06/biggest-crowdfunding-project-ever-dao-mess. In part due to concerns about the adverse effects on intense concentration of ownership, the code itself was added to Ethereum by various anonymous sources, one of these was picked randomly to become the address of the 2016 DAO, and the Creation phase, or funding phase as described above, began. Christoph Jentzsch, *The History of the DAO and Lessons Learned*, SLOCK.IT BLOG (Aug. 24, 2016), https://blog.slock.it/the-history-of-the-dao-and-lessons-learned-d0674of8cfa5 ("After the release of the Framework code version 1.0, multiple DAOs were immediately deployed to the Ethereum Blockchain by several individuals. One address was chosen at random by the community, and the creation of what will be known as 'The DAO' began.").

151. *See The Standard DAO Framework, Including Whitepaper*, GITHUB, https://github.com/slockit/DAO (last visited Nov. 1, 2018) ("We are making the Standard DAO Framework we developed free and open source, so it can be reused by anyone wishing to put together a transparent organization where governance and decision making systems are immutably programmed in the Ethereum blockchain.").

DAO. . . . A Slock.it DAO would not have been a 'true' DAO as it would have been excessively centralized."[152]

Integral to the promise of the 2016 DAO was that it was truly an autonomous organization. Taking as a guide Lessig's famous precept that "code is law,"[153] the organizers envisioned a world where, once the 2016 DAO was up and running, it would continue without any modifications. Its website stated:

> The terms of The DAO Creation are set forth in the smart contract code existing on the Ethereum blockchain at oxbb9bc244d798123f de783fcc1c72d3bb8c189413. Nothing in this explanation of terms or in any other document or communication may modify or add any additional obligations or guarantees beyond those set forth in The DAO's code.[154]

In the film version of this Article, cue the foreboding music.

B. GOVERNANCE OF THE 2016 DAO

Tokens gave DAO tokenholders both ownership and property rights.[155] Much as in the corporate form, each token represented voting power, and thus the holder of more tokens had a larger say in governance than the holder of fewer tokens (as opposed to the default one-partner, one-vote apportionment of the partnership form).[156] The primary voting function was anticipated to be for specific proposals, to be funded with the ether the DAO held.[157]

While the proponents of the DAO point to its decentralized nature, the structure of the DAO itself was projected to make use of "curators" and "contractors."[158] Curators were to control the addition of smart contracts, or project proposals, to the DAO by contractors, who would complete the approved project proposals in exchange for ether from the DAO.[159] Any tokenholder could submit a proposal to become a contractor for the 2016 DAO by writing a smart contract and publishing it on the blockchain, and describing its details on the DAO website.[160] Additionally, it had to pay an ether deposit that it would forfeit if the proposal failed to achieve a quorum

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152. Redakcja, *#SundayInterview. How to Revolutionize Sharing Economy?*, BITHUB.PL (June 3, 2018), https://bithub.pl/typ/sundayinterview-how-revolutionize-sharing-economy.

153. *See* LESSIG, *supra* note 29, at 5.

154. chris4210, *An Open Letter To the DAO and the Ethereum Community*, STEEMIT, https://steemit.com/ethereum/@chris4210/an-open-letter-to-the-dao-and-the-ethereum-community (last visited Nov. 1, 2018).

155. *See* Jentzsch, *supra* note 144, at 2.

156. *Id.* at 1–2.

157. *Id.* at 2.

158. *Id.* at 1–3.

159. *Id.*

160. *Id.* at 2.

of tokenholders.[161] An early proposal example, from the Slock.it team itself, involved creating a physical lock that could be opened remotely, to allow Airbnb style access to homes for rent.[162]

After submitting a proposal, the aspiring contractor would wait for a curator to verify that any contract code submitted by a prospective contractor did in fact match the contract as published on the blockchain, and to verify that the proposal came from an identified person or organization.[163] Curators thus controlled the addition of smart contracts, or project proposals, to the 2016 DAO by contractors. The curators controlled the whitelist of those contractors authorized to receive ether from the DAO.[164] The 2016 DAO boasted of having as curators "the best and brightest developers at Ethereum."[165]

After being approved by a curator for the whitelist, a debate period of a minimum of two weeks would allow for the community to debate and vote on the proposal.[166] After the debate period concluded, any tokenholder could require the DAO to verify that quorum was reached and a majority of votes were cast in favor of the proposal.[167] If a tokenholder disagreed with a proposal of the DAO, he or she would vote against the proposal.[168]

The role of the curators in the 2016 DAO was controversial, and subject to criticism. One potential problem was that the curators had approval over contractor proposals before they were put up to a tokenholder vote.[169] This power was put in place primarily as a diligence function, because the DAO smart contract could not on its own separate genuine "real world" proposals from fake ones, but it also allowed for curators to favor companies they preferred.[170] Curators could also affect the result by choosing the order that different proposals were put forward to the token holders, favoring certain deals by submitting them to tokenholder vote first.[171]

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161. *Id.*

162. Ian Allison, *Ethereum-based Slock.it Reveals First Ever Lock Opened with Money*, INT'L. BUS. TIMES, http://www.ibtimes.co.uk/ethereum-based-slock-reveals-first-ever-lock-opened-money-1527014 (last updated Dec. 17, 2015, 1:15 PM); Stephan Tual, *Decentralized Smart Devices with Stephan Tual from Slock.it*, POSTSCAPES, https://www.postscapes.com/iot-voices/interviews/smart-devices-ethereum-stephan-tual (last visited Nov. 1, 2018).

163. Jentzsch, *supra* note 144, at 2–3.

164. *Id.* at 2, 7.

165. *Ethereum's New DAO Looks to Turn Businesses Into Decentralized Code*, BITCONNECT (May 2, 2016), https://bitconnect.co/bitcoin-news/139/ethereums-new-dao-looks-to-turn-businesses-into-decentralized-code.

166. Jentzsch, *supra* note 144, at 2.

167. *Id.* Quorum requirements were initially set at 20%, unless a proposal was for the transfer of all ether the DAO had ever received and was then set at 53.33%. *Id.*

168. *Id.*

169. *Id.*

170. *Id.* at 3.

171. *Id.* at 2–3.

The 2016 DAO organizers defended the use of curators, saying that they merely served an administrative function.[172] They also claimed that there was an additional check on the curators' control because the DAO selected curators via vote, adding an element of democracy.[173] However, Jentzsch's white paper itself observed that limiting the DAO to one curator would give that individual "considerable power."[174]

Notably, the 2016 DAO organizers were relatively sophisticated in their governance analysis. One marker of such sophistication was understanding the potential perils posed to the minority. Jentzsch formalized protection for the minority investors from what he called a "[m]ajority robs minority attack" by creating an exit mechanism.[175] As he points out, once capital is invested, the minority becomes vulnerable to majority oppression,

> [B]y changing governance and ownership rules after DAO formation. For example, an attacker with 51% of the tokens, acquired either during the fueling period or created afterwards, could make a proposal to send all the funds to themselves. Since they would hold the majority of the tokens, they would always be able to pass their proposals.[176]

Jentzsch proposed a creative mechanism to protect the minority from this type of oppression: a split.[177] If a tokenholder disagreed with a proposal that the majority proposed, or simply wanted to withdraw its ether before the proposal was funded, it could propose to form a new DAO, termed a "split-DAO" or "child DAO."[178] Any tokenholders that voted for the proposal could

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172. An early Curator, Gavin Would, described his role as

> trivial and entirely algorithmic—no judgement whatsoever is required. They exist purely as a means of identity-verification. They remain in their role only at the sufferance of the DAO stakeholders and may be replaced at any time and for any reason. They have no power of oversight. The "curators" are not founders and being a "curator" should not be taken as an endorsement of the DAO. As a "curator," I never had any intention of offering advice to users on which projects they fund. Many (myself included) had no role in its creation over and above offering technical insight into Christoph [Jentzsch's] whitepaper: I was not involved in the conception or creation of the DAO. I agreed to the role in order to support this exciting project in its early stages in the extremely limited scope of identity verification primarily because it is autonomous: it needs nothing more!

Gav Would, *Why I've Resigned as a Curator of the DAO*, MEDIUM (May 13, 2016), https://medium.com/@gavofyork/why-ive-resigned-as-a-curator-of-the-dao-238528fbd447.

173. Andrew Quentson, *Are The DAO Curators Masters or Janitors?*, COINTELEGRAPH (June 12, 2016), https://cointelegraph.com/news/are-the-dao-curators-masters-or-janitors; Alexis Roussel, *The DAO, The Curators: Evaluating and Mitigating the Legal Risks*, BITY (May 14, 2016), https://blog.bity.com/2016/05/14/the-dao-the-curators-evaluating-and-mitigating-the-legal-risks.

174. Jentzsch, *supra* note 144, at 2.

175. *Id.*

176. *Id.*

177. *Id.*

178. *Id.* at 2, 9; Siegel, *supra* note 143.

move their portion of the ether to the new DAO with a new proposed curator.[179] There was no quorum requirement, allowing any single token holder to exit the DAO on his or her own.[180] Split proposals took seven days to 'mature' and attract participants—seven days less than the two week minimum proposal period, to ensure that token holders could retrieve their funds before a "potentially malicious proposal" was approved.[181] Any participants voting "yes" in the split would mean that the ether controlled by the splitters would go into the split-DAO, paying out any accrued "reward" pro-rata to the splitters.[182]

C. THE "HACK" AND HARD FORK

Ironically, the split-DAO mechanism intended to protect the minority carried within it the seeds of the DAO's undoing. On June 12, Slock.it member and Ethereum co-founder Stephen Taul announced that a "recursive call bug" was found in the DAO's code.[183] In essence, the problem was that it allowed a requester of tokens to receive tokens in a split DAO without updating the requester's balance before the tokens were sent.[184] Because the requester's balance was not updated until the end of the string of code, the splitter could repeat the request for additional tokens before his or her balance was updated and thus, continue to receive tokens.[185] It would be as if a bank customer could take out funds from an ATM without her checking account updating to reflect the withdrawal. The concerns over this bug proved fatal when, on June 17th, 2016, someone took advantage of the recursive bug and siphoned $50 million of ether into a split-DAO.[186]

While most media outlets characterized this attack as a "hack," an open letter purporting to be from the perpetrator of the June 17th attack, addressed "To the DAO and the Ethereum community," disagreed:

> I have carefully examined the code of The DAO and decided to participate after finding the feature where splitting is rewarded with additional ether. I have made use of this feature and have rightfully claimed 3,641,694 ether, and would like to thank the DAO for this reward. It is my understanding that the DAO code contains this

179. Jentzsch, *supra* note 144, at 2.

180. *Id.* at 3.

