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Mark Verstraete

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The Stakes of Smart Contracts

Mark Verstraete*

By consensus, smart contracts are a revolution in private ordering: They offer guaranteed enforcement, independent of the whims of territorial governments; efficient formation and interpretation; immunity from external interference; and complete deference to the parties' wishes. Each of these claims is a myth. While smart contracts present themselves as natural and neutral, they are in fact deeply politicized. The Legal Realists tore down the foundations of smart contracts almost a century ago. Advocates for them have not solved the problems of the past—they have forgotten them.

This Article offers a new critique of the optimism about smart contracts and desirability of securing mutual agreements by code rather than law. More specifically, this Article takes aim at the assertion that smart contracts can, and should, provide an alternative to traditional contract law. It contends that advocates for smart contracts rely reflexively on deeply contested assumptions from Lochner-era legal thought, including a political commitment to “freedom of contract,” insistence on a division between “public” and “private” spheres, and a minimalist view of the state’s role in managing private law systems of contract and property. More specifically, these assumptions cause smart contract partisans to fundamentally underestimate the role of the state in maintaining a functioning private law regime. This failure to recognize the inevitable extent of state intervention in private law means that smart contracts will create novel distributions of wealth and power that are normatively suspect.

Furthermore, this Article draws upon two foundational moments in Internet law—early hopes for a realm beyond territorial governance and attempts to override copyright law through technology—to demonstrate the errors that advocates and scholars alike commit based on the evanescent technological promise of this new method. Finally, this Article demonstrates

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that, far from realizing a utilitarian ideal of efficiency, smart contracts are constructed without democratic oversight and governance, which are essential for a legitimate system of private law.

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INTRODUCTION

Private systems of exchange promise to ensure obligations through the coercive power of code rather than the legal force of the state. This Article argues that even when such systems, such as the blockchain, are technologically possible, they are normatively illegitimate. Studying

these new mechanisms, though, offers important insights about the role of the state in private law.

Recently, technologists and legal scholars alike have been drawn to the possibility of private ordering secured by the power of code, rather than law¹ or norms.² Much of this excitement comes from the emergence of “smart contracts”³—a new digital innovation that leverages the blockchain (the technology underlying cryptocurrencies such as Bitcoin) to encode obligations so they execute automatically when certain triggering conditions are met. Smart contracts, at least to their supporters, promise to enable people to create perfect, self-enforcing agreements and maintain a system of mutual exchange independent of any state interference.

That code can regulate behavior is not a new insight.⁴ In many cases, code regulates in ways similar to physical architecture, such as wrought iron fences that mark the outer edges of an owner’s property. Prior instances of code-based regulation—like Digital Rights Management (DRM)—typically restricted behavior rather crudely. Specifically, the technological restrictions DRM created applied equally to any user who stumbled across them, much as a fence restricts all passersby equivalently.

Smart contracts, by contrast, are potentially capable of much more granular interactions. The largest and most well-known platform for smart contracts—Ethereum—claims that its smart contracting scripting language is “Turing-complete,” meaning that any natural language expression can be programmed into an Ethereum smart contract. This marks a key advance over earlier instances of code-based regulation. Smart contracts supporters thus envision far more nuanced obligations

1. See, e.g., THOMAS HOBBS, *LEVIATHAN* (Oxford Univ. Press 2009) (1651) (arguing that productive activity is not possible without a state (or legal system) to make sure people follow through with their obligations). The view that the legal system is the primary mechanism for organizing activity is usually called “legal centralism.” See generally ROBERT C. ELLICKSON, *ORDER WITHOUT LAW: HOW NEIGHBORS SETTLE DISPUTES* (1991) (identifying legal centralism and offering a critique of it).

2. In many cases, people do, in fact, maintain a system of mutual agreements without relying on the state’s enforcement power. The canonical example comes from Professor Robert Ellickson, who detailed how cattle ranchers in Northern California maintain a functioning system of order by norms (instead of law). See generally ELLICKSON, *supra* note 1. Professor Ellickson’s work ushered in an entire movement of law and society scholars who examined how people across a variety of industries maintain systems of agreements beyond law. See, e.g., Lisa Bernstein, *Opting out of the Legal System: Extralegal Contractual Relations in the Diamond Industry*, 21 J. LEGAL STUD. 115 (1992) (discussing diamond merchants who organize activity without depending on the state’s legal system).

3. 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>.

4. LAWRENCE LESSIG, *CODE AND OTHER LAWS OF CYBERSPACE* 6 (1999).

than past versions of code-based regulations.

DRM and smart contracts do, however, share a central defining feature. Both of these code-based restrictions enforce rules perfectly and preemptively, making undesirable conduct much more difficult, if not impossible.⁵ Again, fences are a useful analogy. Unlike legal enforcement, fences preempt unwanted conduct. More specifically, fences impose high ex ante costs that make certain conduct difficult. Legal enforcement, by contrast, usually imposes sanctions ex post. The crux of this distinction is that code-based enforcement can make breaking the law impossible. Or, in the case of smart contracts, preemptive enforcement can make deviating from the requirements of the smart contract impossible. Further, preemptive enforcement allows technical mechanisms to displace the broader legal system because this code can control conduct without depending on the state to impose penalties after a violation occurs.

Smart contracts are beginning to capture the attention of legal scholars as well as researchers across a variety of disciplines. The most ardent supporters of smart contracts—whom I label “cryptoeconomists”—make two principal claims about the desirability of smart contracts. First, cryptoeconomists claim that smart contracts might replace large swaths of the traditional contract system.⁶ To that end, smart contracts—as well as other rules deployed using the blockchain—could function as their own jurisdictions or private legal systems.⁷ Second, they contend that the circumvention of the legal system by smart contracts is desirable.⁸

5. See JONATHAN ZITTRAIN, *THE FUTURE OF THE INTERNET AND HOW TO STOP IT* 108 (2008) (defining and detailing “preemption” as one type of perfect enforcement).

6. See Frank Pasquale, *A Rule of Persons, Not Machines: The Limits of Legal Automation*, 87 *GEO. WASH. L. REV.* 1, 24–25 (2019) (describing smart contracts as “automatons” for executing contract terms once they “have been represented computationally” as a substitute for traditional contract mechanisms); Matt Byrne, *Do Lawyers Have a Future?*, *LAWYER* (Sept. 20, 2016), <https://www.thelawyer.com/issues/online-september-2016/do-lawyers-have-a-future-2>; Alan Cunningham, *Decentralisation, Distrust & Fear of the Body—The Worrying Rise of Crypto-Law*, 13 *SCRIPTED* 235, 237 (2016), <https://script-ed.org/wp-content/uploads/2016/12/13-3-cunningham.pdf> (“Given the potential range of uses . . . these relatively new ways of transacting will have important and potentially radical implications.”).

7. See Carla L. Reyes, *Conceptualizing Cryptolaw*, 96 *NEB. L. REV.* 384, 387 (2017) (defining cryptolaw as “the law of any subject matter implemented and delivered through smart-contracting, semi-autonomous cryptographic computer code”); Aaron Wright & Primavera De Filippi, *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* 48 (2015), <https://ssrn.com/abstract=2580664> (contending “blockchain technology may give rise to yet another body of law—*Lex Cryptographia*—characterized by a set of rules administered through self-executing smart contracts and decentralized (and potentially autonomous) organizations”).

8. See Max Raskin, *The Law and Legality of Smart Contracts*, 1 *GEO. L. TECH. REV.* 305, 335 (2017) (“If [smart contracts progress] to a point where there is truly no need for third-party enforcement, there would be no need for a state and the attendant costs that many libertarians see

Cryptoeconomists have offered different (and sometimes overlapping) rationales for the superiority of smart contracts over traditional contract law. At times, these arguments are wrapped in the rhetoric of distributive justice. Professor Joshua Fairfield, in particular, suggests that smart contracts could displace current doctrines that favor firms at the expense of consumers.⁹ To that end, smart contracts could be used as a tool for consumer protection.¹⁰ Other supporters, by contrast, offer utilitarian justifications for the desirability of smart contracts, which could potentially lower the transaction costs that accompany forming and enforcing agreements.¹¹ Finally, some cryptoeconomists offer autonomy-based justifications for smart contracts, claiming that smart contracts can preserve individual preferences from state override.¹² While the justifications for smart contracts are varied, all of them suggest that closed technical systems for securing agreements are normatively desirable.

Yet the cryptoeconomist view is not without critics. One common criticism is that smart contracts may not be as efficient as their supporters contend.¹³ While smart contracts might enforce terms efficiently, there are high *ex ante* costs associated with forming such agreements. Others argue that smart contracts and contract law serve different functions. Professors Kevin Werbach and Nicolas Cornell offer a version of this critique by arguing that contract law is primarily a remedial institution,

as unjustifiable.”). Cryptoeconomists understand these costs as both economic (enforcing contracts in courts costs money and time) and costs to individual liberty (courts often rewrite contracts and impose mandatory terms). *See id.* at 307. Professor Joshua Fairfield, by contrast, cautiously suggests that circumventing the legal system with smart contracts is desirable because it could empower consumers. *See generally* Joshua Fairfield, *Smart Contracts, Bitcoin Bots, and Consumer Protection*, 71 WASH. & LEE L. REV. ONLINE 35 (2014). Instead of basing the justification on autonomy or efficiency, Professor Fairfield offers a distributive justice argument for side-stepping legal enforcement mechanisms. *Id.*

9. Fairfield, *supra* note 8, at 37 (“Entrepreneurs and analysts agree that [blockchains]—of which Bitcoin is merely one example—can potentially restructure the power relationship between consumers and intermediaries online.” (footnote omitted)).

10. *Id.*

11. *See* Raskin, *supra* note 8, at 336 (noting “some proponents are primarily focused on the capability of smart contracts to reduce transaction costs”).

12. *Id.* at 307 (describing the “power of the smart contract to protect individual autonomy” from the state).

13. *See* Ed Felten, *Smart Contracts: Neither Smart nor Contracts?*, FREEDOM TO TINKER (Feb. 20, 2017), <https://freedom-to-tinker.com/2017/02/20/smart-contracts-neither-smart-not-contracts/> (reviewing Karen E. C. Levy, *Book-Smart, Not Street-Smart: Blockchain-Based Smart Contracts and The Social Workings of Law*, 3 ENGAGING SCI., TECH., & SOC’Y 1 (2017), which recognizes certain smart contract inefficiencies); *see also* Jeremy M. Sklaroff, Comment, *Smart Contracts and the Cost of Inflexibility*, 166 U. PA. L. REV. 263, 267 (2017) (“In some instances, [smart contracts] will make transactions *more* expensive and inefficient than the traditional legal contracts [they] aim[] to replace.”).

while smart contracts are exclusively concerned with ensuring performance.¹⁴ Similarly, Professor Karen Levy argues that smart contracts are a poor fit for how people actually use contracts.¹⁵

This Article offers a new critique of the cryptoeconomist position. More specifically, this Article takes aim at the assertion that smart contracts can, and should, provide an alternative to traditional contract law. It contends that advocates for smart contracts rely reflexively on deeply contested assumptions from *Lochner*-era legal thought, including a political commitment to “freedom of contract,” insistence on a division between “public” and “private” spheres, and a minimalist view of the state’s role in managing private law systems of contract and property.¹⁶ More specifically, these assumptions cause smart contract partisans to fundamentally underestimate the role of the state in maintaining a functioning private law regime. This failure to recognize the inevitable extent of state intervention in private law means that smart contracts will create novel distributions of wealth and power that are normatively suspect.

This is not the first time that emerging technology has resurfaced *Lochner*-era assumptions. Early discussions about Internet governance and the role of the state in cyberspace relied on similar contested beliefs about the scope of state intervention in private order.¹⁷ To that end, Professors Margaret Jane Radin and R. Polk Wagner turned to the core insights of Legal Realism to cast doubt on the several claims about anarchic visions of cyberspace governance.¹⁸ At the same time, Professor Julie Cohen recognized the specter of *Lochner*-era economic orthodoxy haunting the digital frontier.¹⁹ Classical assumptions—such as the sanctity of private property, freedom of contract, and a limited role for public policy in private transactions—buttressed policy arguments that favored contracts (private law) rather than copyright (public law) to govern the emerging market for digital works.²⁰

Yet, this Article goes beyond existing Legal Realist arguments to

14. Kevin Werbach & Nicolas Cornell, *Contracts Ex Machina*, 67 DUKE L.J. 313, 318 (2017) (“[Smart contracts] will not, however, replace contract law. While smart contracts can meet the doctrinal requirements of contract law, they serve a fundamentally different purpose. Contract law is a remedial institution. Its aim is not to ensure performance ex ante, but to adjudicate the grievances that may arise ex post.” (footnotes omitted)).

15. Levy, *supra* note 13.

16. See generally MORTON J. HORWITZ, *THE TRANSFORMATION OF AMERICAN LAW 1870–1960: THE CRISIS OF LEGAL ORTHODOXY* (1992).

17. See generally Margaret Jane Radin & R. Polk Wagner, *The Myth of Private Ordering: Rediscovering Legal Realism in Cyberspace*, 73 CHI.-KENT L. REV. 1295 (1998).

18. *Id.*

19. Julie E. Cohen, *Lochner in Cyberspace: The New Economic Orthodoxy of “Rights Management”*, 97 MICH. L. REV. 462, 464 (1998).

20. *Id.*

combat the cryptoeconomist position. Smart contracts offer a new technology that putatively creates a regime closer to the theoretical ideals of classical legal thought than any previous attempts. The Article modifies and extends the arguments of the Legal Realists to dismantle the neoclassical foundations of smart contracts and makes a further contribution by demonstrating that a system of smart contracts is normatively suspect.

First, providing a private system of enforcement through code does not eliminate the state's role in contract. While enforcement may be the most obvious manifestation of state power in private law, the state also necessarily establishes background rules that determine which contracts are valid in the first instance. Moreover, the choice of content for these rules is not neutral but will necessarily influence the bargaining strength of parties within the system and result in novel wealth distributions. To that end, the insights of Legal Realism demonstrate that governance decisions in smart contracts run deeper than advocates—and even other critics—recognize.

Second, while the choice of background rules necessarily shapes contract outcomes, there is no neutral way to determine the content of these rules. Put simply, the hope for a system of private law derived from natural law premises, as favored by classical theorists and cryptoeconomists alike, is illusory. Scanty premises like “freedom of contract” do not specify a single valid rule, but instead justify a range of background rules that are consistent with its position. Moreover, by overlooking governance decisions, cryptoeconomists do not return private order to a neutral, apolitical foundation, but instead fashion deeply political rules, even if by omission.

Finally, because their advocates overlook the governance decisions inherent in private law, smart contracts are potentially illegitimate exercises of power. More specifically, smart contracts' outcomes and the resulting wealth distributions are normatively suspect. Smart contracts circumvent the democratically responsive institutions that ensure private law's legitimacy through broadly accepted governance processes.

The remainder of this Article unfolds as follows. Part I provides a brief explanation of smart contracts and their underlying technology. Moreover, Part I situates smart contracts within the broader literature about how technology shapes contract law and how this technological transformation is driven primarily by the endless pursuit to optimize for efficiency. Part II introduces the broad contours of classical legal thought (or, alternatively, *Lochner*-era legal thought) and maps the principal arguments that Legal Realism cultivated to upend classical legal thought's intellectual dominance. Part III examines how *Lochner*-era assumptions are embodied in smart contracts and advocated for by

cryptoeconomists. In particular, Part III examines how smart contracts—though closer to the ideals of classical legal thought’s economics orthodoxy than past instances of technological disruption—falter on several fronts. Part IV argues that because cryptoeconomists overlook governance decisions that are associated with smart contracts—and any system of private law—the outcomes smart contracts create are potentially illegitimate.

I. THE TECHNOLOGICAL TRANSFORMATION OF CONTRACT

Smart contracts represent the most recent instance of digital technology remaking contract law. On their face, smart contracts seem to increase efficiency and promote forming agreements to regulate future behavior.²¹ This is not a new goal. Many advances in digital contracting have been motivated by the siren song of efficiency. For instance, clickwrap contracts facilitate legally binding agreements through the touch of a button, thus lowering the transaction costs associated with contract formation.²²

While smart contracts are intended to be a further step toward the frictionless construction and enforcement of mutual obligations, these tools leverage different and largely novel technical mechanisms to achieve their goals. This Part examines the history and workings of smart contracts with a particular focus on how they deviate from earlier instances of technological innovation in contract law. In particular, smart contracts represent a break from earlier forms because their design limits

21. ADAM GREENFIELD, *RADICAL TECHNOLOGIES: THE DESIGN OF EVERYDAY LIFE* 153 (2017) (arguing smart contracts lower the cost of forming mutually binding promises and, therefore, open up more spheres of life to contractual ordering. According to Greenfield, “smart contracts lower the cost of enacting binding agreements between two or more entities In fact, because the overhead imposed is so minimal, it becomes feasible to deploy contracts in contexts where they wouldn’t have been remotely economic before.”); *see also* Werbach & Cornell, *supra* note 14, at 335 (“If smart contracts are substantially cheaper and more efficient, more situations can benefit from the use of contractual agreements”). However, there is also a more obviously political strain in the enthusiasm for smart contracts. Instead of focusing primarily on lowering transaction costs through self-enforcement, this line of thought considers state interference, such as voiding agreements on grounds of unconscionability, with private agreements improper. Both views underestimate the role of the state (and governance) in private law.

22. *See* BRETT FRISCHMANN & EVAN SELINGER, *RE-ENGINEERING HUMANITY* 60–80 (2018) (discussing the current legal and technical architecture of clickwrap contracts and noting how they nudge people to behave like simple stimulus-response machines); *see also* ProCD, Inc. v. Zeidenberg, 86 F.3d 1447, 1449 (7th Cir. 1996) (holding clickwrap licenses are enforceable unless their terms are objectionable on other contract law grounds); MARGARET JANE RADIN, *BOILERPLATE: THE FINE PRINT, VANISHING RIGHTS, AND THE RULE OF LAW* (2013) (describing clickwrap agreements and their boilerplate forms); Julie E. Cohen, *Copyright and the Jurisprudence of Self-Help*, 13 BERKELEY TECH. L.J. 1089 (1998) (identifying the effects of clickwrap contracts on copyright law).

the ability of courts to police smart contract agreements.²³ To that end, smart contracts usher in a new system of governance by technological authority rather than legal authority.

A. Digital Technology and the Transformation of Contract Law

Contracts have evolved dramatically in response to new digital technologies. The most prominent example is how the Internet has reshaped contract law. As more commercial activity is conducted online and mediated by screens and distances, the design of contracts and contract law has evolved to accommodate this new digital environment. To that end, the turn toward digital contracting precipitated changes in contractual form, the substance of contracts, and contract law itself.

While many scholars lament that digital practices do not match the traditional picture of contracts,²⁴ there can be no doubt that contracts have successfully made the transition from the analog to the digital marketplace.²⁵ Participants in the digital economy enter into exponentially more agreements than their counterparts in a previous economy that was predominantly brick and mortar.²⁶

Underlying the increased volume of contractual ordering on the Internet, however, are changes to contract form and law that are intended to lower transaction costs in forming legally binding agreements. Moreover, many changes to contract form do not depend upon sophisticated technological innovations. For instance, the technological infrastructure that underpins clickwrap contracts is not significantly different from analog form contracts. With clickwrap, standard form agreements are simply represented on digital screens instead of paper, and parties indicate assent to the contract terms through clicking instead of signing at the bottom of a printed document.

Though new contract forms (like wrap contracts) might not depend on sophisticated technology, the resulting changes in form are not inert but, instead, have wide-ranging consequences. As Nancy Kim succinctly puts

23. See Werbach & Cornell, *supra* note 14, at 331–32 (recognizing earlier instances still relied on the legal system as a fail-safe or backdrop and explaining “a litigant seeking to enjoin performance of a smart contract has no one to sue”).

24. See Margaret Jane Radin, *The Deformation of Contract in the Information Society*, 37 OXFORD J. LEGAL STUD. 505 (2017) (discussing online contracting’s lack of “fit” within traditional contract doctrine).

25. Joshua A.T. Fairfield, *Bitproperty*, 88 S. CAL. L. REV. 805, 810, 838 (2015).

26. Eric Felten, Opinion, *Are We All Online Criminals?*, WALL ST. J.: POSTMODERN TIMES (Nov. 18, 2011), <https://www.wsj.com/articles/SB10001424052970203699404577044213438024248> (suggesting people make more agreements in a year than past generations did during their entire lives).

it, contract form affects substance.²⁷ Moreover, one empirical study of end user license agreements (EULAs) confirmed that substance is indeed influenced by form, yet these changes primarily benefit sellers. In particular, the study tracked licenses from 2003–2010 and found that EULAs became longer and included more terms that were favorable to merchants, rather than consumers.²⁸

Just as digital contracting has ushered in new contract forms, law has followed suit by modifying traditional contract rules to validate these changes. To that end, through creating a duty to read on parties, courts also hold people to obligations that they have assented to even if they are unaware of the terms.²⁹ Relatedly, courts have stretched the foundational notion of consent to include mere manifestations of assent.³⁰

Moreover, courts appear to have reached a rough consensus about the requirements for a legitimate manifestation of assent.³¹ In particular, courts are more likely to enforce an agreement that requires an affirmative action of assent by the party (clickwrap) and, by contrast, significantly less likely to enforce agreements that do not require a similar action (browsewrap).³² As a result, judicial intervention imposes at least some limits on how new contract forms potentially create legally binding obligations.

Other contract types that more thoroughly blend contract form and technology have been the subject of rich scholarly discussion.³³ Most notably, Harry Surden defines and details two of these more

27. Nancy S. Kim, *The Wrap Contract Morass*, 44 SW. L. REV. 309, 309 (2014) (contending contract “[f]orm affects process but it also affects substance”).

28. Florencia Marotta-Wurgler & Robert Taylor, *Set in Stone? Change and Innovation in Consumer Standard-Form Contracts*, 88 N.Y.U. L. REV. 240, 243–44 (2013) (discussing a study of EULAs over a seven-year span that found the average agreement became longer and more favorable to the seller); see also Kim, *supra* note 27, at 310 n.3 (discussing this study).

29. See Charles L. Knapp, *Is There a “Duty to Read”?*, 66 HASTINGS L.J. 1083, 1083, 1112 (2015) (contending that duty to read might also be understood as a presumption that the parties have read contractual agreements).

30. Margaret Jane Radin, *Humans, Computers, and Binding Commitment*, 75 IND. L.J. 1125, 1141 (2000).

31. Woodrow Hartzog, *Website Design as Contract*, 60 AM. U. L. REV. 1635, 1644–45 (2011).

32. *Id.*

33. See, e.g., Harry Surden, *Computable Contracts*, 46 U.C. DAVIS L. REV. 629, 639, 658–59 (2012) [hereinafter Surden, *Computable Contracts*] (explaining “data-oriented” and “computable” contracts); Kevin Ashley et al., *Legal Reasoning and Artificial Intelligence: How Computers “Think” Like Lawyers*, 8 U. CHI. L. SCH. ROUNDTABLE 1, 19 (2001) (discussing the usefulness of artificial intelligence in interpreting contracts); Robert A. Hillman & Jeffrey J. Rachlinski, *Standard-Form Contracting in the Electronic Age*, 77 N.Y.U. L. REV. 429, 464 (2002); Andrew A. Schwartz, *Consumer Contract Exchanges and the Problem of Adhesion*, 28 YALE J. ON REG. 313, 318 (2011); Harry Surden, *The Variable Determinacy Thesis*, 12 COLUM. SCI. & TECH. L. REV. 1, 70–75 (2011).

technologically advanced contract types: “data-oriented contracts” and “computable contracts.”³⁴ The principal innovation underlying data-oriented contracts is that contractual terms are expressed in machine-readable form.³⁵ Rendering contractual obligations as data facilitates processing by computers and other electronic systems to improve efficiency.

Computable contracts, on the other hand, are more advanced than data-oriented contracts. Like data-oriented contracts, computable contracts express contractual obligations in machine-readable form. But, these contracts go a step further in how much of the process is automated. Computable contracts more robustly automate the contracting process by using data processing to determine if performance of the contract is complete. Still, these conclusions about performance by computable contracts are only *prima facie* determinations; the legal system remains the final arbiter of determining the parties’ obligations and ensuring performance.³⁶

Smart contracts represent a radical break from prior attempts to automate contract law through emerging technology. Designers of earlier variants of technology-infused contracts understood that these contracts would rely on the background legal system for enforcement and setting the “rules of the game” for contracting.³⁷ Smart contracts, on the other hand, are intended to circumvent—or at least be independent of—the state’s contract law machinery.

The next subsection discusses smart contracts and important details of how they function.

B. Smart Contracts and Untethering Enforceable Promises from Law

Like traditional contracts, smart contracts represent a possible system of coordinating activity between individuals (or groups). Both are potential solutions to the problem of ensuring that the party you are relying on will actually perform its end of the deal. Contract law and smart contracts attempt to mitigate the risk (or harm that results) if you

34. Surden, *Computable Contracts*, *supra* note 33.

35. *Id.* at 634 (“In particular, parties can express certain contractual terms or conditions as *computer data*. . . . When terms are represented in highly-structured data, computers can process them with a high degree of accuracy as compared to those expressed in ordinary language.”).

36. Werbach & Cornell, *supra* note 14, at 322–23 (“The limitation of computable contracts is that the computers involved can only make *prima facie* determinations about performance. The legal system and other traditional mechanisms remain available to the parties if they are unsatisfied with the results of automated systems. The contract is designed to be computable, but if the computation diverges from the parties’ intent, as conventionally understood in contract law, they may disregard the computerized result.” (footnotes omitted)).

37. *Id.* at 320–24.

perform and the other party does not. In most cases, parties cannot perform at the same time, so one party runs the risk of its performance not being reciprocated.

Many movies with a drug deal scene demonstrate the difficulties of coordinating without the possibility of state enforcement.³⁸ What if one party tosses over the duffel bag filled with drugs, but the counterparty refuses to hand over the briefcase of cash? When parties contract for the sale of legal items, the state functions to ensure that both parties perform their side of the bargain. In this way, contract is fundamental to the construction of modern capitalist economies, particularly where the Internet mediates the relationship between buyer and seller. In most cases, this is a one-time relationship; buyer and seller do not know each other, yet still need to trust one another until the transaction is complete. Contract law fills this void.³⁹

In a system of contract, parties do not need to trust each other completely. They merely need to trust the state.⁴⁰ Contract law rests on a shared understanding that the legal system will provide some remedy—usually expectation damages—in the case of breach. This is where the core distinction between smart contracts and traditional contracts comes into play. Smart contracts—like other Internet and blockchain projects—remove the need for centralized intermediaries.⁴¹ When it comes to automating contract law, technologists seek to replace the legal system with code-based enforcement mechanisms. Because of this, smart

38. See ELLICKSON, *supra* note 1, at 138 (discussing “legal centralism”).

39. Contract law performs several other functions as well: maintaining the “ground rules” for contract, providing a forum in the case of disagreements, and—as I argue—legitimizing private coercion. See *infra* Part IV.

40. Werbach & Cornell, *supra* note 14, at 330 (“An inherent constraint on traditional contracting is that the parties must trust the state, and a variety of private intermediaries that facilitate efficient operation of the system.”).

41. One of the supposed virtues of cryptocurrency is that it removes the need for banks and central authorities to serve as trusted third parties. See Fairfield, *supra* note 8, at 39 (“If financial transactions can be freed of banks as intermediaries, then contracts can be freed of courts as intermediaries.”); David Z. Morris, *Bitcoin Is Not Just Digital Currency. It’s Napster for Finance.*, FORTUNE (Jan. 21, 2014), <http://fortune.com/2014/01/21/bitcoin-is-not-just-digital-currency-its-napster-for-finance/> (“In the long term, peer-to-peer finance threatens to weaken banks and other financial agents just as peer-to-peer file sharing did the music industry—and some of the architects of this financial Napster seem gleeful about the possibility.”).

Interestingly, disintermediation is one of the defining characteristics of many recent digital innovations (at least since the Internet). YOCHAI BENKLER, THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM 374–75 (2006). For example, peer-to-peer (P2P) file sharing promised to disrupt intermediary authority. Andrew Verstein, *The Misregulation of Person-to-Person Lending*, 45 U.C. DAVIS L. REV. 445 (2011). But see Kate Klonick, *The New Governors: The People, Rules, and Processes Governing Online Speech*, 131 HARV. L. REV. 1598 (2018) (describing how digital technology merely creates new intermediaries, rather than displacing them outright).

contracts might allow parties to form agreements and enforce them without depending on the state. However, this view relies on several contested assumptions about the role of the state in contract law.

In the broadest terms, a smart contract is a self-enforcing digital agreement. As discussed, smart contracts rely on digital enforcement mechanisms instead of legal ones. Yet, using digital means for enforcement is not new. Both the state and private actors have turned to digital enforcement mechanisms, but past instances of digital enforcement were not self-enforcing and still relied on third parties to initiate them.