181. *Id.*

182. *Id.* at 2.

183. Siegel, *supra* note 143.

184. *See* Jentzsch, *supra* note 144, at 2.

185. Phil Daian, *Analysis of the DAO Exploit*, HACKING, DISTRIBUTED (June 18, 2016, 1:11 AM), http://hackingdistributed.com/2016/06/18/analysis-of-the-dao-exploit (providing a detailed technical explanation of the recursive bug with pictures of the code itself).

186. Rob Price, *Digital Currency Ethereum is Cratering Because of a $50 Million Hack*, BUS. INSIDER (June 17, 2016, 5:34 AM), https://www.businessinsider.com/dao-hacked-ethereum-crashing-in-value-tens-of-millions-allegedly-stolen-2016-6.

> feature to promote decentralization and encourage the creation of "child DAOs". [sic]
>
> I am disappointed by those who are characterizing the use of this intentional feature as "theft". [sic] I am making use of this explicitly coded feature as per the smart contract terms and my law firm has advised me that my action is fully compliant with United States criminal and tort law. For reference please review the terms of the DAO . . . .[187]

The letter proceeded to quote from the DAO's terms, which stated:

> The terms of The DAO Creation are set forth in the smart contract code existing on the Ethereum blockchain at oxbb9bc244d798123 fde783fcc1c72d3bb8c189413. Nothing in this explanation of terms or in any other document or communication may modify or add any additional obligations or guarantees beyond those set forth in The DAO's code. Any and all explanatory terms or descriptions are merely offered for educational purposes and do not supercede or modify the express terms of The DAO's code set forth on the blockchain; to the extent you believe there to be any conflict or discrepancy between the descriptions offered here and the functionality of The DAO's code at oxbb9bc244d798123fde783fcc1 c72d3bb8c189413, The DAO's code controls and sets forth all terms of The DAO Creation.[188]

That ominous music is crescendoing now. The smart contract that had created the DAO thus sowed the seeds of its undoing. The founders had no contractual way to address the hack. Neither they, nor anyone else, could reverse the transaction and restore the split DAO funds to the main DAO account.

Yet one way out remained. Because each DAO transaction was recorded in the Ethereum blockchain, if enough of the Ethereum network agreed to it, the Ethereum team could release a new version of the underlying blockchain—essentially altering the ledger to reverse all of the DAO exploiter's transactions. These changes to the Ethereum protocol were referred to as the "hard fork" solution because the change would split, or fork, the blockchain into two separate and incompatible chains: the original blockchain on which the split DAO occurred, and the revised chain that would erase all of the 2016 DAO transactions.[189] This hard fork solution restored the money siphoned off, but also undermined the central premise

187. chris4210, *supra* note 154.

188. *Id.*; Gilot, *supra* note 17.

189. Jeffrey Berns, *Understanding Ethereum and the DAO Conundrum*, ETH NEWS (July 5, 2016, 5:12 PM), https://www.ethnews.com/understanding-ethereum-and-the-dao-conundrum.

and promise of the DAO—that the underlying code constituted the unalterable "law" of the DAO, upon which all participants could rely.[190]

The 2016 DAO thus presented an existential crisis. Indeed, the hard fork proposal created great controversy within the Ethereum community, with a fundamental difference of opinion between hard-fork supporters and blockchain purists.[191] Ultimately, the hard fork was supported by a supermajority (85-89%) of ether holders.[192] The Ethereum network erased the blockchain from the point of the token diversion forward, wiping out its effects.[193] All original 2016 DAO investors were refunded, but the hard fork effectively led to the dissolution of the 2016 DAO.[194] Ethereum Classic exists as a kind of alternate reality blockchain version of Ethereum, trading at a significant discount but continuing nonetheless.[195]

D. THE DAO'S UNEASY FIT IN EXISTING ORGANIZATIONAL LAW

What does one make of the 2016 DAO story? The first challenge is to locate the 2016 DAO within range of traditional business entities. Historically, limited liability status has been available only by filing an organizational document with a governmental agency, and fulfilling appropriate statutory requirements.[196] Governing rules typically require specifying the entity's organizers, its initial capital structure, its registered agent for service of process purposes, and the payment of the requisite filing fee.[197]

The DAO organizers disclaimed any legal organizational structure.[198] Yet these disclaimers are to no avail when it comes to the application of partnership's default rules. The 2016 DAO participants entered into an

190. Paul Vigna, *Ethereum Gets its Hard Fork, and the 'Truth' Gets Tested*, WALL ST. J. (July 20, 2016, 10:56 AM), http://blogs.wsj.com/moneybeat/2016/07/20/ethereum-gets-its-hard-fork-and-the-truth-gets-tested.

191. Note, many DAO investors and ether users discussed the proposal on the online message boards.

192. Madeira, *supra* note 4; Yermack, *supra* note 18, at 23, 28.

193. Madeira, *supra* note 4.

194. *Id.* One legacy of the hard fork solution is that the old Ethereum blockchain continues to exist as "Ethereum Classic." Burgess Powell, *Ethereum (ETH) vs Ethereum Classic (ETC): What Are the Differences?*, BLOCKER (Oct. 4, 2018), https://blocklr.com/guides/ethereum-eth-vs-ethereum-classic-etc. On November 1, 2018, Ethereum Classic traded at $8.96, while Ethereum traded at $196.56. COINBASE, https://www.coinbase.com (last visited Nov. 1, 2018).

195. Antonio Madeira, *What is Ethereum Classic*, CRYPTOCOMPARE (Sept. 10, 2018), https://www.cryptocompare.com/coins/guides/what-is-ethereum-classic.

196. *See, e.g.*, DEL. CODE ANN. tit. 6, § 18-201(a) (West 2011 & Supp. 2018); REVISED UNIF. LTD. LIAB. CO. ACT § 201 (UNIF. LAW COMM'N 2013).

197. DEL. CODE ANN. tit. 6, § 18-201(a); REVISED UNIF. LTD. LIAB. CO. ACT § 201.

198. The legal status of DAOs remains the subject of active and vigorous debate and discussion. Not everyone shares the same definition. Some have said that they are autonomous code and can operate independently of legal systems; others have said that they must be owned or operated by humans or human created entities. Anyone who uses DAO code will do so at their own risk. Jentzsch, *supra* note 144, at 2.

association of two or more persons to carry on as co-owners a business for profit. Foolish or naïve, they tried to disclaim joint and several unlimited liability, but they could not. They were at risk for the full total of the firm's debt, and in theory the firm could be liquidated by any one of the tokenholders' creditors. Cases are legion about how courts use a functional approach to determine whether a partnership was formed.[199] Indeed, the sharing of profits is prima facie evidence of a partnership,[200] and the 2016 DAO expressly contemplated that tokenholders would participate in the profits of the business.

The 2016 DAO organizers and DAO enthusiasts often slipped into corporate terminology when describing the potential of the DAO. They rhapsodized about its ability to do away with the board of directors, creating a new level of transparency and direct involvement befitting a virtual corporation.[201] But because they failed to take the requisite statutory steps, they did not create a corporation. The irony was that instead they created the age-old business organization, a partnership.[202]

And that, with the major exception of the impact of U.S. securities law (of which more will be discussed later) is as far as the 2016 DAO goes in terms of organizational law. Yet that's not the end of the story. While the 2016 DAO failed spectacularly, its existence raises the prospect of a radically new phenomenon. The DAO of the future could be an entity that, via a combination of contract and the peculiar characteristics of the blockchain, exhibits the features formerly only available to corporations: limited liability and asset partitioning, including liquidation protection.

This newfound power is the result the blockchain's nature as a public ledger. As we have seen, in traditional business associations, only the corporate form can reliably separate firm assets from the creditors and partner assets from the creditors of the firm. The partnership form automatically fills in as the default form if the parties do not affirmatively organize as a limited liability entity. The risk that poses is ultimately the risks that someone not bound by intrafirm contracts—a creditor, either of the

199. Glenn G. Morris, *Agency, Partnerships & Corporations*, 51 LA. L. REV. 217, 219–22 (1990).

200. REVISED UNIF. P'SHIP ACT § 202(c)(3) (UNIF. LAW COMM'N 2013).

201. Buterin, *supra* note 141 ("[O]ne can take [a] shareholder-owned corporation . . . and transplant it entirely on the blockchain; a long-running blockchain-based contract maintains a record of each individual's holdings of their shares, and on-blockchain voting would allow the shareholders to select the positions of the board of directors and the employees.").

202. In *If Rockefeller Were a Coder*, Carla Reyes suggests that DAOs could evade the reach of the partnership penalty default by organizing as business trusts. Carla L. Reyes, *If Rockefeller Were a Coder*, 87 GEO. WASH. L. REV. (forthcoming 2019) (manuscript at 43), *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3082915. The DAO would "hold[] the trust property in the form of digital assets," and there would be trustee tokenholders as well as certificate tokenholders. *Id.* "Only a trustee token, and not a certificate token, would be endowed with the right to transfer or otherwise dispose of the DAO's property." *Id.*

partnership or the individual partners—will make an unanticipated and unavoidable claim on assets that the parties desire to shield.