For instance, in *TiVo v. EchoStar*, a federal court found that EchoStar's design infringed TiVo's patent and then required the company to electronically disable DVR functions in devices that were validly purchased and owned by consumers.⁴² In another example, Amazon—in a decision that was not compelled by the courts—remotely deleted digital copies of George Orwell's *1984* from users' Kindle readers after learning that the versions were sold by a company that did not have a copyright license.⁴³ The Internet and digitally connected devices offer expanded opportunities for digital enforcement. The possibilities and perils of code-based enforcement have been well documented by Internet law scholars.⁴⁴

However, these examples of digital enforcement differ in important respects from smart contracts. Using technology to enforce valid legal rules raises a host of important questions, yet these are largely distinct from the normative issues that attend private ordering by smart contracts. Yet, there may be some overlap between third-party digital enforcement and self-enforcement through smart contracts. For example, both practices raise questions about due process and what steps must be taken before digital enforcement can be legitimately initiated.⁴⁵

In total, though, the main issues that attend smart contracts are distinct from other types of digital enforcement. At bottom, the core division between smart contracts and earlier instances of digital enforcement is that smart contracts are self-enforcing. Smart contracts can enforce obligations in place of—or even despite—the legal system. In this way, smart contracts are not a subset of contract law but, instead, can act as a

42. *TiVo Inc. v. EchoStar Corp.*, 646 F.3d 869, 876–79 (Fed. Cir. 2011).

43. Brad Stone, *Amazon Erases Orwell Books from Kindle*, N.Y. TIMES (July 17, 2009), <https://www.nytimes.com/2009/07/18/technology/companies/18amazon.html>.

44. ZITTRAIN, *supra* note 5, at 110.

45. This shows that the legal system is not exclusively focused on efficiency (such as by lowering transaction costs). Sometimes inefficiencies are tolerated—and even celebrated—because they are part of a process that society finds normatively necessary, fair, or valuable.

substitute for a system of legal enforcement.⁴⁶

Self-enforcement allows parties to a smart contract to secure mutual obligations without relying on third parties. Unlike earlier instances of digital contracting (clickwrap, etc.) and digital enforcement, smart contracts do not rely on outside enforcement mechanisms.⁴⁷ Smart contracts, then, represent a possible new form of social organizing. While earlier instances of digital enforcement kept humans in the loop through designs that provided mechanisms to interrupt performance, smart contracts fully automate the contracting process. In a system of smart contracts, obligations are enforced immutably, and rescinding performance is all but impossible.⁴⁸

The underlying idea for smart contracts is relatively straightforward: contract terms could be secured by hardware or software, thus limiting the possibilities—including making it impossible—for parties to breach an agreement.⁴⁹ These basic principles were developed prior to any sophisticated technology that could be used to implement them. For instance, when Nick Szabo formulated and popularized the idea of smart contracting in 1996, he found vending machines—a relatively simple piece of technology—to be close analogues of smart contracts.⁵⁰ In 1996, there was no existing digital technology that could lead to widespread implementation of his idea.

However, vending machines help illustrate how smart contracts work. First, the terms of the exchange are embedded in the hardware of the vending machine itself. The machine takes money and dispenses the desired product based on rules or terms that are programmed into it.⁵¹

46. Primavera De Filippi & Samer Hassan, *Blockchain Technology as a Regulatory Technology: From Code Is Law to Law Is Code*, FIRST MONDAY (Dec. 5, 2016), <https://firstmonday.org/ojs/index.php/fm/article/view/7113/5657> (“[S]mart contracts are actually meant to replace legal contracts. They are no longer regarded as a mere support or enforcement mechanism to existing legal rules, rather, their code is intended to have the effect of law as its primary function.”).

47. Though technologists contend that smart contracts entirely displace intermediaries from contracts, new intermediaries may spring up to replace old ones. This is the case with social media and speech intermediaries. See Klonick, *supra* note 41.

48. *But see* Angela Walch, *The Path of the Blockchain Lexicon (and the Law)*, 36 REV. BANKING & FIN. L. 713, 735–45 (2017).

49. Szabo, *supra* note 3 (“The basic idea behind smart contracts is that many kinds of contractual clauses . . . can be embedded in the hardware and software we deal with, in such a way as to make breach of contract expensive (if desired, sometimes prohibitively so) for the breacher.”).

50. *See id.* (describing the vending machine example); Werbach & Cornell, *supra* note 14, at 323–24 (noting “Szabo’s smart contracts did not require fancy technology” and analyzing his vending machine example).

51. Szabo, *supra* note 3; Werbach & Cornell, *supra* note 14, at 323 (“The simple electronic mechanism of a vending machine performs two critical functions. First, it directly effectuates performance by taking in money and dispensing products. Second, it incorporates enough security to make the cost of breach . . . exceed the potential rewards.”).

Here, the machine most closely mirrors smart contracting because performance is ensured by technology rather than the outside legal system. Second, vending machines also provide a baseline level of security that prevents people from acquiring an item without paying. Security measures force individuals to comply with the terms of the deal embedded in the machinery instead of making off with a soda for free. If vending machines were designed without glass casings and instead relied on social norms for enforcement (for example, leave a dollar if you take a soda), some people might be inclined to not pay, especially if others were not around to notice.

Szabo's understanding of smart contracts—that technology could enforce agreements rather than the legal system—is in many ways agnostic toward the type and design of such a system. For the most part, the bedrock principles of smart contracts do not require a specific technology. Again, the analogy to the vending machine is useful because it demonstrates that these principles could be realized in many ways. Recently, blockchain technology has revived and implemented the idea of smart contracts. Yet, it is important to keep in mind that the principles and ideas behind smart contracts do not rise and fall solely on the promise of the blockchain. The critique of smart contracts in this Article focuses most prominently on the ideas and assumptions behind smart contracts in all forms. Still, it is important to detail how blockchain technology has provided a system to implement Szabo's vision of smart contracts.

C. *Bitcoin and the Blockchain*

The emergence of Bitcoin—and the blockchain—provided a mechanism for implementation of Nick Szabo's smart contracts.⁵² Initially, Bitcoin was almost exclusively a curiosity for libertarian computer programmers.⁵³ For instance, many Bitcoin developers were attracted to the possibility of maintaining a digital currency that did not depend on the state or other centralized institutions.⁵⁴ By circumventing

52. Wright & De Filippi, *supra* note 7, at 10–11 (“[Blockchain] technology has breathed life into a theoretical concept first formulated in 1997: digital, computable contracts where the performance and enforcement of contractual conditions occur automatically, without the need for human intervention.”); *see also* DON TAPSCOTT & ALEX TAPSCOTT, *BLOCKCHAIN REVOLUTION: HOW THE TECHNOLOGY BEHIND BITCOIN IS CHANGING MONEY, BUSINESS, AND THE WORLD* 102 (2016) (“[Before blockchain], smart contracts were an idea all dressed up with nowhere to go, as no available technology could deploy them as Szabo described.”).

53. *See* Jake Goldenfein & Dan Hunter, *Blockchains, Orphan Works, and the Public Domain*, 41 COLUM. J.L. & ARTS 1, 6 (2017) (“The blueprint for cryptocurrency was first floated in the early 1990’s in the techno-ideological ether of the Cypherpunks mailing list. . . . [The list’s members] promote[d] ‘crypto-anarchy,’ that is, the use of cryptography to facilitate private contractual ordering, promote individual liberty, and dismantle the nation-state.” (footnote omitted)).

54. *Id.*

these traditional gatekeepers, Bitcoin holders were able to send and receive payments without interference by governments or banks. Before the development of Bitcoin, by contrast, authorities could interrupt money transfers to prevent politically undesirable groups from receiving funds. For example, in 2011, WikiLeaks turned to Bitcoin donations after Visa—under pressure from government authorities—stopped processing transfers for the whistleblower advocacy group.⁵⁵ Similarly, much of the media's early reporting on Bitcoin detailed its use in online "dark net" marketplaces where people could purchase illegal goods like guns, drugs, and possibly even hitmen.

Lately, Bitcoin has started to transition out of the dark web and attracted interest from more traditional segments of the economy. Mainstream financial institutions have started exploring possible uses for Bitcoin. For instance, a recent Goldman Sachs report suggested that Bitcoin could provide a viable alternative currency in countries facing rapid inflation, such as Venezuela.⁵⁶ Additionally, many American merchants are beginning to accept Bitcoin payments, including established companies like Microsoft. Still, Bitcoin continues to hold our collective attention at least in part for its historic rise in market price, continued volatility, and initial morally suspect uses.

But, just as Bitcoin marked new territory for organizing without a central authority, cryptoeconomists imagine that its model can extend to applications beyond digital currency. On this account, the blockchain—the distributed ledger technology underlying Bitcoin—might be significantly more transformative than Bitcoin, which is merely an example of an individual instance of the technology's use. To that end, the blockchain might allow individuals to displace intermediaries and, by extension, shift the balance of power away from centralized institutions and toward individuals. Again, this turn tracks the ideology of Internet visionaries who argued that the Internet's dissolution of traditional institutions might empower individuals. And as with the Internet, the resulting distributions of power are a more complicated story than simply

55. Jon Matonis, *WikiLeaks Bypasses Financial Blockade with Bitcoin*, FORBES (Aug. 20, 2012, 9:47 AM), <https://www.forbes.com/sites/jonmatonis/2012/08/20/wikileaks-bypasses-financial-blockade-with-bitcoin/#1d2b57877202>. For another similar example, in 2016, Argentina prohibited credit card companies from processing Uber payment transactions because the ride-sharing service was skirting local laws. The Bitcoin-based debit card Xapo was able to circumvent the moratorium on payment processing, which allowed Uber to continue to operate in Argentina despite government efforts to throttle its payment system. See Kevin Werbach, *Trust, but Verify: Why the Blockchain Needs the Law*, 33 BERKELEY TECH. L.J. 487, 507 (2018).

56. Kenneth Rapoza, *Goldman Sachs Caves: Bitcoin Is Money*, FORBES (Jan. 10, 2018, 11:15 AM), <https://www.forbes.com/sites/kenrapoza/2018/01/10/goldman-sachs-caves-bitcoin-is-money/>.

a one-way transfer from central authorities to individuals.

At bottom, the blockchain is a distributed database that allows a group of individuals to guarantee the accuracy of its data without trusting a third-party intermediary. For Bitcoin, the blockchain creates an accurate, unalterable record that safeguards against spending or transferring a single Bitcoin multiple times.⁵⁷ The blockchain leverages several different elements to achieve these ends. First, it is widely distributed.⁵⁸ Each participant in the Bitcoin network stores a complete, up-to-date copy of the record. Second, the system uses an innovative incentive structure—called mining—to ensure that only accurate entries are recorded in the database. Though other mining systems are possible,⁵⁹ Bitcoin uses a “proof of work” consensus system. In this system, the nodes—or miners—are incentivized to maintain an accurate record of the ledger by solving computationally intensive problems with the possibility of getting a reward (additional Bitcoin). By rewarding only computational work that validates legitimate transactions, the Bitcoin protocol ensures that the nodes in the network remain honest and do not alter the record in their own interest.⁶⁰

According to many cryptoeconomists, blockchain technology might be used to circumvent established intermediaries, leading to widespread restructuring of our social institutions. This hope for institutional reorganization is dependent on a set of innovative features within blockchain technology. As Joshua Fairfield explains, this technology is pioneering in two central ways: it creates a system for tracking ownership of property without a trusted authority, and it allows peer-to-peer transfers of that property.⁶¹

In line with the blockchain’s capacity to track ownership, some commentators suggest that tamper-proof registries could be stored on the blockchain, thus providing security, transparency, and market

57. The ability to spend a single Bitcoin multiple times is known as “double spending.” Bitcoin does not allow for this as the ability to double spend would render the currency “worthless since everyone would have unlimited amounts and the scarcity, that which gives currency value, would disappear.” *What Is Bitcoin Double Spending?*, BITCOIN.COM (June 23, 2017), <https://www.bitcoin.com/info/what-is-bitcoin-double-spending>.

58. Likely, the more accurate word is “replicated.” Most distributed systems store fractions of the total system in different places; however, the blockchain stores the entire record in many different places. This structure has implications for the scalability of Bitcoin.

59. Nicolas Houy, *It Will Cost You Nothing to “Kill” a Proof-of-Stake Crypto-Currency*, 34 *ECON. BULL.* 1038, 1040 (2014) (“[W]ith [proof-of-stake], the expected reward for inserting transactions in the blockchain does not depend on the computational power of miners but on the amount of crypto-currency they already own.”).

60. These are called “51 percent attacks.” See *infra* Part III.A.2.b. (discussing this point in the context of the rise and fall of the Ethereum DAO).

61. Fairfield, *supra* note 8, at 40–41.

facilitation. To that end, Sweden has started to experiment with managing its land registry on a blockchain.⁶² Similarly, digital art might be recorded on tamper-proof blockchain registries to help authenticate and distinguish original works of digital art from copies.⁶³ And another widely-discussed use is that the blockchain might solve copyright's orphan works problem by recording rightsholders' information in a blockchain database so potential licensees can find the copyright holder and seek a license.⁶⁴

Just as the blockchain can track property, it can enable transfers of it. Again, the blockchain's mechanisms for transferring property do not rely on intermediaries—it is peer to peer. This distinguishes it from earlier instances of digital transfer that relied on the state or nonparty private actors to intervene and ensure compliance. With smart contracts, the process is automated and self-enforced by the blockchain network. In most cases, assets—as of now, usually digital currency—are tied to triggering conditions that are encoded on the blockchain and transfer automatically when one of the conditions is met.⁶⁵

D. *Ethereum and Smart Contracts*

While Ethereum is specifically designed for users to draft their own smart contracts, it is not the only blockchain platform that can support such agreements. For example, Bitcoin—which predated Ethereum—also enables smart contracts. Yet, the functionality of Bitcoin smart contracts is limited. Bitcoin's native scripting language (Bitcoin Script) can be difficult to use⁶⁶ and does not allow users to draft more complex

62. Joon Ian Wong, *Sweden's Blockchain-Powered Land Registry Is Inching Towards Reality*, QUARTZ (Apr. 3, 2017), <https://qz.com/947064/sweden-is-turning-a-blockchain-powered-land-registry-into-a-reality/> (“Enter blockchain technology, the technical concept behind bitcoin, which is designed to solve precisely those problems, or so its boosters say. Land titling has long been one of the most talked-about uses for [blockchain technology]. . . . Putting transactions on a blockchain makes all that paper go away; and it becomes much more difficult, if not impossible, to forge records.”).

63. Daniel Penny, *How Much for That Pepe? Scenes from the First Rare Digital Art Auction*, PARIS REV. (Jan. 23, 2018), <https://www.theparisreview.org/blog/2018/01/23/much-pepe-scenes-first-rare-digital-art-auction/> (“The history of digital-art collection has been one of beneficence; institutional collectors typically choose to pay artists because curators deem their work important and want to preserve and archive it, but most digital art has no resale value because it cannot be rigorously authenticated. The advent of blockchain is poised to change that.”).

64. See Goldenfein & Hunter, *supra* note 53, at 23.

65. Lauren Henry Scholz, *Algorithmic Contracts*, 20 STAN. TECH. L. REV. 128, 146 (2017).

66. Giulio Prisco, *Ivy Playground for Bitcoin: Experimenting with the Future of Bitcoin Smart Contracts*, BITCOIN MAG. (Dec. 29, 2017, 11:16 AM), <https://bitcoinmagazine.com/articles/ivy-playground-bitcoin-experimenting-future-bitcoin-smart-contracts/> (“However, Bitcoin Script is not being fully used by software developers, which according to Chain is due to ‘the relative difficulty of reading and writing Bitcoin Script programs, and of creating and using addresses from those programs.’”).

smart contracts.

By contrast, Ethereum is widely considered an improvement over Bitcoin. Ethereum deploys a more sophisticated drafting language than Bitcoin. More specifically, Ethereum's scripting language (Solidity) is Turing complete,⁶⁷ meaning that it can simulate a computer and, by extension, enables much more rich expressions than Bitcoin Script.⁶⁸ Solidity was also envisioned to be much easier to use than Bitcoin Script. Whether Solidity is actually practicable for people without coding expertise is unclear. However, the vision of completely democratized smart contracting is not an unalloyed good, especially considering that mistakes in smart contract code might be much more harmful than slight errors in legal drafting. For example, bugs in smart contract code might allow an individual to extract the entire value of the contract—something that would likely be proscribed by contract law.⁶⁹

Up to this point, the discussion of smart contracts has focused primarily on how they can move digital assets like cryptocurrency. Yet, smart contract advocates envision extending their use into the physical world. In particular, cryptoeconomists contend that smart contracts may bridge the gap between physical assets and digital mechanisms of control.⁷⁰ To that end, Aaron Wright and Primavera De Filippi discuss a possible future where “[d]evices and other tangible property can be registered on the blockchain and turned into *smart property*, using smart contracts . . . allowing tangible property to be controlled over the Internet and even controlled by other machines.”⁷¹ For example, Slock.it—a German blockchain start-up—developed a business based on controlling and monetizing access to physical property through smart contracts.⁷² In particular, Slock.it created and distributed a networked lock that unlocks when and only when the terms of a smart contract are met.⁷³ Property owners can attach the networked lock to physical spaces (hotel rooms or apartments) or other tangible assets (cars) in order to more efficiently

67. See Werbach, *supra* note 55, at 505 (defining Turing completeness).

68. Reyes, *supra* note 7, at 397.

69. See, e.g., discussion of DAO Hack, *infra* notes 134–43. Further, courts may use the contract doctrine “consideration” to void a clause that allows a party to extract all the monetary value of a contract with no payment or beneficial action in return. See RANDY E. BARNETT & NATHAN B. OMAN, *CONTRACTS: CASES AND DOCTRINE* 579–646 (6th ed. 2017) (discussing “consideration”).

70. Wright & De Filippi, *supra* note 7, at 17; see also VEENA PURESWARAN & PAUL BRODY, *IBM INST. FOR BUS. VALUE, DEVICE DEMOCRACY: SAVING THE FUTURE OF THE INTERNET OF THINGS* 1, 19 (2015), <https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=GBE03620USEN> (“As more and more devices around us become connected and intelligent, many physical products as we know them will be transformed into digital experiences.”).

71. Wright & De Filippi, *supra* note 7, at 15.

72. GREENFIELD, *supra* note 21, at 156.

73. *Id.*

lease their property.

In sum, blockchain-based smart contracts are self-enforcing agreements that ensure performance through technological authority rather than sovereign authority. While many advocates consider smart contracts a more efficient version of contract law, the story is more complex. In some situations, smart contracts might be more efficient; in other cases, less so. However, from this Article's perspective, the most important feature of smart contracts is that they are often intended to provide an alternative system to contract law entirely.⁷⁴ Examining how smart contracts putatively supplant state authority raises a host of governance and political economy issues. Starting with the principal insights of the Legal Realists, the rest of this Article argues that because systems of smart contracts overlook the governance issues that attend private ordering, their outcomes are normatively suspect.

II. THE LEGAL REALIST CRITIQUE OF SMART CONTRACTS

This section argues that the possibility of substituting smart contracts for traditional contracts undervalues the role of the state in maintaining a system of contract law. To support this claim, I draw upon core tenets of Legal Realism to demonstrate that the order seemingly inherent in the contract system is not natural but, instead, is a product of state intervention in private law. This analysis yields two conclusions. First, the attendant governance issues in any system of contract are more significant than cryptoeconomists imagine. Second, partly because cryptoeconomists underestimate the scope of governance and partly because of the design of smart contracts, these instruments may not adequately fulfill several core functions of contract law. Thus, the

74. Most scholars writing about smart contracts note this vision for smart contract systems to replace traditional contracts, which I will call the "replacement thesis." Of course, the scope of this claim can vary. For instance, smart contract advocates could suggest that smart contracts can and should replace contract law entirely (strong version), or instead that smart contracts can and should replace a subset of contract law (weak version). Primavera De Filippi and Samer Hassan state a version of the replacement thesis as follows: "[w]hat makes blockchain different from other technologies is that smart contracts are actually meant to replace legal contracts. They are no longer regarded as a mere support or enforcement mechanism to existing legal rules, rather, their code is intended to have the effect of law as its primary function." De Filippi & Hassan, *supra* note 46; *see also* Werbach & Cornell, *supra* note 14, at 353 (responding to the question of whether "smart contracts can replace courts in the adjudication of contract cases"). Werbach and Cornell argue that the answer to that question is no. To them, "smart contracts cannot supplant the role that courts play. Smart contracts are not, even conceptually, a replacement for judicial contract adjudication." *Id.* Their reason is that "[s]mart contracting functions to ensure action. Contract law functions to recognize and remedy grievances." *Id.* at 363; *see* Jay Cassano, *What Are Smart Contracts? Cryptocurrency's Killer App*, FAST COMPANY (Sept. 17, 2014), <https://www.fastcompany.com/3035723/smart-contracts-could-be-cryptocurrencys-killer-app> ("Someday, [smart contracts] may replace lawyers.").

transition from traditional contracts to smart contracts would not be as seamless as its advocates often insist.⁷⁵ Instead of confining the discussion to efficiency and utility, we should address the normative stakes of this transition.

A. *Lochner and the Realist Reply*

The current debates about smart contract systems—like many early discussions about the role of the state in maintaining private order in cyberspace—wish away some of the core insights from the Legal Realists.⁷⁶ At bottom, the cryptoeconomists' understanding of the legal system shares many assumptions undergirding classical legal thought—or conceptualism—that predominated *Lochner*-era jurisprudence. Many arguments about the possibility and desirability of smart contracts depend on these deeply contested assumptions. Yet most critics also fail to address key insights that Legal Realism—and later, critical legal theory—cultivated that cast doubt on the cryptoeconomist account.

By enshrining freedom of contract in constitutional law, the Supreme Court in *Lochner v. New York* animated the movement for progressive legal thought developed by the Legal Realists in the early twentieth century.⁷⁷ Before turning to the insights of Legal Realism, it is worthwhile to assess the system of thought that the Realists reacted against. Classical legal thought assumed a firm distinction between law and politics. This approach viewed some areas and aspects of law as not necessarily political; thus, they did not—and should not—involve the state.⁷⁸ This assumption suggested certain conclusions about the role of the state in private law. Descriptively, state intervention—by both courts and legislatures—in private law was unnecessary; contract and property were self-regulating and apolitical. Similarly, because the background rules of private law could be derived from self-evident principles, they were natural and not political inventions. Finally, adjudication within the system of private law was formalistic and fully constrained by the legal system. Judges simply applied the relevant law to specific facts to divine

75. See *infra* Section III.C.

76. Though the Legal Realism movement consisted of a diverse group of thinkers, scholars largely agree on their fundamental contributions; thus, using the rubric “Legal Realism” to denote a largely coherent body of thought is uncontroversial. However, at least one commentator suggests that using the term “Legal Realism” as an analytical tool is overly reductive. See William Twining, *Talk About Realism*, 60 N.Y.U. L. REV. 329, 343–47 (1985). That view, though, is the minority opinion. See Joseph William Singer, *Legal Realism Now*, 76 CALIF. L. REV. 465, 482 (1988) (reviewing LAURA KALMAN, *LEGAL REALISM AT YALE: 1927–1960* (1986)).

77. HORWITZ, *supra* note 16, at 33 (arguing *Lochner v. New York* brought progressive legal thought into being and led to a fundamental assault on classical theory).

78. See *id.* at 4 (discussing the “night-watchman” theory of the state).

the correct result.

Normatively, *Lochner*-era theorists considered most state intervention in private law illegitimate.⁷⁹ Except for a few narrowly tailored exceptions, interference from political actors in private arrangements was unacceptable. To that end, *Lochner*-era jurisprudence grafted this model of permissible state action onto the baseline entitlements created by the market and private ordering. The state's role was therefore constitutionally constrained. Classical theorists were particularly concerned with "class-based" or redistributive interventions.⁸⁰

The Realist response to the *Lochner*-era understanding of the legal system consisted most notably of exposing the distinction between law and politics as illusory. Critically, it also questioned the classical understanding of adjudication as nonpolitical. The older view posited judges as actors who are wholly constrained by an autonomous body of law. Apolitical adjudication thus reaffirmed the distinction between law and politics.

In addition, although at first glance market ordering may appear natural, the Realists demonstrated that it was not inevitable, but instead was legally and politically constructed. Importantly, the Realist critique insisted that because the market was *already* constituted by state action, it could not mark the boundary delineating legitimate from illegitimate state authority. The entire system was pervaded by state power, and the outcomes it generated were responsive to political choices made by state actors.⁸¹ As such, the market system could not be analytically separated from the regulatory system.⁸²

79. Cass Sunstein summarizes this point in a way that is worth repeating in full:

For the *Lochner* Court, neutrality, understood in a particular way, was a constitutional requirement. The key concepts here are threefold: government inaction, the existing distribution of wealth and entitlements, and the baseline set by common law. Governmental intervention was constitutionally troublesome, whereas inaction was not; and both neutrality and inaction were defined as respect for the behavior of private actors pursuant to the common law, in light of the existing distribution of wealth and entitlements. Whether there was a departure from the requirement of neutrality, in short, depended on whether the government had altered the common law distribution of entitlements. Market ordering under the common law was understood to be part of nature rather than a legal construct, and it formed the baseline from which to measure the constitutionally critical lines that distinguished action from inaction and neutrality from impermissible partisanship.

Cass R. Sunstein, *Lochner's Legacy*, 87 COLUM. L. REV. 873, 874 (1987).

80. See e.g., Cohen, *supra* note 19.

81. Singer, *supra* note 76, at 478.

82. *Id.* at 482 ("From [the Realist] perspective, a free market system could not be distinguished in a significant sense from a regulatory system. All market systems distribute power, and thus constitute regulatory systems. The rules in force have the effect of privileging the interests of some persons over the interests of others. It is impossible for a legal system not to so distribute power

B. *Lochner-era Ideology and Emerging Technology*

Many of *Lochner's* core tenets have resurfaced in response to technology's promise of reshaping governance and markets in line with laissez-faire orthodoxy. However, before this recent epicycle, discussions about state management of cyberspace generated markedly similar arguments. At first glance, cyberspace suggested the possibility of returning to classical conceptions of governance and markets. For governance, networked environments offered to potentially upend points of control exerted by sovereign nation states.⁸³ Because cyberspace was global, it was initially unclear how local, territorial governments could wield their authority to structure and organize it.⁸⁴ The reduced power of traditional sovereigns in cyberspace suggested that the role of the state could be reduced and private ordering by contract could take its place.

Just as the supposed boundlessness of cyberspace suggested new forms of governance and organization, self-enforcing smart contracts offer a potential avenue to remake contractual organization outside the state. As the cryptoeconomist account goes: traditionally, contracts have been enforced and structured by the state, yet because smart contracts offer their own, internal enforcement mechanism, the state is rendered unnecessary. Smart contracts, then, can be managed and ordered without centralized authority in a truly peer-to-peer fashion.⁸⁵

This position provides an answer to some of the initial challenges of private ordering outside state authority, primarily by offering an

and wealth. Any definition of property and contract rights necessarily requires the state to determine the character of relations among citizens in the marketplace.”).

83. David R. Johnson & David Post, *Law and Borders—The Rise of Law in Cyberspace*, 48 STAN. L. REV. 1367 (1996).

84. Radin & Wagner, *supra* note 17, at 1296.

85. There are several conclusions that smart contract advocates draw from this argument. In most cases, they are found together, but are not mutually exclusive. One conclusion is grounded primarily in examining the change in efficiency generated from moving to a system of smart contracts. Here, supporters contend that smart contracts could enforce agreements more efficiently. In addition, they argue that smart contracts and traditional contracts are functionally the same, but enforcement by code is more efficient. See Raskin, *supra* note 8, at 333–36. A second conclusion sees benefits in circumvention of state authority. If the state's role in private law is illegitimate, smart contracts can be used to reduce its encroachment. Relatedly, this same argument is sometimes used to claim that smart contracts might be helpful in legal regimes where certain groups are barred from exercising rights. For instance, some commentators suggest that smart contracts could allow women to exercise contractual rights in countries that restrict their ability to do so through law. See Alyssa Hertig, *Code as Law: How Bitcoin Could Decentralize the Courtroom*, MOTHERBOARD (July 3, 2014, 12:34 PM), https://motherboard.vice.com/en_us/article/vvb79d/code-as-law-how-bitcoin-could-decentralize-the-courtroom (arguing that “[p]eer-to-peer contracts and smart dispute resolution could provide opportunities for oppressed populations, by allowing people to draw up contracts outside of the established system”).

alternative system of enforcement.⁸⁶ To many, the state's most visible influence in private law is its role as enforcement mechanism. For example, the state protects property rights and guarantees a remedy for breached contracts. For that reason, any system for private ordering outside of the state must address how agreements will be effectuated. To cryptoeconomists, code-based enforcement can adequately substitute for legal enforcement. Moreover, smart contracts can administer agreements in the absence of stable community norms or in situations where neither party trusts the other. This enables them to facilitate transactions between individuals in different jurisdictions and communities.

Smart contracts, though, have not solved all of the problems inherent in maintaining functional systems of order outside the state. As the next section explains, the foundational Realist arguments demonstrate that much of the support for smart contracts rests on outmoded assumptions about the legal system.