The transparency of the blockchain, coupled with its imperviousness to defaults, creates such a shield. Blockchain participants know exactly what contracts and claims they are subject to in a way that their corporeal firm counterparts cannot. We return to the various features of corporate law that have, so far, been understood to be unique to the corporate form to see how the blockchain can approximate them.

IV. THE PROMISE OF THE BLOCKCHAIN

With the corporate exceptionalism theories of Part II in mind, we can begin to appreciate the potential the DAO offers of upending the spectrum of business entities. Perhaps it would help to start with how lawsuits look in the real world. Susan operates a small nail care business with Jim, Susan's Salon. She's gotten in over her head, and the salon owes suppliers more than it can pay. The business folds, and it turns out that Susan never filed with the state where she operates as a corporation, LLC, or other limited liability entity. As a result, Susan is personally liable for the debts of the business creditors.[203] They take her to court, prove that she is liable, and obtain a judgment against her. She is forced to sell her house and car to pay the judgment.

Now let's suppose Susan instead set up a different business on the blockchain, Susan's Blockchain Storage ("SBS"), that will create a decentralized marketplace for storing files, using the blockchain to encrypt them.[204] Any business faces two types of potential creditors, voluntary and involuntary (that is, tort) creditors.[205] As to the former, the code of the blockchain would have to specify the terms and conditions of loans in order for an obligation to arise.

The 2016 DAO had no creditors. Although its coders described it in terms of a corporation, it was more of a virtual venture capital fund—it had no operating costs, and thus no need of creditors. But future DAOs could offer a security interest to creditors that could be baked directly into the smart contract. One could imagine a creditor lending to a future DAO, on the condition of a smart contract that provides the terms for repayment with interest. The DAO could in the initial code—or after, presumably, with a subsequent vote—create debt versions of tokens that automatically entitle creditors to assets under certain circumstances: including before a split,

203. REVISED UNIF. P'SHIP ACT § 306; Ribstein, *supra* note 20, at 192; *see supra* note 56 and accompanying text.

204. Filecoin launched an ICO in August 2017 on this model, raising $257 million. Bennett Garner, *What is Filecoin? Beginner's Guide to the Largest-Ever ICO*, COINCENTRAL (Feb. 20, 2018), https://coincentral.com/filecoin-beginners-guide-largest-ever-ico; Stan Higgins, *$257 Million: Filecoin Breaks All-Time Record for ICO Funding*, COINDESK (Sept. 8, 2017, 3:00 PM), https://www.coindesk.com/257-million-filecoin-breaks-time-record-ico-funding.

205. Ribstein, *supra* note 20, at 193.

before a liquidation, or upon certain dates or under certain conditions, as when token activity reaches a specified level.

The attraction from the creditors' perspective is considerable. Monitoring a borrower's activities constitutes a major transaction cost of any loan arrangement (for this reason, banks and other lenders protect themselves with covenants, inspection rights, and other mechanisms to ensure that the creditor can be assured of repayment).[206] But monitoring would be far less costly if the creditor could code enforcement mechanisms directly into the contract. On the blockchain, creditors would have to do very little in monitoring asset levels and prior claims, because the contract encoded in the DAO would protect their interest. In this sense, creditors could lend money without the risk of opportunism and the commensurate high cost of monitoring, as long as the code itself established, for example, trigger points for return of principal. For example, the code could specify that if the DAO's assets dip below a certain amount, the debt is automatically called and the loan repaid. Interest rates could reset automatically, and creditors could waive protective covenants by means of voting on the blockchain.

A key point is this: In order to mimic their real-world counterparts in obtaining a right to individual tokenholders' personal assets—a right that is automatically theirs in traditional partnerships[207]—creditors would have to establish that right within the blockchain code. Otherwise, although DAO creditors would have the *theoretical* right to reach those personal assets, in practice the blockchain would not permit them to do so. On the other hand, tort creditors are involuntary creditors who cannot anticipate being the victims of a particular tortfeasor.[208] These creditors would have no ability to contract for recourse to tokenholder, and the default code would, as with voluntary creditors, not permit access to individual accounts. A DAO creditor would have to reduce a claim to judgment, track down individual tokenholders, and convince judges to enforce a claim.

Say a loan of one of the creditors of SBS, our hypothetical business, is not repaid because of a fault in the code. The creditor convinces a New York court that it has jurisdiction. It obtains a judgment against SBS for $100,000. It cannot enforce a judgment against SBS unless the blockchain has a way to recognize valid court orders and effectuate them. In other words, it would need a legal intervention point coded into the blockchain that recognized the legitimacy of the judgment, and provided a means to effectuate it. What of SBS's tokenholders? What of the unlimited joint and several personal liability that makes real-world partnership such a dangerous form? The answer to that question, and the potential for a legal intervention point in the intersection

206. *See* Easterbrook & Fischel, *supra* note 19, at 1425.

207. REVISED UNIF. P'SHIP ACT § 306.

208. *See* Ribstein, *supra* note 20, at 193.

between the blockchain and the tokenholder's corporeal-world identity, takes us to that central corporate feature, limited liability.

A. LIMITED LIABILITY

SBS's creditor would need to identify the true identity of Susan, or at least one of SBS's tokenholders in order to get at that tokenholder's personal assets. Then the creditor would have to prove that the tokenholder in question held the tokens at the time of the default. In a sense, the blockchain makes this proof easy by laying bare the history of all of SBS's transactions. Even with this proof, however, SBS's creditor faces two obstacles to satisfying a judgment: The code will almost certainly not automatically provide access to tokenholder accounts. And the pseudonymous nature of the blockchain creates a practical obstacle to pursuing individual tokenholders' real-world assets.

First, while in theory one could imagine tokenholders agreeing to some level of individual recourse (for example, that the DAO creditor could reach into a tokenholder's personal wallet for up to 50 ether), in practice it is hard to imagine a tokenholder affirmatively opting into the partnership's default of unlimited liability by permitting a DAO creditor unlimited access to a personal wallet. Yet, that's exactly what would have to occur in order to mirror real-world unlimited liability. An entity-level escrow account would be the more natural mechanism for providing such protection. More likely would be for the DAOs of the future to encode protections contractually limiting DAO creditors to claims upon the DAO and the DAO alone—thus contracting for limited liability, again in the absence of the corporate code.

Second, the law presupposes that the partnership's creditors will be able to ascertain the partners' identities, and then pursue them to satisfy the firm's debts. While a partnership creditor in the real world can expect headaches and holdups in identifying the appropriate jurisdiction, reducing a claim to judgment and then locating and attaching partner assets,[209] at least the creditor knows what defendants to go after.

The virtual world of the blockchain is a different story. Ethereum and other DLTs are "not anonymous, but, rather, pseudo-anonymous," or pseudonymous[210]: the blockchain preserves all transactions in the network, allowing anyone to inspect and analyze them.[211] All transactions linked to a particular address are visible on the blockchain, which is public and

209. *See* MARIA A. AUDERO & BRENT A. OLSON, CALIFORNIA BUSINESS LAW DESKBOOK §§ 4:17, 4:28 (2017).

210. Aaron van Wirdum, *Is Bitcoin Anonymous? A Complete Beginner's Guide*, BITCOIN MAG. (Nov. 18, 2015, 2:34 PM), https://bitcoinmagazine.com/articles/is-bitcoin-anonymous-a-complete-beginner-s-guide-1447875283.

211. Ameer Abbas, *Understanding Privacy: How Anonymous Can Bitcoin Payments Be?*, BITCOINIST (Oct. 14, 2016, 4:48 PM), https://bitcoinist.com/understanding-privacy-anonymous-bitcoin.

transparent.[212] "However, it is not possible to link a particular wallet address to the real world identity of a person/company without any additional information."[213]

Security experts described this as "pseudonymous privacy," comparing it to "writing books under a nom de plume."[214] An anonymous author can produce dozens of books under a pseudonym. J.K. Rowling penned the *Cuckoo's Calling* under the nom de plume Robert Galbraith—just as Stephen King wrote under the name Richard Bachman.[215] In each case, the pseudonym cloaked the author's true identity effectively for a time. But once the pseudonym was linked to its real-life counterpart, the author's entire pseudonymic writing history became compromised. Similarly, as soon as individuals' personal details are linked to their bitcoin (to use the most widespread cryptocurrency) address, their entire transaction history —including any available assets—are laid bare as well.[216]

As former federal prosecutor Jason Weinstein explains:

> A user's bitcoin address is just an account number that stays with the user; if you can connect that address to a particular user, you can identify and trace all of the transactions in which that individual has participated using that address. Indeed, if the individual uses an exchange or wallet service as the "on ramp" to the blockchain, then the bitcoin address is essentially about as anonymous as a bank account number, because the exchange or wallet service will maintain records linking the address to a particular identity, much like a bank maintains records establishing the owner of each bank account.[217]

Note that the pseudonymity of cryptocurrency does not perfectly protect against identification. There are three main ways in which to de-anonymize bitcoin users (and the same principles apply to Ethereum)[218]:

(1) "Since Bitcoin is a peer to peer network (vulnerable to hackers), if hackers can connect to the Bitcoin network using several nodes or

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212. *Id.*

213. Jacob J, *IRS Uses Chainalysis to Track Down Bitcoin Tax Cheats*, COINTELEGRAPH (Aug. 23, 2017), https://cointelegraph.com/news/irs-uses-chainalysis-to-track-down-bitcoin-tax-cheats.

214. Emerging Technology from the arXiv, *Bitcoin Transactions Aren't as Anonymous as Everyone Hoped*, MIT TECH. REV. (Aug. 23, 2017), https://www.technologyreview.com/s/608716/bitcoin-transactions-arent-as-anonymous-as-everyone-hoped.

215. Haroon Siddique, *JK Rowling Publishes Crime Novel Under False Name*, GUARDIAN (July 14, 2013, 7:22 AM), https://www.theguardian.com/books/2013/jul/14/jk-rowling-crime-novel-cuckoos-calling.

216. Emerging Technology from the arXiv, *supra* note 214.

217. Jason Weinstein, *How Can Law Enforcement Leverage the Blockchain in Investigations?*, COIN CTR. (May 12, 2015), https://coincenter.org/entry/how-can-law-enforcement-leverage-the-blockchain-in-investigations.

218. *See* Abbas, *supra* note 211; van Wirdum, *supra* note 210.

> computers there is a high chance that they can extract enough information to decipher where transactions originated."[219]

(2) Bitcoin addresses can be used to identify users:

> Bitcoin addresses can be linked to real identities if these real identities are used in combination with the bitcoin addresses in some way. This includes addresses used to deposit or withdraw money to or from a (regulated) exchange or wallet service, publicly exposed donation addresses, or addresses simply used to send bitcoin to someone (including the online store) when using a real identity.[220]

Cryptocurrency exchanges are subject to know-your-customer and anti-money laundering rules, so individuals making use of these exchanges—as will most unsophisticated users—can be relatively easily identified by law enforcement.[221]

(3) The inherent transparency of cryptocurrency networks facilitates user identification:

> Perhaps most importantly, all transactions over the Bitcoin network are completely transparent and traceable by anyone. It's typically this complete transparency that allows multiple Bitcoin addresses to be clustered together, and be tied to the same user. Therefore, if just one of these clustered addresses is linked to a real-world identity through one or several of the other de-anonymizing methods, all clustered addresses can be [revealed].[222]

Nevertheless, as one commentator has observed, sophisticated users who are "willing to go [to] extraordinary lengths can find ways to acquire and use bitcoin anonymously."[223] Even so, "the open nature of the transaction ledger and other unknowns leave open the possibility that identities and activities once considered perfectly secure may be revealed at some point down the road."[224]

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219. Abbas, *supra* note 211 (emphasis omitted).

220. van Wirdum, *supra* note 210.

221. Robinson, *supra* note 18 (manuscript at 25–26).

222. van Wirdum, *supra* note 210.

223. Adam Ludwin, *How Anonymous Is Bitcoin?*, COIN CTR. (Jan. 20, 2015), https://coincenter.org/entry/how-anonymous-is-bitcoin.

224. *Id.* The most common method to improve a user's level of financial privacy protection is to use a "tumbler" (also called a "mixer"). *Id.* Tumblers work by literally mixing up a user's payment with lots of other payments from other users. *Id.* Put another way, tumblers "take a set of bitcoins and return[] another set of the same value (minus a processing fee) with different addresses and transaction histories, thus effectively 'laundering' the coins." *Id.* This makes it very difficult for any observer to be able to work out who is actually sending money to whom. An observer who knows your addresses will still be able to see that you have sent or received a certain amount of money. *Id.* But if an individual uses a tumbler, in theory, the observer will not be able

In conclusion, DAO tokenholders enjoy two main bulwarks against personal liability for firm liabilities. First, the blockchain itself can limit contract creditors to the assets of the firm. Though this is a smart contract, presumably a court would recognize its validity in the corporeal world, since the creditor has affirmatively agreed not to have recourse to individual tokenholders assets. Second, for tort creditors[225] or non-tort without contractual protections in place, pseudonymity provides a weaker shield against firm liabilities. A creditor faced with the prospect of finding the right jurisdiction, reducing a claim to judgment, and then identifying and tracking down tokenholders may well conclude the effort is not worth her time.

B. ASSET PARTITIONING VIA CONTRACT ALONE

Remember, the reverse of limited liability is entity shielding.[226] Here the concern is the threat that the debts of the partners pose to the entity itself. Say Susan owns tokens of a DAO. Further say that her creditors are able to reduce their claims against her to judgment. Susan, like presumably most debtors, would likely try not to disclose that she had a blockchain asset. Her creditors or the bankruptcy court would first have to know of the existence of her wallet, with the tokens, ether, or bitcoins contained therein to potentially use that asset to make themselves whole. But what if creditors determine that she owns DAO tokens? They could go to court (presuming they can find a court with jurisdiction) to require her to divulge her key. They would have to prove their claim on any tokens or assets in the wallet—presumably they could do so with ease. Then they could force her to transfer any tokens in the wallet. But they could not use those tokens to force liquidation of the actual

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to tell to whom the user has made a payment. Dean, *How to Use a Bitcoin Mixer or Tumbler*, CRYPTORIALS (Feb. 17, 2017), http://cryptorials.io/use-bitcoin-mixer-tumbler; Ludwin, *supra* note 223. Tumbling services pose serious risks:

> Users must hand over control of their bitcoins and trust the service to return them. Transaction graph analysis can identify use of a mixing service and flag the user as potentially suspicious. Mixers do not work well for very large sums, unless others with similarly large sums happen to be mixing their bitcoins at the same time. Some mixing services do not work as advertised and can be reverse-engineered. Services that operate legally must keep detailed records of how the coins were mixed, which could later be hacked or subpoenaed. And the new bitcoins received might themselves be tainted by illegal activity.

Id. Steven Goldfeder, a fifth-year PhD student in the Department of Computer Science at Princeton University, has observed "that if an individual uses CoinJoin [a popular mixer] to make several purchases . . . it is straightforward to link them back: 'If the victim employs 3 rounds of CoinJoin and the adversary observes two of the victim's payments, he can link them back to her wallet (despite mixing) with 98% accuracy.'" Emerging Technology from the arXiv, *supra* note 214 (quoting Steven Goldfeder).

225. It is hard to imagine what a DAO tort creditor would even look like. As Section V.B details, governmental fines may be more likely claims.

226. *See supra* notes 96–103.

business—or, following the more modern rule, a buyout of whatever the tokens are worth.

This inability stems from the fact that the blockchain is a decentralized and distributed technology. There is no one person who controls the code. Even if a court rendered judgment in favor of a particular creditor, if the code did not permit a liquidation, then any attempt by a creditor or a coder in the creditor's employ to update the blockchain to liquidate the entity would be rejected by the consensus of miners. Such a change would therefore not become part of the distributed ledger. Thus, even after finding a court with jurisdiction, attempts to enforce a judgment against an organization would founder if that organization's basic code does not recognize such a judgment.

Again, the lack of a legal intervention point protects against the traditional partnership vulnerability to partner creditors. Thus, while the DAO in theory may be a partnership, that most vulnerable of business forms, legal recourse in practice will prove well-nigh impossible.

To summarize, the DAO is legally a partnership, so that personal creditors could in theory liquidate it. But the tokens do not give those creditors that power. Hansmann, Kraakman, and Squire assert that only organizational law can perform the entity shielding function of providing protection from the creditors of individual investors, but in the virtual world contract can play the role.[227] Because the smart contract does not permit liquidation, effectively it provides entity shielding.

More broadly than mere entity shielding, the blockchain provides a radical form of asset partitioning. Because of the ability to code smart contracts directly into the blockchain, assets can be reliably apportioned to specific uses without the need for a separate entity structure, obviating the need for the separate organization Triantis identifies.[228] Similarly, addressing Blair's concern about capital lock-in, a DAO's blockchain could provide that no single tokenholder could liquidate the blockchain.[229] Indeed, as a practical matter, it would be difficult, if not impossible, to enforce any theoretical liquidation right if it is not already encoded in the block chain.

This point is worth restating. In theory, the tokenholders' creditors would have the right to liquidate the DAO. But in practice, the DAO would have to code that right in to provide a legal intervention point on which the penalty default rules of partnership a place to take effect. The law gives creditors that power in the real world. But it cannot in the DAO.

V. LEGAL INTERVENTION POINTS

So far, I have treated the blockchain as being unto itself, a nexus of contracts made flesh. The first section of this part will continue in that vein.

227. *See* Hansmann et al., *supra* note 60, at 1340.

228. *See* Triantis, *supra* note 94, at 1104, 1106; *supra* notes 104–05 and accompanying text.

229. *See* Blair, *supra* note 50, at 393; *supra* notes 106–07 and accompanying text.

But the idea of a fully autonomous business organization untethered to the corporeal world is, and may always be, largely fanciful. In the second section, however, the lens will widen to explore the question of legal intervention points for blockchain entities not organized wholly on the blockchain. Here the law can and will intervene.

A. THE PURE BLOCKCHAIN BUSINESS ORGANIZATION

Can business entities exist on the blockchain alone? If so, then no legal intervention point will exist unless explicitly coded. Section 1 argues that such entities *can* in fact exist, and Section 2 sketches out some possible governance models for such organizations.

1. The Possibility of a Purely Blockchain Entity

The easiest way for blockchain entities to evade the reach of the law would be to organize entirely on the blockchain, without the organizers identifying themselves in any way as associated with the blockchain entity. The idea of strangers organizing via pseudonyms and trying to coordinate a governance structure is not as unthinkable as one might suppose. The true identity of bitcoin's designer or designers is unknown—"Satoshi Nakamoto" is the pseudonym he, she, or they used.[230] Bitcoin was born out of a distrust for authority and driven by a desire for governance by community consensus rather than central authority.[231] Nakamoto seems not to have been a promoter looking to make a quick buck, but rather an idealist looking to break governments' monopoly on currency by offering an alternative to fiat currency.[232] Bitcoin suggests that it might be possible, even likely, given the open source ethos of the blockchain, for a business organization to exist that encoded real governance into its code, enabling pseudonymous participants to engage in real decision-making for the firm without identifiable organizers claiming credit for doing so.