III. SMART CONTRACTS AND THE REVIVAL OF *LOCHNER*

Smart contracts are not simply a more efficient version of traditional contract law. Instead, they are a distinctively new system for coordinating activity between individuals. That system, though, is deficient in that it elides critical governance issues in the contract system and fails to capture necessary features of contract law. This section situates smart contracts within the Realist critique of the strict separation between law and politics. Notably, the cryptoeconomist account mirrors *Lochner*-era legal thought along three main (yet flawed) commitments, namely: the public/private distinction, natural law foundations of private law and contract rules, and formalist theories of adjudication.

A. *Smart Contracts and the Resurgence of the Public/Private Distinction*

The most significant attack on the *Lochner*-era distinction between law and politics was the Realist critique of the public/private distinction.⁸⁷ For most *Lochner*-era jurists, the legal system could be divided into two mutually impenetrable realms: public law and private law.⁸⁸ Similarly,

86. For an analysis of private ordering and the enforcement ability of ICANN, see Thomas Schultz, *Private Legal Systems: What Cyberspace Might Teach Legal Theorists*, 10 YALE J.L. & TECH. 151 (2007).

87. Singer, *supra* note 76, at 475 (stating that “[i]n [his] view, [the Realist critique of the public/private distinction] is at least as significant, and possibly more significant, than the realists’ critique of formalism”).

88. Morton J. Horwitz, *The History of the Public/Private Distinction*, 130 U. PA. L. REV. 1423, 1424 (1982) (noting that “[o]ne of the central goals of nineteenth century legal thought was to create a clear separation between constitutional, criminal, and regulatory law—public law—and the law

the actors within these distinct spheres could be analytically separated based on the source of their power—public officials exercised state power while private actors exercised natural rights.⁸⁹ At bottom, this understanding of the legal system depicted private law and the market as self-regulating and beyond government control—or, at least, legitimate control.⁹⁰ The cryptoeconomist account of smart contracts offers a similar view about the nature of private law and the market. This view is necessary to support the idea that smart contracts can create a system of private ordering outside the state.

The insistence on an independent system of smart contracts reproduces the *Lochner*-era commitment to the public/private distinction along several distinct fault lines. First, cryptoeconomists misunderstand the public law component of contracts that exists in doctrines like unconscionability and public policy limits on private agreements. Like *Lochner*-era theorists, smart contract proponents consider contract arrangements as purely private affairs. Yet, current contract doctrine does not reflect this understanding. Second, cryptoeconomists depict enforcement of agreements as a neutral exercise that does not implicate policy questions. While code-based enforcement creates a gloss of neutrality, impartiality is not the case practically or theoretically, as recent events in the Ethereum community demonstrate.⁹¹

The Realists demonstrated that private law was necessarily constituted by state power. For that reason, insistence on a distinct sphere of private law was incoherent. While some of the mechanics of smart contracts make state power—and, more specifically, inherently political governance decisions—less obvious, they are still fully present.

1. The Public Dimensions of Contract Law

Smart contracts might override some of the public law interventions that are central to contract law. More specifically, a system of smart contracts might preempt contract doctrines like unconscionability and public policy limitations on enforcement.⁹²

of private transactions—torts, contracts, property, and commercial law”).

89. Singer, *supra* note 76, at 478.

90. *Id.* at 481 (contending the ultimate result of this reorganization and reconceptualization of private law was to portray the market as largely self-regulating and beyond governmental control).

91. Joon Ian Wong & Ian Kar, *Everything You Need to Know About the Ethereum “Hard Fork”*, QUARTZ (July 18, 2016), <https://qz.com/730004/everything-you-need-to-know-about-the-ethereum-hard-fork/>.

92. See Wright & De Filippi, *supra* note 7, at 26 (“While contract law implements a series of safeguards to protect consumers that might either invalidate the contract or make it non-enforceable (e.g., information asymmetries, undue influence, unconscionability, and incapacitation), smart contracts operate within their own closed technological framework. Although implementing basic

The circumvention of public law overrides in contract law is another relic from the *Lochner*-era. On the classical account, state intervention in contract law was only justified in a small number of explicitly demarcated cases. Classical jurists, then, limited the legislature's regulatory power over private contract to the protection of health and safety as well as prevention of fraud.⁹³ Moreover, even these narrow legislative interventions in contract law would not survive if they were class-based or specifically brought a distinct group under statutory protection.⁹⁴

Smart contracts, by design, enforce all obligations once they are encoded and registered on the blockchain. However, current contract doctrine recognizes that some validly formed obligations are too coercive or otherwise problematic to justify enforcement. To that end, contract law is not purely private. Instead, it embeds policy considerations that smart contracts might eradicate through their design.

For advocates, however, even displacement of doctrines like unconscionability does not eliminate the desirability of smart contracts.⁹⁵ They argue that since judges rarely invoke these doctrines to nullify private agreements, the transition to smart contracts might not—as a practical matter—alter the contract landscape significantly. Moreover, parties in weak bargaining positions might stand to gain more from the efficiency improvements of smart contracts than they would lose from eliminating judicial oversight. If smart contracts sufficiently increase surplus value, all parties might be better off with smart contracts rather than traditional contract law.⁹⁶

Briefly, there are two principal responses to this claim.⁹⁷ First, even though unconscionability is infrequently invoked, it does not follow that the exception need not exist. Moreover, the elimination of public oversight of private law raises substantial concerns about legitimacy by

contractual safeguards and consumer protection provisions into smart contracts is theoretically possible, in practice, it may prove difficult given the formalized and deterministic character of code.”).

93. See Stephen A. Siegel, *Lochner Era Jurisprudence and the American Constitutional Tradition*, 70 N.C. L. REV. 1, 9 (1991); Cohen, *supra* note 19, at 468.

94. This issue was central to *Lochner*, where the Court found that specific intervention favoring bakers violated the principle of neutrality for limits on liberty of contract. *Lochner v. New York*, 198 U.S. 45, 64 (1905).

95. Further, some commentators suggest that one of the primary benefits of smart contracts is their ability to circumvent contract doctrine—though not explicitly the public limitations—to the benefit of consumers. See Fairfield, *supra* note 8, at 38–39.

96. In economic terms, the transition to smart contracts might be both Kaldor-Hicks and Pareto efficient. See Jules L. Coleman, *The Economic Analysis of Law*, in NOMOS XXIV: ETHICS, ECONOMICS, AND THE LAW 83, 83–84 (J. Roland Pennock & John W. Chapman eds., 1982) (providing definitions).

97. Part IV more fully details why we should reject this style of argument.

removing the state's role in checking private coercion.

Second, it is not clear from the mere fact that judges rarely resort to unconscionability means that the doctrine fails to serve disadvantaged parties. For example, the possibility of having a contract voided for unfairness can pressure stronger parties to create a more favorable deal. Simply put, judicial oversight of private law—and unconscionability in particular—likely does more work than critics give it credit for.⁹⁸

Interestingly, debates about the relationship between private ordering and public law limitations on contracts collided—again in response to emerging technology—at the turn of the twenty-first century.⁹⁹ More specifically, technological innovations in the market for digital works began to allow copyright holders to retain control over copies of their works even after transferring them (which would ordinarily exhaust their distribution rights). Copyright holders employed standard form contracts (such as end-user license agreements) and digital rights management (DRM) technologies to effectively nullify copyright's fair use and first sale provisions. DRM's technological controls fenced off content and prohibited consumers even from uses that might have been lawful under the fair use exception.¹⁰⁰ This use of technological tools to circumvent public law limitations on private law is particularly salient to current debates. Just as DRM allowed copyright holders to displace public policy limitations—in this case, fair use—on copyright, smart contracts might similarly displace public policy limitations on contract. And, with smart contracts, code-based enforcement might require some action by a party that would not be mandated by law.

It is incredibly difficult—if not impossible—to recast doctrines like fair use or unconscionability in a set of machine-readable instructions.¹⁰¹ As many scholars have noted, fair use analyses employ an unwieldy set of factors that resist reduction to clear rules.¹⁰² Likewise, the public fail-safes of contract are not amenable to this kind of simplification. However, this is not a design flaw. The use of standards for fair use and unconscionability is a feature. That fair use is a standard, rather than a strict rule, allows flexibility in fair use doctrine allowing it to more easily

98. Similarly, public oversight might provide a legitimating function for private coercion. *See infra* Part IV.

99. Cohen, *supra* note 19, at 468; *see generally* Niva Elkin-Koren, *Copyright Policy and the Limits of Freedom of Contract*, 12 BERKELEY TECH. L.J. 93 (1997).

100. ZITTRAIN, *supra* note 5, at 111–12; *see generally* Danny Rosenthal, *Assessing Digital Preemption (and the Future of Law Enforcement?)*, 14 NEW CRIM. L. REV. 576 (2011).

101. *See generally* Timothy K. Armstrong, *Digital Rights Management and the Process of Fair Use*, 20 HARV. J.L. & TECH. 49 (2006).

102. Lloyd L. Weinreb, *Fair Use*, 67 FORDHAM L. REV. 1291, 1306–07 (1999).

incorporate technological changes.

Some commentators have offered a possible solution to this problem. Future legislatures, they argue, might draft laws with an eye toward their suitability for code-based expression.¹⁰³ Even bracketing pragmatic concerns about implementation, this might not be a solution but, instead, a concession. As with fair use and the public policy doctrines from contract law, there might be good reasons why standards are more desirable than rules. Thus, smart contracts are unlikely to be able to reproduce the public law limitations inherent in contract and, by extension, embody a return to the classical vision of contract law.¹⁰⁴

2. Private Systems of Enforcement

For advocates, one benefit of relying on code to maintain a system of agreements—unlike state-based contract law—is that it eliminates discretion about which agreements to enforce and, by extension, is politically neutral. This view implicitly recognizes and supplies an answer—albeit an incomplete one—to the Realist contention that contract law is an inherently public and political phenomenon. Interestingly, then, smart contracts seek to remake the boundary between public and private, thus returning contract law to an autonomous, apolitical private sphere. While this view might be intuitively plausible, it does not hold up to scrutiny. First, using the blockchain to enforce all obligations is not politically natural or neutral. And second, even with code-based systems of enforcement, discretion is not completely eliminated.

The Realist response to the classical conception of contract law demonstrated that contracts are an inherently public phenomenon. Contracts, they argued, depend on a delegation of public power from the state to force individuals to comply with agreements that might no longer serve their best interest. Morris Cohen offered a concise articulation of both the public nature of the contract system and the necessary policy decisions within it:

[I]n enforcing contracts, the government does not merely allow two individuals to do what they have found pleasant in their eyes. Enforcement, in fact, puts the machinery of the law in the service of one party against the other. When that is worthwhile and how that should be done are important questions of public policy.¹⁰⁵

103. De Filippi & Hassan, *supra* note 46.

104. See generally U.C.C. § 2-302 (AM. LAW INST. & UNIF. LAW. COMM'N 2002) (detailing the contract law doctrine of unconscionability); see also Arthur Allen Leff, *Unconscionability and the Code—The Emperor's New Clause*, 115 U. PA. L. REV. 485 (1967).

105. Morris R. Cohen, *The Basis of Contract*, 46 HARV. L. REV. 553, 562 (1933).

The insight that contract law requires public policy decisions about when enforcement is desirable was distinctively at odds with the classical understanding of law.¹⁰⁶ For *Lochner*-era theorists, the state merely facilitated the freely chosen obligations of the parties when it enforced contracts. Furthermore, the judiciary's role in contract law was considered to be neutral and impersonal because it responded exclusively to individual desires.¹⁰⁷

Yet, the *Lochner*ian view overlooked the fact that courts are typically relied upon to enforce agreements when one of the parties would prefer not to follow through on its end of the bargain. In many cases, that party has wrongly predicted future events and wants to evade its obligations. To prevent this form of opportunism, contract law summons the coercive power of the state to make sure that party performs or pays. Thus, it is inaccurate to view contract enforcement as merely facilitating individual freedom.

Instead, contract law engages in a value-laden choice to protect the promissory expectations of one party at the expense of the other party's right to change its mind.¹⁰⁸ This pits competing moral principles—paternalism versus individualism—against each other in a way that cannot be fully resolved on natural law premises alone. For this reason, the state is not a neutral mechanism in the contract system—judges necessarily make policy choices about which contracts should be enforced.

Similarly, state action—at least on the Realist account—is not only implicated when coercive power is affirmatively wielded, such as when the state forces a party to perform or pay damages. It can plausibly be extended to cases where the state *fails* to undertake some action. This view of state action is broader than what the Constitution requires. Typically, the Constitution is understood to create negative rights; that is, it prohibits the government from undertaking certain forbidden actions.¹⁰⁹ Yet, to some, the imposition of affirmative duties on the state is consistent with general philosophical principles, particularly consequentialist ones. For example, Cass Sunstein and Adrian Vermeule

106. Gary Peller, *The Classical Theory of Law*, 73 CORNELL L. REV. 300, 301 (1988) (“[T]he traditional notion of a sharp distinction between the public and private realms as the basis for distinguishing law and politics, or law and legislation, is no longer considered respectable in American intellectual life . . .”).

107. *Id.* at 303 (stating that “[on the classical account], [t]he judiciary, on the other hand, does not threaten liberty because it simply facilitates the achievement of individual desire”).

108. Singer, *supra* note 76, at 483.

109. Christopher Serkin, *Passive Takings: The State's Affirmative Duty to Protect Property*, 113 MICH. L. REV. 345, 346 (2014).

argue that in a large set of cases, the distinction between acts and omissions by the state is morally irrelevant, particularly in the case of punishment.¹¹⁰ Killings that the government inflicts (through capital punishment) thus could have the same moral status as murders that it tolerates through inaction.¹¹¹ Most strikingly, Sunstein and Vermeule contend that if empirical evidence confirms the deterrent effect of capital punishment, then states might be morally compelled to use it.¹¹²

More controversially, there may be cases where constitutional principles create positive rights. For example, Christopher Serkin argues that the constitutional principles underlying the Takings Clause are consistent with imposing affirmative obligations on the state to protect property that is put in jeopardy by rising sea levels and climate change.¹¹³ To Serkin, the harms that accrue from government inaction can be equally culpable—and legally cognizable—as government action.¹¹⁴ This understanding offers doctrinal—not just philosophical—grounding to erase the distinction between acts and omission, which might be considered a corollary of the dissolution of the public/private distinction.¹¹⁵

Consider *Shelley v. Kraemer*, the canonical civil rights case.¹¹⁶ The issue in *Shelley* was whether enforcing racially restrictive covenants in deeds to real property constituted state action and thus violated the Equal Protection Clause of the Fourteenth Amendment.¹¹⁷ The Supreme Court decided that judicial enforcement of private agreements implicated state action because it “made available to . . . individuals the full coercive power of government to deny” property based on considerations of race.¹¹⁸ In the cases following *Shelley*, federal courts have been reluctant to find state action in the enforcement of private agreements, likely out of the reasonable fear that it might swallow state action doctrine almost entirely. While the public/private distinction may be logically untenable, constitutional law still insists on some form of the division.¹¹⁹

110. Cass R. Sunstein & Adrian Vermeule, *Is Capital Punishment Morally Required? Acts, Omissions, and Life-Life Tradeoffs*, 58 STAN. L. REV. 703 (2005).