One white paper describes a DAO as "a self-organizing entity" that "better resembles an organism rather than an organization."[233] In fact, a fully autonomous, self-reproducing DAO now exists: the Plantoid, "a robot or

230. SATOSHI NAKAMOTO, BITCOIN: A PEER-TO-PEER ELECTRONIC CASH SYSTEM 1 (2008), https://bitcoin.org/bitcoin.pdf.

231. Ryan Clements, *Decoding the Demand for Cryptocurrency: What Is Driving the Historic Price Surge?*, FINREG BLOG (Sept. 26, 2017), https://sites.duke.edu/thefinregblog/2017/09/26/decoding-the-demand-for-cryptocurrency-what-is-driving-the-historic-price-surge.

232. *See* Joseph Young, *It's Not Really About Bitcoin Price Surging, It's Fiat Currencies in Free Fall*, COINTELEGRAPH (Dec. 4, 2017), https://cointelegraph.com/news/its-not-really-about-bitcoin-price-surging-its-fiat-currencies-in-free-fall.

233. DAOstack, The Operating System for DAOs: White Paper V1.0, at 6 (Oct. 29, 2017) (unpublished white paper), https://icorating.com/upload/whitepaper/hGKjXjrHPLu4F6vLLzLhd9MgbHFU1FdcW2E6yvcB.pdf.

synthetic organism designed to look, act and grow like a plant."[234] As Carla Reyes describes it:

> If an onlooker passing by the Plantoid sufficiently appreciates the Plantoid's artistic qualities, the onlooker may send a donation to the Plantoid through the decentralized virtual currency called bitcoin. The onlooker sends the bitcoin directly to a wallet owned by the Plantoid itself. As an expression of gratitude for the funds transfer, the Plantoid performs a dance for the onlooker. Once the Plantoid raises sufficient funds, the Plantoid advertises for, selects, and commissions an artist to create a new Plantoid.[235]

If the DAO is an organism, creating its own nexus of contracts as it goes, there may be little room in its operation for formal law at all. It can make its own rules (as we will see, quite sophisticated rules), and even replicate, all autonomously, without an identifiable individual doing the organizing. And without an individual on the scene, there is no actor for the law to latch onto. The code really is the law—the only law. There is no legal intervention point on which the law can work.

To be clear, this point is not a normative one. I am not a cyber-separatist, arguing that regulation should *not* apply to the blockchain.[236] I am merely pointing out that, for the first time as a practical matter, the possibility exists of a type of business organization that can exist apart from the defaults of contract law. It may be that this possibility will remain an obscure footnote in the history of the blockchain, and that examples such as the Plantoid or bitcoin are aberrations. It may be that people who create entities generally do so to make a profit, and ultimately cannot do so solely on the blockchain. If international regulation makes it impossible to exchange bitcoin for fiat currency, and the bitcoin economy remains as limited as it is now, even Satoshi Nakamoto (or the Satoshi Nakamotos of the future) may not see much profit in pure blockchain entities. The intersection between blockchain and the corporeal world will then provide a legal intervention point, as Section V.B will describe.

For now, it remains to be seen whether pure blockchain entities are viable. Accept for the moment that such entities will exist in the future. Any discussion of the purely blockchain entity must deal with the problem the 2016 DAO posed—the problem that represents the flipside of the freedom from default rules that the 2016 DAO cast in stark relief. As Easterbrook and Fischel have observed, even when parties think they have planned for every eventuality, "they are apt to miss something" because "[a]ll sorts of

234. *I'm a PLANTOID: A Blockchain-Based Life Form*, http://okhaos.com/plantoids (last visited Nov. 1, 2018).

235. Reyes, *supra* note 18, at 385–86 (footnotes omitted).

236. Mayer-Schönberger, *supra* note 23, at 618.

complexities will arise later."[237] The central argument of *The Economic Structure of Corporate Law* is that corporate law supplies majoritarian default rules that fill the gaps of parties' necessarily incomplete contracts.[238] Yet, as we have seen, when gaps arise in the blockchain's smart contracts, there are no legal intervention points upon which the law can work. The blockchain needs intervention points in order to fill the gaps in incomplete contracts. Said differently, blockchain entities have a governance problem.

2. The Problem of Blockchain Governance

The failure of the 2016 DAO made clear the problem of governance on the blockchain. There is no code that could anticipate all problems that will arise. The problem with the 2016 DAO was that it didn't provide a mechanism for the tokenholders to vote to change the code to address the flaw once it arose. This section will describe three different governance models that emerged in the post-2016-DAO era to address the governance failures of the DAO. Notably, each of these mechanisms creates an intervention point—a place in the code where participants can supply terms to the incomplete contract in light of events following the initial launch of the code-contract. None of them supply a *legal* intervention point—that is, a point where a legal authority can assert jurisdiction. But they supply intervention points, nonetheless.

First, DAOStack illustrates a dizzying array of governance options unimaginable in a traditional corporation. For example, imagine a corporation that weighs some shares more than others using a reputation system, rather than operating on a vote-per-share basis. DAOStack enables a DAO to institute such a system, whereby tokenholders can earn reputation —for example, for past contributions or successful proposals to the DAO.[239] Reputation, unlike a token, is not transferrable, but instead awarded to or earned by "specific members, according to their merits and contributions made to the organizations."[240] To guard against locking up decision-making power with a group that could become less engaged down the road, an organization can provide that reputation will dissipate over time.[241]

A common concern in public corporations is voter apathy, and the corporation generally offers the blunt tool of quorum to ensure that low voter turnout does not allow a minority preference to govern.[242] With DAOStack, voting schemes can be weighted by reputation.[243] There can be a finite

237. Easterbrook & Fischel, *supra* note 19, at 1444.

238. *See* EASTERBROOK & FISCHEL, *supra* note 38, at 14–15.

239. DAOstack, *supra* note 233, at 15.

240. *Id.* at 16.

241. *Id.*

242. Robert B. Thompson & Paul H. Edelman, *Corporate Voting*, 62 VAND. L. REV. 129, 137–39 (2009).

243. DAOstack, *supra* note 233, at 15, 21.

number of proposals open to vote at any one time—with all other proposals in a queue.[244] Tokenholders need not rely on an individual or individuals to serve as gatekeepers or agenda-setters.[245] If there is a queue, a tokenholder can "boost" a proposal by putting tokens at stake that will be returned if the proposal is successful.[246]

Moreover, just as bitcoin has issuance limits, the DAOStack organization can build in certain constraints. Examples offered include a cap of the total number of tokens that can be issued, a rate of token inflation, a limit on the use of funds, a maximum amount of reputation that can be issued in a given time period, and more.[247] For lawyers, these strictures might seem akin to charter-based limits on the authorized number of shares. As a practical, matter, however, they provide protection against future dilution even more robust than those found in the corporeal corporation: they are self-enforcing structural constraints. Finally, DAOStack provides what the 2016 DAO failed to offer: a mechanism for amending its governance structure. Called "governance upgrades," these allow the organization to specify the mechanism for changing their governance models.[248] As the DAOStack white paper remarks, "the spectrum of possib[ility a] scheme's design [allows] is nearly endless."[249]

Another blockchain operator, Aragon, offers would-be entrepreneurs the ability to organize on the blockchain, issue tokens, and raise funds.[250] But Aragon goes further in creating private law on the blockchain. As the whitepaper observes, "The traditional solution[s] to [opportunistic behavior] are government-powered jurisdictions. Since Aragon organizations are location and government-agnostic—they are meant to be run on the

244. *Id.* at 21–22.

245. Sofie Cools, *The Real Difference in Corporate Law Between the United States and Continental Europe: Distribution of Powers*, 30 DEL. J. CORP. L. 697, 741–43 (2005).

246. DAOstack, *supra* note 233, at 22. To avoid "finalization attacks," where voting in the final period changes the outcome, the DAO can provide that "if on the last day of opening the majority changed from yes to no (or vice versa), the voting period would extend by another day. The vote is closed only once there is no change of decision during the last day of voting." *Id.*

247. *Id.* at 18.

248. *Id.* at 17.

249. *Id.* at 18.

250. Its white paper promises to implement "basic features of an organization like a cap table, token transfers, voting, role assignments, fundraising, and accounting. The behavior of an Aragon organization is easily customized by changing the bylaws." Luis Cuende & Jorge Izquierdo, A Decentralized Infrastructure for Value Exchange § 1.1 (Apr. 20, 2017) (unpublished white paper), https://www.chainwhy.com/upload/default/20180705/49f385of2702ec6beof57780b22feab2.pdf. Like DAOStack, Aragon enables organizations to account for reputation, and it allows tokens to be issued with limited transferability according to a vesting calendar. *Id.* at 9–10. It promises organizations a way off the "VC unicorn rollercoaster" of fundraising, where they "can easily issue new shares in exchange for capital without operating with a third party, both through direct sales and public offerings." *Id.* § 2.2(D), (F). What's more, Aragon offers a simpler way to hire and pay employees by allowing organizations to issue tokens under specific time- or task-based parameters. *Id.* § 2.2(H).

Ethereum network—we came out with a better solution."[251] The Aragon Network provides "basic constitution and governance methods."[252] Within the Network, organizations can create new laws specific to their organization.[253]

Aragon also provides an "unbiased arbitration system . . . for cases where conflict is not explicitly resolved in the smart contract code."[254] The nuances are beyond the scope of this Article, but some details make clear the level of thought behind the effort. Arbitration requires an applicant posting a bond of tokens, or putting a freeze on an organization's contracts if the applicant has an ownership interest in the organization.[255] A panel of judges render a verdict via a "two-step reveal" to prevent collusion on the part of the judges.[256] They must reveal their verdict in order to learn their fellow panelists' decision. If the applicant is successful, her bond is returned; if unsuccessful, the judges keep it. If applicants are dissatisfied, they can appeal (or "request an upgrade," in Aragon parlance) by posting a "significantly larger" bond and having all of the available judges participate.[257] All judges who "voted the incorrect answer are extremely penalized."[258] Finally, a supreme court is composed of the top nine judges, as measured by which judges have sided with the majority the most in the past.[259]

It has not likely been lost on the reader that each of these examples is, in one manner or another, recreating governance mechanisms familiar in the corporeal world—even to the extent of Aragon mimicking the number of the justices on the U.S. Supreme Court.

Tezos stands as a cautionary tale regarding blockchain governance. Hard on the heels of the 2016 DAO's hard fork, the first problem Tezos aimed to solve was the "'hard fork' problem, or the inability for Bitcoin to dynamically innovate due to coordination issues."[260] A Tezos tokenholder could propose an alteration to the community of token holders.[261] If a quorum was reached, and a majority voted for the proposal, the alteration would be implemeted to the blockchain.[262] This structure provided a fluid system of governance over time and was intended to eliminate the need for a 2016-DAO-style hard

251. *Id.* app. A § 1.

252. *Id.* § 5.4.

253. *Id.* ("Effectively, organizations will be able to use the Aragon Network's services basic constitution and services as a framework, and build a custom set of rules to govern relationships inside organizations.").

254. *Id.* § 1.2.

255. *Id.* app. A § 3.

256. *Id.*

257. *Id.* app. A § 3.2.

258. *Id.*

259. *Id.* app. A § 3.3.

260. L.M. GOODMAN, TEZOS: A SELF-AMENDING CRYPTO-LEDGER POSITION PAPER 3 (2014), https://tezos.com/static/papers/position_paper.pdf.

261. *Id.* at 3, 12.

262. *Id.* at 12.

fork.[263] Tezos's ICO in July of 2017 garnered $232 million in bitcoin and Ether, which rose to be worth almost $1 billion at the end of the year as the cryptocurrency it raised increased in value.[264] Ironically, however, Tezos' ICO has been mired in a governance dispute amongst its founders and is on indefinite hold.[265]

Voltaire once declared that "If God did not exist, it would be necessary to invent him."[266] In similar fashion, it may well be that, if business associations law does not exist on the blockchain, the blockchain will have to create it. DAOs, like all organizations and all organisms, require some kind of governance mechanism when inevitable gaps arise in the incomplete contract of the firm. As the emergence of Aragon illustrates, newfangled organizations have an appetite to address these governance issues. They seem willing to borrow from traditional models, but also ready to adapt them to the challenges of the pseudonymous world of the blockchain. This Section has provided examples of the many governance options available on the blockchain. While many of these options will be obsolete by the time this Article goes to print, the larger point will not: The DAO opens up a dizzying array of governance possibilities as long as intervention points exist in the code, where governance can be exercised. As long as these organizations exist solely on the blockchain, their interaction with traditional business law—as well as securities law and other forms of state regulation—could be minimal.

The contours of governance on the blockchain—and the extent to which jurisdictions will recognize it, or even have the chance to recognize it—remain open questions. Another open question is how securities law, and other law, will interact with the blockchain. Most entities organized on the blockchain thus far have had identifiable human organizers who remain susceptible to the reach of laws, even if the blockchain itself resists it. This is a key point: As

263. *Id.* at 2–3. Additionally, to guarantee the smart contract alterations and additions did not contain avoidable bugs, Tezos's smart contract language used "formal verification," which essentially allowed developers to mathematically prove the correctness of their code. *Id.* at 10; *see* Omri Barzilay, *Tezos' $232 Million ICO May Just be the Beginning*, FORBES (July 15, 2017, 8:39 AM), https://www.forbes.com/sites/omribarzilay/2017/07/15/tezos-232-million-ico-may-just-be-the-beginning; Linda Xie, *A Beginner's Guide to Tezos*, MEDIUM (Aug. 3, 2017), https://medium.com/@linda.xie/a-beginners-guide-to-tezos-c9618240183f.

264. Barzilay, *supra* note 263.

265. *See* Joon Ian Wong, *A Cryptocurrency Raised $400 Million to Avoid Bitcoin's "Civil Car" and Now Has Its Own*, QUARTZ (Oct. 19, 2017), https://qz.com/1106594/tezos-dispute-puts-400-million-raised-in-the-ico-at-risk. Three class-action lawsuits have been filed against Tezos founders Arthur and Kathleen Breitman. They are mired in a dispute with Johann Gevers, President of the Tezos Foundation, that controls the ICO proceeds. The Tezos project is on indefinite hold. Steve Stecklow et al., *Exclusive: Tezos Founders Push for Legal Bailout from Swiss Foundation*, REUTERS (Dec. 1, 2017, 5:06 AM), https://www.reuters.com/article/us-bitcoin-tezos-lawsuits-exclusive/exclusive-tezos-founders-push-for-legal-bailout-from-swiss-foundation-idUSKBN1DV4Ko.

266. VOLTAIRE, EPÎTRE À L'AUTEUR DU LIVRE DES TROIS IMPOSTEURS [EPISTLE TO THE AUTHOR OF THE BOOK, "THE THREE IMPOSTORS"] (Jack Iverson, trans., 1770), http://www.whitman.edu/VSA/trois.imposteurs.html (last visited Nov. 1, 2018).

long as there are identifiable organizers in the corporeal world—as long as an entity does not exist solely on the blockchain—they will provide a legal intervention point. The next Section begins with U.S. securities law, as it is the law that has been the most influential in shaping the contours of ICOs. But the two key questions are broader ones: Where are the legal intervention points in the blockchain? And how should the law work upon them?

B. CORPOREAL ENTITIES WITH ASSOCIATED BLOCKCHAIN ORGANIZATIONS

So far most ICOs and DAOs have not organized purely on the blockchain. Instead they have opted for some identifiable group of promoters. This move puts them squarely subject to regulation by governing authorities. The ways in which the United States and other jurisdictions will regulate the blockchain are still open questions. Coin exchanges, for example, are subject to anti-money laundering and Know Your Customer regulations.[267] South Korea recently put in place measures to curb cryptocurrency speculation by requiring trading only through real-name bank accounts linked to cryptocurrency exchanges.[268]

Staying within the scope of business associations law, once the identity of a blockchain owner is known, a court could establish jurisdiction over the blockchain business association as a partnership by establishing personal jurisdiction over the known individual. Personal jurisdiction over a single partner is enough to establish personal jurisdiction over the partnership and, in some jurisdictions, over the remaining partners.[269] Any enforcement against the blockchain entity would suffer from the handicaps discussed in Section IV.B. A judgment calling for dissolution of a DAO would have no effect upon code unless the code permits it. But a court *could* enforce a judgment against any individual partners whose identities are known, either because they were chief organizers or because the true identity behind their pseudonym has been discovered.

The reach of U.S. securities law to these groups provides a slightly more developed case study of how regulation might impact blockchain entities —and, indeed, how it is shaping the evolution of those entities. Essentially,

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267. *See* Dan Ryan, *FinCEN: Know Your Customer Requirements*, HARV. L. SCH. F. ON CORP. GOVERNANCE & FIN. REG. (Feb. 7, 2016), https://corpgov.law.harvard.edu/2016/02/07/fincen-know-your-customer-requirements. "Know Your Customer" rules require financial institutions to obtain certain information about their customers before doing business with them. Genci Bilali, *Know Your Customer—Or Not*, 43 U. TOL. L. REV. 319, 319 (2012).

268. Press Release, Financial Services Commission (South Korea), Financial Measures to Curb Speculation in Cryptocurrency Trading (Jan. 23, 2018), https://www.fsc.go.kr/downManager?bbsid=BBS0048&no=123388.

269. Brown v. 1995 Tenet ParaAmerica Bicycle Challenge, 931 F. Supp. 592, 594 (N.D. Ill. 1996). *But see* RCI Contractors & Eng'rs, Inc. v. Joe Rainero Tile Co., 666 F. Supp. 2d 621, 624 (W.D. Va. 2009) ("If a court has personal jurisdiction over a partnership, an exercise of personal jurisdiction over individual partners depends on a partner's contacts with the forum and the forum's laws dictating the agency relationship among partners.").

the question is one of how much power tokenholders have, and what rights and responsibilities should flow from that power. Both questions are very much open, as we will see. As we will also see, the nature of the solution to the governance problem has direct repercussions for securities law.

On July 25, 2017, the SEC released a "Report of Investigation" (SEC Report) deeming 2016 DAO tokens to be securities—meaning that their issuance was illegal because the 2016 DAO did not register an initial public offering with the SEC or qualify for an exemption from registration.[270] While the SEC did not pursue an enforcement action against the 2016 DAO organizers, the SEC Report did have a profound effect on subsequent initial coin offerings, which now seek to evade the reach of U.S. securities laws.[271]

The SEC's conclusion that the 2016 DAO tokens were securities is not surprising giving the breadth of the definition of one type of security, the investment contract.[272] The *Howey* test for what constitutes an investment contract is an "investment of money in a common enterprise" where profits are expected to be derived "solely from the efforts of others."[273] A key focus of the SEC Report was the fact that the DAO's profits were to be derived from the efforts of others, namely the DAO's founders and its curators.[274] In particular, the SEC cited the fact that Slock.it created the DAO website, published a White Paper describing the DAO, and created, maintained, and "closely monitored" online fora about the DAO.[275] They held themselves out as experts on Ethereum, "and told investors that they had selected . . . [c]urators based on their expertise and credentials."[276] Slock.it also informed investors that it would make the first proposal to the DAO.[277] In short, "[t]hrough their conduct and marketing materials, Slock.it and its co-founders led investors to believe that they could be relied on to provide the significant managerial efforts required to make The DAO a success."[278]

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270. Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO, Exchange Act Release No. 81,207, *supra* note 32, at 1–2.

271. *See id.* at 1.

272. The Securities Act's definition of "security" includes traditional financial instruments such as stocks, bonds, and debentures, but also includes what has proved a capacious catch-all term, "investment contract." 15 U.S.C. § 77b(a)(1) (2012); Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO, Exchange Act Release No. 81,207, *supra* note 32, at 11.