111. *Id.* at 721.

112. *Id.* at 745.

113. Serkin, *supra* note 109, at 400.

114. *Id.*

115. Others have recognized the possibility of imposing affirmative duties on the state in response to climate change. See Eric Biber, *Law in the Anthropocene Epoch*, 106 GEO. L.J. 1 (2017).

116. See generally *Shelley v. Kraemer*, 334 U.S. 1 (1948).

117. *Id.* at 7–8.

118. *Id.* at 19.

119. Paul Schiff Berman, *Cyberspace and the State Action Debate: The Cultural Value of*

Yet even though constitutional law does not recognize state action in all cases where the Realists demonstrated it resides, a functioning system of private law intimately involves the state and governance. Granted, in many cases, parties form and follow through on agreements without relying on the state, and other times may act merely “in the shadow of the law.”¹²⁰ However, contract relies on the background expectation of judicial enforcement for its efficacy.¹²¹ Any account of smart contracts that suggests they can replace the state—even in a subset of cases—must account for the extent to which the state constructs the system of private law.

Critically, the state intervenes and maintains the contract system in other, frequently overlooked ways beyond deciding which agreements are enforceable. Often, this intervention requires the judiciary to determine the substance of the contract *ex post*.¹²² Most clearly, state engagement happens in two ways. First, it promulgates regulations that shape the substantive terms of a contract.¹²³ For example, the state might mandate particular terms for certain contractual relationships, such as those between landlords and tenants.¹²⁴ Judges will imply these terms even if they are not expressly included.

Second, courts routinely resolve conflicts about the division of surplus—or losses—in a contract where the agreement itself does not provide a clear answer. This practice, called gap filling, is required largely because of the costs inherent in forming complete contracts.¹²⁵

Applying Constitutional Norms to “Private” Regulation, 71 U. COLO. L. REV. 1263 (2000).

120. See Robert H. Mnookin & Lewis Kornhauser, *Bargaining in the Shadow of the Law: The Case of Divorce*, 88 YALE L.J. 950 (1979).

121. The threat of judicial enforcement of contracts provides parties an incentive to perform, particularly in cases where performance may no longer be in their best interest. Without the threat of enforcement, parties would not have adequate assurance that the other party would uphold its end of the deal, and, for that reason, would not rely on the other party’s promise.

122. Briefly, the state is also implicated in the contract system before contracts are even formed or a dispute is resolved. This happens in at least two ways. First, the property regime is responsible for the relative bargaining power of the parties and, by extension, determines the content of the contract and how surplus is divided. Second, the state creates contract ground rules that specify when a contract is formed as an initial matter. These topics are the subject of the next subsection. See *infra* Part III.B.

123. Statutory or administrative regulation is more common in Europe with its civil law systems. Parties choose from a slate of contracts that have predefined terms, such as for sales, leases, etc. See Mariana Pargendler, *The Role of the State in Contract Law: The Common-Civil Law Divide*, 43 YALE J. INT’L L. 143 (2018).

124. See David A. Super, *The Rise and Fall of the Implied Warranty of Habitability*, 99 CALIF. L. REV. 389, 399 (2011) (addressing the role of legislation in the tenants’ revolution in the 1960s and 1970s).

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

Moreover, when judges are forced to make these determinations, there is often insufficient information to divine what the parties would have wanted under the relevant circumstances. Instead, judges necessarily resolve these disputes through policy decisions—that is, the result does not follow as a matter of deductive logic.¹²⁶

By contrast, cryptoeconomists suggest that using code rather than the state to enforce agreements is politically neutral. More specifically, the blockchain enforces agreements perfectly; all smart contracts that are encoded on the blockchain will be enforced provided that the triggering conditions occur. To cryptoeconomists, then, the move toward a system of private ordering that enforces all agreements is natural. By removing judges and turning to perfect enforcement by code, cryptoeconomists imagine that they can create a system that apolitically performs the functions of contract law. That vision is illusory.

a. Perfect Enforcement Is a Political Choice

Enabling perfect enforcement through smart contracts is itself a political decision. Though the infrastructure of smart contracts eliminates discretion (by enforcing them all), this merely makes the political stakes of the system less apparent. It does not eliminate them. Perfect enforcement reflects a social choice that is derived from a distinct philosophical account of contract enforcement—one that stems largely from deontological or Kantian moral premises.¹²⁷ For that reason, smart contracts find their closest theoretical ancestor in accounts that connect legal enforcement of promises to autonomy.¹²⁸

Smart contracts, by perfectly enforcing all encoded commitments, necessarily reflect a value choice among competing moral principles. More specifically, smart contracts systematically prioritize adhering to obligations over other normative concerns, such as aggregate welfare or distributive justice. These bedrock principles are largely incommensurable. There is no natural or apolitical way to decide between alternative philosophical accounts of contract theory. Moreover, the decision about which theory justifies contract enforcement will benefit some while burdening others. Cryptoeconomists have thus created a system that distributes wealth and power based on deeply political design

126. See Singer, *supra* note 76, at 485 (stating that “[g]ap-filling thus necessarily requires the court to make value judgments and public policy judgments”).

127. See generally Seana Valentine Shiffrin, *The Divergence of Contract and Promise*, 120 HARV. L. REV. 708 (2007) (arguing that legal norms that regulate promises between those who make the promise diverge from the moral norms that apply to those promises).

128. See generally CHARLES FRIED, *CONTRACT AS PROMISE: A THEORY OF CONTRACTUAL OBLIGATION* (1981) (studying the philosophical foundations of contract law). For a critique of promise-based accounts of contracts that predate Charles Fried, see Cohen, *supra* note 105, at 571–75.

choices without acknowledging the nature of those decisions.

Many cryptoeconomists advocate for perfect enforcement of obligations on efficiency grounds. Undoubtedly, eliminating judges and other institutional frictions inherent in contract law could make smart contracts more efficient than contract law in some cases. Yet, it is by no means guaranteed to do so. For example, perfect enforcement and efficiency can cut in opposite directions, almost on principle. The clearest example is efficient breach. In short, the doctrine of efficient breach creates a system where parties perform only when it promotes overall social welfare.¹²⁹ Here, contract law makes the social choice to maximize net total efficiency at the expense of broken promises. Because smart contracts enforce with virtual immutability, efficient breach—and the expectation remedy of damages—is likely foreclosed in virtually every case. Thus, at times smart contracts maximize performance at the cost of efficiency.

While efficient breach provides an example where smart contracts might over-enforce in ways that are undesirable, the duty to mitigate demonstrates the opposite problem. From the standpoint of efficiency, there will be situations where the technological obligations created by smart contracts are undesirably narrow.¹³⁰ The duty to mitigate imposes an additional obligation—to take reasonable steps to limit damage from non-performance—that is not expressly included in the contract itself. Because smart contracts ensure performance through technological means that only attach to what is explicitly encoded in the agreement, there is no practical way to enforce this additional obligation.

Smart contracts, then, embody a political choice to ensure performance of agreements rather than favoring some other value.

b. The Politics of *Nearly* Perfect Enforcement

While smart contract transactions are normally enforced and irrevocable after they are completed, there are still a few possibilities for ex post intervention.¹³¹ The primary—and possibly only—method of ex post intervention is a hard fork.¹³² Critics of the blockchain's supposed apolitical nature point to the possibility of a hard fork to demonstrate that the blockchain in general, and smart contracts in particular, do not

129. Gregory Klass, *Efficient Breach*, in PHILOSOPHICAL FOUNDATIONS OF CONTRACT LAW 362, 362 (Gregory Klass, George Letsas & Prince Saprai eds., 2014).

130. Of course, the decision to optimize for efficiency is a contested one.

131. Werbach & Cornell, *supra* note 14, at 351 (explaining that a hard fork requires undermining the entire system).

132. See Barry Ritholtz, *Transcript: WSJ's MIB: Paul Vigna on Bitcoin*, BIG PICTURE (July 8, 2018, 12:00 PM), <https://ritholtz.com/2018/07/transcript-wsjs-mib-paul-vigna-bitcoin/>.

preclude collective governance decisions.¹³³ Smart contracts, by dint of their design, allow political intervention; failure to exercise this power is a political choice.

A hard fork allows members of the network to change the underlying code by exploiting a potential security vulnerability in the blockchain. Because the blockchain dispenses with central authority, a consensus of a majority of nodes in the network controls what is recorded on the blockchain ledger. Such a majority can therefore unilaterally alter transactions and reverse otherwise valid transfers. To preserve the validity of the ledger, blockchain systems rely on two key features. First, the consensus system provides an economic incentive for nodes to remain faithful. And second, blockchain systems are distributed so computing power is not concentrated within any individual's or group's control. However, when users coordinate outside the consensus system, achieving majority control of the network, to alter the underlying code of the blockchain, they generate a hard fork.

The rise and fall of the Ethereum DAO is one of the most widely publicized example of a blockchain community initiating a hard fork.¹³⁴ The DAO was an experimental venture capital fund heralded by its supporters as a new model for organizing a business.¹³⁵ Instead of relying on management to make decisions about how to invest the fund's capital, users could manage the fund in a supposedly democratic fashion through a network of smart contracts.¹³⁶ Initially, the DAO attracted widespread interest. Within the first few weeks, investors pledged over 150 million dollars of cryptocurrency to the project.¹³⁷

However, the unbridled optimism surrounding the DAO faded quickly when a participant within the project drained roughly 50 million dollars of cryptocurrency from the fund.¹³⁸ In a controversial response, Ethereum community members initiated a fork to the underlying code and reversed the hacker's cryptocurrency transfer.¹³⁹ The decision to fork the

133. Adam J. Kolber, *Not-So-Smart Blockchain Contracts and Artificial Responsibility*, 21 STAN. TECH. L. REV. 198, 216–17 (2018); Pasquale, *supra* note 6, at 43; Walch, *supra* note 48, at 735–45 (contesting claims of “immutability” by blockchain experts).

134. *See generally* Wong & Kar, *supra* note 91.

135. Kolber, *supra* note 133, at 210.

136. *Id.* at 212.

137. *Id.* at 201; Paul Vigna, *Fund Based on Digital Currency Ethereum to Wind Down After Alleged Hack*, WALL ST. J. (June 17, 2016, 7:27 PM), <https://www.wsj.com/articles/investment-fund-based-on-digital-currency-to-wind-down-after-alleged-hack-1466175033>.

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

139. Kolber, *supra* note 133, at 215.

blockchain was deeply contested within the Ethereum community.¹⁴⁰ Many members objected to reversing the transaction because they considered the underlying transfer valid.¹⁴¹ To these members, the hacker simply read the fine print of the contract (the relevant source code) and found a provision that allowed them to divert cryptocurrency to their personal account.¹⁴² Some Ethereum members reached the same conclusion by arguing that forking the blockchain and unwinding the transfer would undermine the technology's immutability and thus was undesirable.¹⁴³ In the end, the community opted to fork the Ethereum blockchain and recover the funds from the hacker.

The possibility of a hard fork allows for collective governance decisions in a supposedly ungovernable technology. However, the situations in which a hard fork is possible or likely are relatively narrow. Moreover, these situations have unique distributive stakes worth detailing.

To start, a hard fork requires that a majority of the network nodes cooperate to override the consensus system of the blockchain. For this reason, a hard fork will be politically possible only when the transaction or underlying code at issue is widespread enough to negatively affect a large number of members. This will likely only occur when the entire smart contract's project is put in jeopardy or where many members have suffered losses through a single, questionable transaction. Conversely, it will likely not be politically possible where only a few individuals are defrauded or suffer losses.

The Ethereum controversy demonstrates that individual smart contracts are still subject to political decisions.¹⁴⁴ As Professor Frank Pasquale notes, if the principal motivation undergirding smart contracts is immutable transfers, then the hacker ought to have been entitled to keep the funds gained in the DAO exploit.¹⁴⁵ Yet, reversing the transaction

140. *Id.* (claiming many Ethereum members are "vehemently opposed" to the hard fork).

141. *Id.* at 216–17.

142. *Id.*

143. Nathaniel Popper, *A Hacking of More Than \$50 Million Dashes Hopes in the World of Virtual Currency*, N.Y. TIMES (June 17, 2016), <https://www.nytimes.com/2016/06/18/business/dealbook/hacker-may-have-removed-more-than-50-million-from-experimental-cybercurrency-project.html> ("Programmers working on the Ethereum network, which hosts Ether, were debating on Friday whether to make a [fork] to the code to recover the frozen money. That faced immediate opposition from many virtual currency purists who were attracted to the technology because of its ostensible freedom from human meddling.").

144. See Kolber, *supra* note 133, at 225 (explaining how the hard fork affected individual Ethereum holders); Walch, *supra* note 48, at 738–39 (arguing technology can always bend to human decisions).

145. Pasquale, *supra* note 6, at 41 ("Reversing the hacking is a reflection of values outside the smart contract as it existed at the time the hack happened. Those are legal and political values that

necessarily appeals to values and considerations outside the closed, technical environment of smart contracts.¹⁴⁶ Decisions about how to balance countervailing values are necessarily governance questions with distributional consequences. More simply, any rule defining how to choose between conflicting values will necessarily benefit some while burdening others.

Importantly, the DAO episode foreshadows another issue for both contract law and smart contracts. The determination of what counts as a valid transaction cannot be made solely in reference to the agreement itself. Similarly, whether a smart contract was entered into as a result of fraud or duress—and the definitions for these concepts—cannot be resolved by looking to the code or natural law principles alone. Background rules are indispensable to any system of contract and cannot be deduced from first principles or thin concepts like “freedom of contract.”

The next subsection analyzes how the background rules of contract set the parameters for distinguishing between valid and invalid transactions and applies insights from the Realists to argue that determining the content of these rules is necessarily a political enterprise.

B. Smart Contracts and the Background Rules of Contract

Like classical legal theorists, cryptoeconomists undervalue both the governance decisions involved in selecting background contract rules and the extent to which these rules shape contractual outcomes. According to smart contract advocates, the entire contractual agreement is contained within the code.¹⁴⁷ Smart contracts, on this account, are closed systems that do not incorporate background rules of contract like duress, fraud, or voluntariness—these doctrines are preempted by code-based enforcement.