273. SEC v. W.J. Howey Co., 328 U.S. 293, 298, 301 (1946); *see* SEC v. Edwards, 540 U.S. 389, 393 (2004) (applying the *Howey* test to investment contracts that promise a fixed rate of return).

274. Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO, Exchange Act Release No. 81,207, *supra* note 32, at 12. In the SEC's analysis, "[t]he DAO's investors relied on the managerial and entrepreneurial efforts of Slock.it and its co-founders, and The DAO's Curators, to manage The DAO and put forth project proposals that could generate profits for The DAO's investors." *Id.*

275. *Id.*

276. *Id.*

277. *Id.*

278. *Id.*

The SEC emphasized in particular how dependent tokenholders were on the efforts of Slock.it and its co-founders. "At the time of the offering, The DAO's protocols had already been pre-determined by Slock.it and its co-founders, including the control that could be exercised by the Curators."[279]

This characterization of the 2016 DAO tokens as securities remains in dispute, however. Randolph Robinson takes issue with the SEC's Report, challenging the claim that the 2016 DAO was a "common enterprise" under the *Howey* test.[280] Most intriguingly, he argues that commonality requires "investors' dependence on the promoter's expertise."[281] But he argues, once the 2016 DAO's code was launched, Slock.it, the 2016 DAO promoter, exercised *no* expertise—indeed, it retained no control over the management of the DAO at all:

> Unlike in a traditional enterprise where the promoter or management enjoys special decision making privileges . . . or the ability to control entity assets, here, as the promoter, Slock.it was just one of many token holders, holding the same rights as any other token holder in the DAO enterprise. Neither Slock.it nor any other individual or entity could take any action to spend DAO resources, incur obligations, or take any other action independent of a vote of DAO Token holders.[282]

Robinson argues that because, after launch, all decisions "were made collectively by all token holders," there was no collective reliance on the DAO promoters' expertise.[283] Similarly, Rohr and Wright argue that "[b]ecause each token holder was entitled to participate in each funding decision, it is at least arguable that token holders participated sufficiently in the profit-making activities of the enterprise" for them not to qualify as securities under *Howey*.[284] This feature means that DAO investors did not have an expectation of profits solely from the efforts of others. Robinson also takes issue with the SEC's

279. *Id.* at 13. That control was indeed substantial: Curators had the power to "(1) vet Contractors; (2) determine whether and when to submit proposals for votes; (3) determine the order and frequency of proposals that were submitted for a vote; and (4) determine whether to halve the default quorum necessary for a successful vote on certain proposals." *Id.* The tokenholders could exercise relatively little power over the process, and still less over the Curators themselves. Tokenholders could only vote on proposals whitelisted by the curators. *Id.* at 8, 14. While they could submit a proposal for a vote, the curators would need to greenlight it before it was eligible for a tokenholder vote. *Id.* at 13. A tokenholder could propose replacing a curator, but current curators would have to whitelist the proposal in order for it to come before the full body for a vote. *Id.* "In essence, Curators had the power to determine whether a proposal to remove a Curator was put to a vote." *Id.*

280. Robinson, *supra* note 18 (manuscript at 6–7).

281. *Id.* (manuscript at 39).

282. *Id.* (manuscript at 40) (citations omitted).

283. *Id.*

284. Rohr & Wright, *supra* note 18, at 68.

characterization of the Curators' power, arguing that it was much less significant than the SEC portrayed.[285]

Hearkening back to the various governance possibilities Part V described, we begin to see how complicated, important, and unsettled the question of intervention on the blockchain is. Even if the 2016 DAO tokens *were* securities, if a future DAO tokenholder earns reputation and uses that to weigh her votes heavily, at what point is she no longer dependent "solely on the efforts of others" for her profits?

The SEC Report could be describing common critiques of whether the shareholder vote provides an effective constraint on a public corporation's managers when it observed:

> The voting rights afforded DAO Token holders did not provide them with meaningful control over the enterprise, because (1) DAO Token holders' ability to vote for contracts was a largely perfunctory one; and (2) DAO Token holders were widely dispersed and limited in their ability to communicate with one another.[286]

The SEC Report emphasizes the passive, public-company-shareholder-like role that the tokenholders played.[287] But the blockchain vote, as we have seen, need not be largely perfunctory, and DAOs of the future could make voting far from "perfunctory" by, for example, creating reputation-weighted voting in the manner of DAOStack.[288] The blockchain could counteract wide dispersion of holdings by coding limits on the number of tokens and could augment tokenholders' ability to communicate with one another.

Thus far, ICOs have not followed this robust governance path—nor have they used anonymity or pseudonymity to evade regulation. Currently many ICOs are launched by an organization or group of developers.[289] Some are traditional business entities or non-profits.[290] Others, like the 2016 DAO, are not formally organized at all.[291] They have taken various paths with regard to

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285. Robinson, *supra* note 18 (manuscript at 41–48); Rohr & Wright, *supra* note 18, at 68–69. As we saw in Section III.B., the role of the Curators in the DAO was controversial and disputed. Rohr and Wright observe that just because tokenholders could only vote for whitelisted proposals does not necessarily mean that they were "sufficiently dependent" on Curators' efforts to deem the 2016 DAO tokens securities. *See id.*

286. Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO, Exchange Act Release No. 81,207, *supra* note 32, at 14. Rohr and Wright take issue with the SEC's analysis here, observing that it "may not be completely accurate." Rohr & Wright, *supra* note 18, at 69. "Ten accounts owned over 20%" of the tokens, and overall the 2016 "DAO was substantively controlled by only a handful of token holders." *Id.*

287. Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO, Exchange Act Release No. 81,207, *supra* note 32, at 13–15.

288. *See supra* notes 239–46 and accompanying text.

289. *See* Rohr & Wright, *supra* note 18, at 30.

290. *Id.*

291. A particular canton in Switzerland has been home to a disproportionate number of ICOs. "The small canton of Zug, near Zurich, has unofficially become 'Crypto Valley.'" Ralph

securities laws. Some have openly flouted the SEC—and the SEC has taken an increasingly active role in actions against them.[292] Others have tried to evade the reach of U.S. securities laws in three ways.

First, some ICOs have tried to bar would-be investors from the United States from participating, in the hopes that they will qualify as foreign offerings under Regulation S.[293] In particular, many recent ICOs have been launched by nonprofits organized in Switzerland to evade the reach of U.S. securities law and the law of other jurisdictions.[294] Second, promoters have directed offerings not to the general public, but instead only to accredited investors, the wealthy individuals who qualify to invest in private securities.[295] The SAFT (Simple Agreement for Future Tokens) suggests one way to avoid liability under the securities laws is to offer investment exclusively to accredited investors, who are more sophisticated and better prepared to accept the risk.[296] In other words, the SAFT promoters acknowledge that

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Atkins, *Switzerland Embraces Cryptocurrency Culture*, FIN. TIMES (Jan. 24, 2018), https://www.ft.com/content/c2098ef6-ff84-11e7-9650-9c0ad2d7c5b5.

292. *See generally, e.g.*, Sec. & Exch. Comm'n v. PlexCorps, No. 17 CIV. 7007 (CBA), 2017 WL 6398722 (E.D.N.Y. 2017) (granting a preliminary order and asset freeze against Dominic LaCroix and his owned entities for likely violation of securities laws); Press Release, SEC, *supra* note 32 ("The Securities and Exchange Commission today charged a businessman and two companies with defrauding investors in a pair of so-called initial coin offerings (ICOs) purportedly backed by investments in real estate and diamonds.").

293. Although EOS, a smart contract and cryptocurrency platform, maintains that its tokens are not securities, it banned U.S. investors because of state regulations. *See* Frances Coppola, *When Is a Security Not a Security*, FORBES (Sept. 5, 2017, 10:29 PM), https://www.forbes.com/sites/francescoppola/2017/09/05/when-is-a-security-not-a-security; clickside, *Upcoming EOS Token Distribution —US Citizen Restriction—and Other NOOB Questions*, STEEMIT, https://steemit.com/eos/@clickside/upcoming-eos-token-distribution-us-citizen-restriction-and-other-noob-questions (last visited Nov. 1, 2018). The Monaco Visa ICO employed a click-wrap block so U.S. investors would not join. dana-edwards, *ICOs Are Not for US Citizens? Should ICOs Reject Self Proclaimed US Citizens as a Way to Reduce Legal and Regulatory Risk?*, STEEMIT, https://steemit.com/icos/@dana-edwards/icos-are-not-for-us-citizens-should-icos-reject-self-proclaimed-us-citizens-as-a-way-to-reduce-legal-and-regulatory-risk (last visited Nov. 1, 2018). The Cobinhood ICO also banned U.S. investors (and, unrelatedly, employed celebrity Jamie Foxx to advertise via his twitter feed). *See Frequently Asked Questions About COBINHOOD*, CRYPTO INDON., https://cryptoindonesia.com/frequently-asked-questions-cobinhood (last visited Nov. 1, 2018) ("While most participants of any citizenship can join the ICO, unfortunately, we are unable to accept participation from citizens of The United States of America, Canada, China, and Taiwan due to existing regulations in their respective states."); *see also* Eugene Kim, *Cryptocurrency Investors Worry About a Bubble as Jamie Foxx and Other Celebrities Jump on Board*, CNBC (Sept. 19, 2017, 2:28 PM), https://www.cnbc.com/2017/09/19/jamie-foxx-ico-investors-worried.html (discussing actor Jamie Foxx's promotion of Cobinhood, "a free cryptocurrency exchange," and noting that some cryptocurrency investors see such celebrity endorsements as "a worrying sign of a bubble" warranting actions by regulators).

294. Atkins, *supra* note 291 ("Of the 10 biggest proposed initial coin offerings—by which start-ups raise funds by selling tokens—four have used Switzerland as a base . . . .").