While smart contracts displace state-sponsored background rules, smart contracting platforms, like Ethereum, have not yet recognized their importance. Even though platform-specific background rules might be an improvement over a complete lack of background rules, this approach is a poor substitute for the state’s system of contract rules.

As other scholars have discussed, the absence of background rules in a system of smart contracts might offset some of the supposed efficiency gains because parties would need to specify all contingencies in the

need to be fully articulated . . .”).

146. *Id.*

147. Kolber, *supra* note 133, at 217–20 (discussing the cryptoeconomist claim that the code is the contract); Werbach & Cornell, *supra* note 14, at 349.

contract itself.¹⁴⁸ This point, while correct, overlooks the political stakes inherent in decisions about the background rules of contract.¹⁴⁹ Background rules not only facilitate forming agreements but also distribute power. To that end, voluntary choices about what agreements are—as well as the choice of content for other background rules—will influence the power to coerce and, by extension, will distribute wealth in different ways.

Any system of exchange must necessarily grapple with the limits of voluntariness. Because smart contract advocates overlook that the distinction between voluntariness and duress is contested, they run the risk of enforcing transfers that are not freely chosen obligations. Smart contracts collapse the distinction between validity and enforceability.¹⁵⁰ All smart contracts that are properly registered on the blockchain will be enforced regardless of the circumstances of their formation.

This subsection has two principal parts. First, it details the classical understanding of background contract rules and the Realist response. To *Lochner*-era theorists, the background rules of contract were natural and could be deduced from fundamental concepts within freedom of contract. In response, the Realists argued that these concepts could not fully determine specific rules.

Smart contract advocates, like classical theorists, underestimate the governance issues associated with developing a system of contract rules. The rules undergirding contract law are not natural and necessarily involve political decisions about their content. Smart contracts, through their design, implicitly go a step further than their *Lochner*-era predecessors to suggest that background rules are dispensable. However, by neglecting background rules, smart contracts implicitly create their own sets of background rules that distribute power and wealth in unique ways.

Second, this subsection offers a critique of platform-specific background rules for smart contracts. More specifically, Kevin Werbach and Nicolas Cornell suggest that platforms could introduce their own suite of background rules and then optimal rules will be selected through

148. Werbach & Cornell, *supra* note 14, at 360 (“Specifically, one might worry that the ex ante information costs to determine all contingencies could make smart contracting overly costly.”).

149. The politics of background rules operate on two levels: first, there is no neutral way to decide the content of the rules, and second, decisions about the rules’ content will distribute wealth and entitlements in different ways. See Duncan Kennedy, *The Stakes of Law, or Hale and Foucault!*, 15 LEGAL STUD. F. 327, 332 (1991).

150. Werbach & Cornell, *supra* note 14, at 369 (noting that when “a party enters into an agreement due to fraud or duress . . . , performance may be excused. The contract itself is valid; it is simply not enforceable. Yet, the distinction between validity and enforceability is precisely the one that smart contracts elide.” (footnote omitted)).

competition between platforms.¹⁵¹ This suggestion is overly narrow because it only recognizes default rules and not more fundamental background rules governing contracts. Similarly, it discounts the distributive stakes of contract rules (by focusing only on default rules) and instead is primarily concerned with facilitating agreement formation.

1. The Classical Understanding of Private Law Rules and the Realist Response

Unlike Werbach and Cornell, this Article focuses on background rules of contract: those obligations that are imposed by law and that cannot be waived or disclaimed in most cases. Moreover, the focus is different—it concentrates not on facilitating formation, but on policing it.

Lochner-era theorists envisioned that the details of private law systems—particularly, contract and property—could be derived mathematically from natural law concepts. On this account, the “rules of the game,” or background rules that undergirded private law, were neither political inventions nor creations of positive law. Instead, private law rules followed axiomatically from natural law concepts like “freedom of contract” or “protection of property.” In this way, property and contract were natural and constituted pre-politically without intervention by the state. State alteration of these rules was therefore presumptively suspect.

In response, the Realists demonstrated that these rules were not natural, but instead were political inventions.¹⁵² Notably, this mode of argument—often referred to as the internal critique—cast doubt on classical thought’s depiction of rules as neutral and axiomatic by illustrating the explanatory gaps between concepts and private law rules. The Realists and their heirs offered a few different versions of the internal critique.

First, the Realists demonstrated that private law concepts were too vague to determine the selection of specific rules within the contract and

151. *Id.* at 375.

152. Duncan Kennedy, *Form and Substance in Private Law Adjudication*, 89 HARV. L. REV. 1685, 1748 (1976) (“As we have seen, the charge against conceptualism was that it was a mystification: there simply was no deductive process by which one could derive the ‘right’ legal answer from abstractions like freedom or property.”). Elsewhere, Professor Kennedy reiterates the point that legal rules do not follow deductively—or apolitically—from abstract concepts. *Id.* at 1732 (“[I]t is implausible to describe the total body of legal rules as implicit in general principles like ‘protection of property’ or ‘freedom of contract.’ . . . [I]t is not possible to move in a deductive fashion from concept to implications . . .”). Professor Barbara Fried offers a similar critique about the impossibility of deriving specific property rules from “thin” natural law premises. Barbara H. Fried, *Left-Libertarianism: A Review Essay*, 32 PHIL. & PUB. AFF. 66, 78 (2004). For Fried, the Lockean idea of “self-ownership”—often used by natural law theorists in an attempt to justify specific legal rules—does not provide determinative outcomes in a large set of cases. *Id.* at 75–76.

property systems.¹⁵³ For example, the concept of “freedom of contract” can be divided into several constituent parts. To that end, freedom of contract also included the freedom *not* to contract. This required courts to promulgate rules that distinguished contracts that were entered into voluntarily from those that were not.¹⁵⁴ However, what constitutes a voluntary agreement is not metaphysically given; reasonable people can disagree about where to draw the line between voluntariness and impermissible duress.

On this score, Robert Hale offered one of the most famous incarnations of the internal critique of background rules.¹⁵⁵ Hale demonstrated that all contracts were shot through with coercion.¹⁵⁶ He argued that because all contracts were instances of mutual coercion, the choice about which agreements were voluntary involved reasonable disagreements that could not be resolved on natural law premises alone.¹⁵⁷ Instead, courts are thrust into the position of making policy decisions that result in selecting one rule over another.¹⁵⁸

Moreover, the ability of individuals to exert coercion within private law is not natural, but a function of social power constituted by the property system. As Hale noted, the state—through the property system—delegates the power to withhold what the counterparty to the contract needs.¹⁵⁹ For instance, the owner of a factory has the legal power to withhold wages unless the worker performs services.¹⁶⁰ Conversely, the worker has a legal power to withhold his services from the factory owner.¹⁶¹ Both sets of legal power—possessed by the factory owner and worker—exert coercive pressure on the other party.¹⁶² As a result, the distribution of gains in a contract is a product of each party’s power to coerce.¹⁶³

153. Singer, *supra* note 76, at 486.

154. *Id.*

155. Robert L. Hale, *Coercion and Distribution in a Supposedly Non-Coercive State*, 38 POL. SCI. Q. 470 (1923). Other versions of the internal critique include Duncan Kennedy & Frank Michelman, *Are Property and Contract Efficient?*, 8 HOFSTRA L. REV. 711 (1980).

156. Hale, *supra* note 155.

157. *Id.*

158. Singer, *supra* note 76, at 486 (“The realists concluded that contract doctrine inescapably engages courts in making moral and policy decisions about the legitimate distribution and use of power in the market. The manipulability of the concepts of duress and liberty allows courts to use the concept of freedom of contract either to defer to the terms of a particular market transaction or to reject them.”).

159. Hale, *supra* note 155, at 471–72.

160. *Id.* at 472; *see also* Singer, *supra* note 76, at 486.

161. Hale, *supra* note 155, at 472; Kennedy, *supra* note 149, at 351.

162. Hale, *supra* note 155, at 472.

163. *Id.* at 477.

Yet because all contracts are instances of mutual coercion, courts are necessarily required to make policy judgments distinguishing legitimate from illegitimate coercion. By casting doubt on bright-line divisions between contracts entered into freely and those entered into under duress, Hale and the Realists demonstrated that freedom of contract could not be constructed on natural law premises alone.¹⁶⁴ Further, and significantly, the decision about what types of coercion are legitimate—like decisions about the content of all other background rules—will alter the distribution of resources within the private law system.¹⁶⁵ For example, the legal decision about whether ownership of a factory entails the legal power to exclude workers and prevent picketing on site will necessarily alter the contractual landscape in ways that benefit one side or the other and redistribute power and wealth.

The Realists—and even more so, critical legal theorists—were particularly interested in the background rules that were most intimately tied to bargaining strength between labor and capital, such as rules governing strikes, lockouts, picketing, and so forth.¹⁶⁶ Yet, other background rules that might appear less relevant to determining the ability to coerce still play an important role.

The decision (or inability) of smart contracting platforms to affirmatively create background rules does not mean that such rules do not exist. Instead, they are created by omission. For example, because smart contracts are still enforced where there is possible fraud, this implicitly fashions a background rule that there is no duty for better-informed parties to disclose material information. Of course, this allows parties with more information to coerce and control the surplus of a deal in ways that might not be possible with common law contract rules on fraud, disclosure, and duress.

Further, some design features of smart contracts also impliedly create rules and, by extension, novel wealth distributions. Smart contracts enforce precisely the terms embodied in the code, illustrating a transition away from traditional doctrines like the preference for expectation damages and prohibition on enforcing penalty clauses, and toward a system of specific performance in all cases. Moreover, these doctrines—expectation damages and nonenforcement of penalty clauses—are arguably a judicial strategy to mitigate harsh bargains.¹⁶⁷ To that end,

164. Robert L. Hale, *Law Making by Unofficial Minorities*, 20 COLUM. L. REV. 451, 452 (1920); Singer, *supra* note 76, at 490 n.83 (citing Hale at length, *supra*).

165. Kennedy, *supra* note 149, at 330; Peller, *supra* note 106, at 305; Singer, *supra* note 76, at 486–87.

166. Kennedy, *supra* note 149, at 330.

167. Nathan B. Oman, *Specific Performance and the Thirteenth Amendment*, 93 MINN. L. REV.

smart contracts might enable stronger parties to more effectively coerce weaker parties without oversight by democratic institutions.

Granted, the potential for specific performance to be overly coercive is recognized, in part, because it—like other equitable remedies—allows government officials to levy sanctions for noncompliance. Of course, this concern will be minimized if a system of smart contracts operates outside of the state. Yet, specific performance is also considerably harsher than expectation damages in the set of cases where performing may be impractical or particularly costly.

Contracts at common law are generally understood to create the obligation to perform or pay damages.¹⁶⁸ Though this flexibility in how parties may discharge their contractual duties predated the law and economics movement, it has become associated with those scholars' utilitarian justifications of private law rules and, in particular, their rationalization of efficient breach. While many legal theorists celebrate efficient breach on consequentialist grounds, it might also serve distributive justice or fairness ends by providing weaker parties an easier option to meet their contractual obligations.

This analysis shows that foundational contract principles—such as assenting to contract terms—are not given *a priori* but, instead, are contingent and given content by democratic institutions.

2. The Failures of Platform-Specific Rules

One common criticism claims smart contracts are undesirable because they embody a deeply flawed view of contracts as fully complete agreements.¹⁶⁹ By design, blockchain enforcement removes the possibility of interventions that alter the substance of the agreement after the fact. For this reason, smart contracts are fully determined by the substance of the agreement that is registered in the blockchain (or, more parsimoniously, the code).¹⁷⁰

While advocates celebrate the design of smart contracts for ensuring certainty that agreements will be enforced, there are significant costs that attend this design. As several commentators have observed, smart

2020 (2009); Pargendler, *supra* note 123, at 146 (“[O]nce the contract passes muster under this test, the State is also willing to sanction breaches with more severe consequences: namely, by permitting the enforcement of penalty clauses [and] granting specific performance . . .”).

168. Oliver Wendell Holmes, *The Path of the Law*, 10 HARV. L. REV. 457, 462 (1897).

169. Felten, *supra* note 13; Usha R. Rodrigues, *Law and the Blockchain*, 104 IOWA L. REV. 679, 681–83 (2019); Skarloff, *supra* note 13, at 277–78.

170. Rodrigues, *supra* note 169, at 682 (“Because the smart ‘contract’ is code alone, there is no gap, in the sense of entry point, for the law to step in to fill.”); Scholz, *supra* note 65, at 148 (stating “the contract and the code are matching to one thing”).

contracts might falter because all contracts are incomplete¹⁷¹ and there are few (or no) points of intervention to resolve smart contracts' incompleteness. By contrast, contract law resolves this issue by providing rules that govern when parties have not adequately recorded their preferences or if an unforeseen event occurs (of course, these might be related).

However, perfect enforcement of smart contracts all but fully forecloses *ex post* interventions.¹⁷² Analogously, critics of perfect enforcement by DRM technology raised a suite of similar concerns. For example, DRM prevents end users from nominally infringing copyright and then arguing fair use after the fact.¹⁷³ Similarly, recipients of products wrapped in DRM technology cannot assert other contract defenses (like unconscionability) in order to stop the technology from functioning.¹⁷⁴

Werbach and Cornell contend that the critique of smart contracts centered on incompleteness might not be dispositive because smart contract platforms could offset this concern by incorporating a suite of default rules.¹⁷⁵ More specifically, smart contract platforms could embed a set of default rules into the platform, allowing competition among competing platforms to select efficient and majoritarian default rules.¹⁷⁶

Most importantly, this solution and the incompleteness critique focus almost exclusively on how rules facilitate efficiency; they overlook the importance of more fundamental background rules that determine when a contract is formed in the first instance. To that end, rules that distinguish voluntariness (legitimate coercion) from duress (illegitimate coercion) are indispensable for any legitimate system of reciprocal exchange.

At the farthest end of this continuum, there is no legitimate basis for

171. Ayres & Gertner, *supra* note 125, at 92–94.

172. Rodrigues, *supra* note 169, at 682 (stating “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*.”).

173. Margaret Jane Radin, *Regulation by Contract, Regulation by Machine*, 160 J. INSTITUTIONAL & THEORETICAL ECON. 142, 152 (2004) (arguing that DRM strips the users' choice to infringe and then assert fair use).

174. *Id.* (noting “[t]he recipient has no option to plead unconscionability or some other grounds for unenforceability in order to stop the ‘injunction’ from ‘issuing’”).