295. Robinson, *supra* note 18 (manuscript at 27).

296. JUAN BATIZ-BENET ET AL., THE SAFT PROJECT: TOWARD A COMPLIANT TOKEN SALE FRAMEWORK 19 (2017), https://saftproject.com/static/SAFT-Project-Whitepaper.pdf. The SAFT is modeled on the SAFE—the Simple Agreement for Future Equity. The SAFE is a contract in a fledgling corporation that provides that an investor's interest will convert automatically into

SAFTs are investment contracts subject to the 1933 Act, but argue that they qualify for exemption from registration because they are offered only to accredited investors.[297] SAFT investors fund developers who "develop [a] genuinely functional network, with genuinely functional utility tokens, and then deliver those tokens to the investors once functional. The investors may then resell the tokens to the public, presumably for a profit, and so may the developers."[298] The tokens themselves are merely "consumptive products,"[299] leading to the third manner of evading the reach of U.S. securities law.

Finally, there has been an effort to develop public token offerings that would not be securities offerings under the *Howey* test. These token offerings are "utility tokens" or "app coins," that is, tokens to be used for consumptive purposes, and whose primary purpose is not to be held for future profit.[300] Utility tokens are more like a right to buy a future product or service than a right to participate in the profits of a future enterprise. Rohr and Wright contrast these tokens with what they term investment tokens, which "bestow express economic rights on their holders."[301] Nevertheless, many of these utility token offerings have had a speculative component—either because investors are betting that their use rights will go up in value, or because they do not understand that they are not receiving an equity interest in the offering.

The SEC is closely monitoring these developments and has expressed skepticism about the proliferation of ICOs. Jay Clayton, Chairman of the SEC, stated in December of 2017, "[m]erely calling a token a 'utility' token or structuring it to provide some utility does not prevent the token from being a

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equity if the company raises finances in the future, is sold, or goes public. Joseph M. Green & John F. Coyle, *Crowdfunding and the Not-So-Safe SAFE*, 102 VA. L. REV. ONLINE 168, 172 (2016). SAFEs were created to offer a simple solution to the problem often confronting early-stage entrepreneurs who needed to raise funds quickly and cheaply, without the time and cost intensive negotiations that surround venture financing and, increasingly, angel investing. *Id.* at 172–73.

297. BATIZ-BENET ET AL., *supra* note 296, at 4, 16–17.

298. *Id.* at 1.

299. *Id.* Several platforms have used the SAFT framework, including Unikrn, a sports betting platform backed by Mark Cuban, and Kik, which raised $100 million in Ethereum to develop a new social internet platform. *See* Unikrn Bermuda Ltd., Notice of Exempt Offering of Securities (Form D) (Oct. 6, 2017), https://www.sec.gov/Archives/edgar/data/1718925/000171892517000003/xslFormDX01/primary_doc.xml; Eugene Kim, *Crypto Start-Ups are Trying to Get Their House in Order Ahead of a Possible SEC Crackdown*, CNBC (Oct. 12, 2017, 12:16 PM), https://www.cnbc.com/2017/10/12/crypto-start-ups-turn-to-safts-for-icos-raising-more-than-350m.html.

300. Gertrude Chavez-Dreyfuss, *Global Crypto-Currency Crackdown Sparks Search For Safe Havens*, REUTERS (Nov. 28, 2017, 12:04 AM), https://www.reuters.com/article/us-blockchain-regulation-tokens-insight/global-crypto-currency-crackdown-sparks-search-for-safe-havens-idUSKBN1DSoF2 ("[M]any U.S. startups thought they could avoid such scrutiny by selling 'utility tokens,' which gave buyers access to products or services rather than a stake in the company."); *see also* Rohr & Wright, *supra* note 18, at 41 ("Because [utility] tokens entitle the holder to use, consume, or access an online service or serve other functional purposes (for example, participating on a messaging platform or surfing the Internet without ads), elements of a consumption purpose are present.").

301. *See* Rohr & Wright, *supra* note 18, at 52.

security."[302] Clayton further noted that offerings that "emphasize the potential for profits based on the entrepreneurial or managerial efforts of others" are "the hallmarks of a security under U.S. law."[303]

One neat solution to the securities problem ICOs confront involves not trying to evade the *Howey* test by not offering an ownership interest; instead, it involves embracing the need for governance and gap-filling by creating intervention points for tokenholders to fill. Once set in motion, a smart contract continues to operate autonomously—no single individual can stop it once it has begun running. Thus, if the contract codes for meaningful governance amongst DAO tokenholders, then the ownership interest would not generate profits "solely through efforts of others." Instead, it would look more like a true partnership interest. This solution has the benefit of neatly tying two threads this Article has explored: It not only solves the *Howey* securities problem, but also reintroduces a place for gap-filling in what will inevitably be an incomplete contract for firm organization at the outset of an undertaking. The result would be that the DAO will function more like the partnership it technically is under the law.

The point of this Article, however, is not to suggest a solution to the *Howey* problem current ICOs confront. Instead, its argument is simply that the blockchain reshuffles the relationship between the law and private ordering. For better and for worse, the blockchain does not provide parties with the intervention points corporeal firms naturally supply. That lack of intervention point is both a bug and a feature. Incomplete contracting teaches that intervention points are necessary. The DAOs of the future, if they exist, will be able to configure governance rules in ways previously unimaginable. But legal intervention points remain wherever blockchain organizers and their identifiable organizers meet.

VI. CONCLUSION

This Article makes no claims that the blockchain is an unregulable space. The history of Internet regulation has taught us that borders, governments, and authority will inexorably extend wherever legal intervention points exist.[304] Instead, its focus has been on the world of private ordering and the usual relationship between contracting parties and private law that arises on the blockchain. If parties generally "bargain in the shadow of the law,"[305] so

302. Public Statement, SEC Chairman Jay Clayton, Statement on Cryptocurrencies and Initial Coin Offerings (Dec. 11, 2017), https://www.sec.gov/news/public-statement/statement-clayton-2017-12-11.

303. *Id.*

304. *See* JACK GOLDSMITH & TIM WU, WHO CONTROLS THE INTERNET?: ILLUSIONS OF A BORDERLESS WORLD 65–85 (2006).

305. Robert H. Mnookin & Lewis Kornhausert, *Bargaining in the Shadow of the Law: The Case of Divorce*, 88 YALE L.J. 950, 968, 997 (1979).

too have they traditionally contracted in the shadow of default rules. Not on the blockchain.

The nexus of smart contracts on the blockchain represents a fundamental challenge to business association law and contract law more generally. Traditionally, the law must and does provide its own governing rules all the time. One such rule, for example, establishes fiduciary duties. Agency law, the most fundamental building block of business association law, provides for a fiduciary duty owed by agent to principal, whether or not their agreement makes mention of it.[306] Business associations law fills gaps.

There are no similar background rules in the DAO. The DAO explicitly codes the contract law to which it is subject, and default rules have no legal intervention point in which to take effect. Put differently, there is no room in the DAO for a court to determine whether fiduciary duties are owed or what business form an entity takes. There is no room for courts to effectuate these kinds of judgments. Absent explicit coding, there is no room for the default function of contract law.

Moreover, prior business association law offered a type of penalty default: Entrepreneurs filed with the state to obtain specific entity status, or were swept into the default business form, the partnership.[307] The attraction of the corporate form was that it provided a reliable way to erect barriers between creditors and assets in a way that contract alone could not.[308] Without the shield of the corporate entity, unsuspected claims from creditors outside the firm threatened. Because of the public nature of the blockchain's ledger, however, each of the firm's contracting parties can see the full extent of the firm's obligations and, by contract alone, protect against them. A partner in a traditional partnership might fear that the partnership was taking on too many obligations, and that her assets might be on the hook. A tokenholder need not fear such claims unless the code affirmatively gave creditors access to her assets—at least, until her pseudonym was discovered. Conversely, and perhaps more importantly, firm creditors and tokenholders alike could trust that a DAO cannot be liquidated by a tokenholder or a tokenholder's creditors—simply because the code does not provide such power.

But the danger of incomplete contracting remains. Blockchain business organizations cannot evolve to the point that they no longer need contract law—or, more precisely, that they no longer need the gap-filling that contract law traditionally provides. The 2016 DAO's story, although in one sense the height of innovation, also revealed its fatal flaw. The nexus of contracts literature views the law—including, but not limited to business organization

306. *See, e.g.*, RESTATEMENT (SECOND) OF AGENCY § 387 (1958); 2A C.J.S. Agency § 271 (2013).

307. Joshua Fairfield, *The Cost of Consent: Optimal Standardization in the Law of Contract*, 58 EMORY L.J. 1401, 1444 (2009) ("Corporations, limited liability partnerships, and other legally defined business associations present a standardized face to the public, declaring the extent of limited liability protection.").

308. *See, e.g.*, Hansmann & Kraakman, *supra* note 47, at 429.

law—as a gap filler.[309] The 2016 DAO, like the Titanic's claim to be the unsinkable ship, failed in the hubris of the idea that its coders could lay down rules at inception and then have a business organization run on autopilot.

This Article has used the law of business associations as a lens through which to view the relationship of law to the blockchain, but its lessons extend beyond the reach of organizational law. The blockchain offers the heady promise of self-enforcing contracts, making it possible to transact with strangers is a "trustless" environment. Yet with this promise comes a concomitant need to reexamine just what role law plays in the relationship between contracting parties—and how that role changes when the customary intervention points no longer exist. The story of securities law's shaping of ICOs to offer utility tokens reminds that legal intervention points remain, not in the blockchain itself, but in its interface with the corporeal world. Like the Internet before it, the blockchain is subject to regulation from governments around the world.[310] This Article provides a first attempt to think through how the law can, and cannot, work upon the blockchain.

309. Bratton, *supra* note 74, at 407.

310. *See generally* GOLDSMITH & WU, *supra* note 304 (analyzing the ways in which governments around the world regulate the internet, notwithstanding its status as a diffuse and seemingly unbounded network).