175. Werbach & Cornell, *supra* note 14, at 360 (stating “one might worry that the *ex ante* information costs to determine all contingencies could make smart contracting overly costly. While this is undoubtedly a significant concern, it is ultimately a practical rather than theoretical objection. If smart contracts came with an array of well-understood default rules, that could mitigate *ex ante* information costs” (footnote omitted)).

176. *Id.* at 360 n.207 (arguing “[p]resumably part of any smart contracting platform—and much of what competing platforms might compete over—would be supposedly majoritarian and efficient default rules”).

enforcing obligations entered into under the threat of physical violence—for instance, when one party agrees with a gun pointed at its head. Further, as the insights of Legal Realism demonstrated, reasonable people can disagree about where to draw the line between legitimate and illegitimate coercion. For example, it is contested as to what circumstances, if any, constitute economic coercion that invalidates a contract.

While Werbach and Cornell respond exclusively to the incompleteness critique, their solution highlights an important point.¹⁷⁷ The market might be an enticing mechanism for introducing contract rules, both fundamental rules about when a contract is formed (like the line demarcating voluntariness from duress) and default rules (primarily concerned with efficiency). Because other methods of intervention—most notably, law—are largely preempted by the design of smart contracts, using market competition to generate rules and governance seems a tempting solution.

And yet, the market is unlikely to generate desirable rules to govern foundational inquiries in contract law, such as when an agreement is validly formed.

More specifically, these rules may not motivate participants to choose a particular platform. It is not clear that these rules will be particularly salient to users of smart contract platforms, so competition between platforms is unlikely to produce desirable rules.

Worse, these rules might be important to a specific subset of users with homogeneous interests (namely, large firms). In response, smart contract platforms might tailor their rules to be desirable to large firms that enter into many smart contracts—for example, Amazon or other large Internet companies—based on their stronger bargaining position. Analogously, incorporation competition between states resulted in regulatory arbitrage with states minimizing corporate liability in order to attract businesses.¹⁷⁸ Similarly, a regulatory “race to the bottom” could occur with smart contract platforms in an effort to make to their platforms desirable to large firms.

Just as the absence of network effects might facilitate regulatory arbitrage and undesirable rules, high switching costs that are endemic to the platform economy may also limit the effectiveness of rule creation through market selection. In particular, network effects might allow smart contract platforms to alter rules in undesirable ways once they attain a critical mass of users.

177. *Id.* at 369.

178. William L. Cary, *Federalism and Corporate Law: Reflections Upon Delaware*, 83 YALE L.J. 663 (1974).

Importantly, network effects potentially operate on two distinct levels within competition among smart contract platforms. First, the security of the blockchain is amenable to network effects: having many, distributed nodes prevents attackers from controlling the network and altering the ledger.¹⁷⁹ Simply put, a larger network increases the resiliency of the blockchain ledger which, in turn, provides larger platforms a distinct advantage over smaller, less established ones. Second, because contracts are inherently social, a smart contract platform will be more desirable if there are more users on it. Given these reasons, one (or a select few) platform for smart contracts might dominate the market, limiting the effectiveness of competition for creating and maintaining rules.

C. *Smart Contracts and Formalism*

Smart contracts—and code-based enforcement more generally—embody a contested theory of legal reasoning that tracks outmoded, *Lochner*-era assumptions about adjudication. More specifically, cryptoeconomists embrace a pure version of formalism that undervalues the extent to which judges determine outcomes to specific legal questions. Like other foundational assumptions of classical thought, formalism (and even more so, pure formalism) sharply distinguishes law from politics.¹⁸⁰

Morton Horwitz described the orthodox distinction: “If political reasoning was subjective, legal reasoning was objective; if the one was discretionary and a matter of opinion, the other was non-discretionary and not subject to the whims of the judge.”¹⁸¹ The Realists, though, demonstrated that this supposedly analytic separation of legal and political reasoning was porous—legal reasoning necessarily involved political judgment.

The cryptoeconomist project of replacing large swaths of state-supported contract law with smart contracts rests on the discredited pure formalist theory. Cryptoeconomists rely upon this contested account of judicial reasoning to bolster their claims about the possibility (descriptive) and desirability (normative) of supplanting contract law with smart contracts. Descriptively, the formalist view makes judges appear more amenable to replacement by smart contracts and code-based enforcement. Normatively, because smart contracts embody pure formalism, these automated systems introduce a more desirable (at least to cryptoeconomists) system of determining contract outcomes. Paradoxically, these two views seem to be contradictory, or at least in

179. Fairfield, *supra* note 25, at 824–25.

180. HORWITZ, *supra* note 16, at 198–99.

181. *Id.* at 199.

tension.

Broadly, formalism advances two principal claims. First, law is rationally determined. That is, all—or almost all—legal questions have one and only one correct result that a judge (or lawyer) derives from legitimate legal reasons.¹⁸² Second, legal reasoning is autonomous from other systems of reasoning, meaning that judges can derive outcomes without relying on non-legal normative systems (like morality or philosophy).¹⁸³ Moreover, pure formalism—or more pejoratively, mechanical formalism—depicts judicial decision-making as simply a deduction by application of law to fact.

Of course, formalism admits several intermediate positions that are more flexible than the pure account. For example, Professor Brian Leiter describes one such position as “Sophisticated Formalism.”¹⁸⁴ Sophisticated formalists assert that law is rationally determined but reject the premise that judges simply perform mechanical deductions to derive legal results. In particular, sophisticated formalists acknowledge that legal reasoning necessarily involves determining which sources of law are valid and interpreting these sources; moreover, it recognizes that these decisions are necessarily nondeductive.

Interestingly, though, pure formalism—rather than other, more moderate accounts—has predominated with smart contracts. This should not come as a surprise. The formalist account performs significant philosophical work for advocates of smart contracts and buttresses both their descriptive and normative claims. Yet, as the Realists taught, pure formalism fails as a descriptive account. And second, the claim that pure formalism—or, alternatively, judging like a machine—is a superior (normative) form of adjudication is contested, to say the least.¹⁸⁵

1. Pure Formalism (Descriptive)

In an article discussing smart contracts, Max Raskin describes judges and legal reasoning in mechanical terms that track the pure formalist account.¹⁸⁶ In particular, Raskin claims that “the judge is nothing more than a computer who applies a series of rules to a set of facts and then

182. Brian Leiter, *Legal Formalism and Legal Realism: What Is the Issue?* 1 (Univ. Chi. Pub. Law & Legal Theory, Working Paper No. 320, 2010), https://chicagounbound.uchicago.edu/cgi/viewcontent.cgi?article=1178&context=public_law_and_legal_theory; see also Matthew C. Stephenson, *Legal Realism for Economists*, 23 J. ECON. PERSPECTIVES 191, 193 (2009).

183. Leiter, *supra* note 182, at 1.

184. *Id.*; see also Stephenson, *supra* note 182, at 194 (describing “moderate [f]ormalis[m]”).

185. See Betsy Cooper, *Judges in Jeopardy!: Could IBM’s Watson Beat Courts at Their Own Game?*, 121 YALE L.J. ONLINE 87, 95–100 (2011), https://www.yalelawjournal.org/pdf/999_gqgj98ui.pdf (offering a critique of AI-based judicial decision-making).

186. Raskin, *supra* note 8.

instructs others to enforce his output.”¹⁸⁷ In the same article, Raskin similarly characterizes the larger court system, claiming that when courts interpret “private contracts, statutes, or the Constitution, [they] take a series of inputs, run them through a series of conditionals, and then have an executor enforce their output.”¹⁸⁸

Smart contracts—by dint of their code-based enforcement—deduce outcomes through rigid application of conditional statements. Likewise, this strictly logical process maps neatly to Raskin’s understanding of legal decision-making. More concretely, many smart contracts are a set of conditional statements like “if X , then Y , and if $\sim X$, then Z .” For example, this set of conditionals could determine possible outcomes for managing a car lease via smart contract. If the lessee’s account is paid up to date (X), then the party’s cryptographic key unlocks the car door and starts the engine (Y). Alternatively, if the account is unpaid (not X), then the cryptographic key will not unlock the door and, further, automated repossession might be triggered (Z).

Here, the consequences of the pure formalist account are clearly visible. If judges are simply deductively applying law to facts in a mechanical (or computerized) way, then their role seems particularly amenable to replacement by code-based systems. Put simply, if judging is merely deduction, then smart contracts might be able to perform this role more efficiently and more cost-effectively than humans.

However, the pure formalist account of adjudication embodied by a system of smart contracts is distinctively different than how legal decision-making is carried out in practice. The Realists demonstrated that judges (as a descriptive matter) did not derive results mechanically from legal rules. Instead, judges decide cases through some combination of legal rules and general policy considerations (like fairness). Yet, judges often describe their decisions as though the result follows axiomatically from the relevant legal rules. To that end, legal rules not only motivate the decision but also supply public reasons (or post hoc justifications).¹⁸⁹

Smart contracts, then, represent a break from how judges and legal decision-making works in practice.

2. Pure Formalism (Normative)

Though Raskin’s claims appear to be purely descriptive, cryptoeconomists might be more charitably understood to be making a normative claim about smart contracts and the return to pure formalism.

187. *Id.* at 314.

188. *Id.* at 312.

189. Brian Leiter, *American Legal Realism*, in *THE BLACKWELL GUIDE TO THE PHILOSOPHY OF LAW AND LEGAL THEORY* 50, 50 (Martin P. Golding & William A. Edmundson eds., 2005).

Instead of claiming that smart contracts derive outcomes in the same way that judges do, cryptoeconomists might claim that mechanical deduction is a superior alternative to legal adjudication. Of course, this normative point inherently admits that the transition from legal contracts to smart contracts is not seamless, but instead embodies a distinctively new system.

There are several responses to the claim that smart contracts are normatively superior to traditional contracts. As a general matter, pure formalism is impossible. As the Realists demonstrated, generalized rules (even conditional rules enforced by smart contracts) cannot fully determine outcomes. To that end, the system employed by smart contracts cannot embody pure formalism; instead, smart contracts will necessarily deploy some makeshift formalist alternative.

Pure formalism and smart contracts both hinge their normative desirability on the belief that forming complete agreements is practicable. Empirically, this is not the case. Contracts are incomplete, and the legal system provides implied terms to remedy this problem. In short, the costs of forming complete agreements would likely outweigh the supposed benefits from smart contracts.

And, both formalism and smart contracts overlook the underdetermination of language. Language is inherently imprecise, so disputes will arise (at least at the margins). This insight is H.L.A. Hart's idea of the "open texture" of language.¹⁹⁰ Though cryptoeconomists argue that code is more precise than natural language, this misunderstands the issue. Reducing contract terms to code does not solve ambiguity but instead wishes it away, to no avail. The famous prohibition on "vehicles" in the park is still ambiguous whether it is expressed in natural language (like English) or code (like Ethereum's Solidity).¹⁹¹

Finally, that judges can (and do) decide outcomes by evaluating the social realities of outcomes—instead of merely through mathematical deduction—might be a more desirable system. By contrast, cryptoeconomists advocate for smart contracts because of the supposed (though illusory) apolitical system that deduces outcomes simply in reference to the contract and, by extension, more adequately preserves the autonomy of the parties. Yet, this is not clearly superior to judges deviating from the explicit terms of the contract in order to preserve or promote other social values. In particular, Karl Llewellyn advocated for

190. See generally Brian Bix, *H.L.A. Hart and the "Open Texture" of Language*, 10 L. & PHIL. 51 (1991).

191. See H. L. A. Hart, *Positivism and the Separation of Law and Morals*, 71 HARV. L. REV. 593, 607 (1958); see generally Frederick Schauer, *A Critical Guide to Vehicles in the Park*, 83 N.Y.U. L. REV. 1109 (2008).

judges to do just this.¹⁹² Rules, Llewellyn argued, should guide decisions with social considerations also informing judges of the proper outcome.¹⁹³

At bottom, a system of smart contracts (and the return to formalism) is not clearly superior. Instead, a world where reciprocal obligations are coordinated by smart contracts and determined mechanically might well be normatively suspect.

IV. SMART CONTRACTS AND THE CRISIS OF LEGITIMACY

This section argues that smart contracts, as an institution, suffer a crisis of legitimacy. The principal reason for this crisis is that cryptoeconomists overlook the necessarily political decisions inherent in any functioning system of private law, including smart contracts.¹⁹⁴ Advocates ignore core questions of political theory and institutional governance; that is, how should we make collectively binding decisions? Who should decide such questions? And, what rules and procedures should they use in this inquiry? This section addresses these questions, which remain not only unresolved, but largely ignored, by the smart contracts literature.

A. *What Do We Decide and How We Decide It? (Outcome vs. Process)*

Political theorists have offered many different (and often ambiguous) definitions of legitimacy.¹⁹⁵ Broadly, discussions of legitimacy typically offer descriptive or normative definitions (though these can be interrelated). On one hand, *descriptive* legitimacy—detailed extensively by Max Weber—typically examines whether people have faith in the authority of a particular political institution.¹⁹⁶ Descriptive legitimacy is determined largely on empirical grounds through sociological or ethnographic examination. To that end, participants in smart contract platforms may in fact believe that the rules governing the coercive power of code are legitimate and, by extension, that the authority of code-based enforcement is valid. Of course, many of the most ardent supporters of these projects believe that such governance decisions or beliefs are

192. KARL N. LLEWELLYN, *THE COMMON LAW TRADITION: DECIDING APPEALS* 19–61 (1960). *See also* FELIX S. COHEN, *ETHICAL SYSTEMS AND LEGAL IDEALS: AN ESSAY ON THE FOUNDATIONS OF LEGAL CRITICISM* 34–40 (1933).

193. LLEWELLYN, *supra* note 192, at 179 (arguing “rules are not to control, but to guide decision”).

194. A quick point of clarification is needed. This section questions the legitimacy of a system of smart contracts. Of course, “legitimacy” has been discussed and variously defined by political philosophers.

195. *See, e.g.*, Allen Buchanan, *Political Legitimacy and Democracy*, 112 *ETHICS* 689 (2002).

196. *See generally* MAX WEBER, *THE THEORY OF SOCIAL AND ECONOMIC ORGANIZATION* (Talcott Parsons ed., A. M. Henderson & Talcott Parsons trans., The Free Press 2012) (1947).

unnecessary. At bottom, it is an open, empirical question about what beliefs participants hold and, by extension, whether smart contract projects are descriptively legitimate.

By contrast, a more challenging question is whether participants in systems of smart contracts are justified in believing that the outcomes created by these systems are legitimate; that is, whether smart contracts meet the threshold requirements of *normative* legitimacy.¹⁹⁷ While descriptive legitimacy turns primarily on the beliefs people actually hold, normative legitimacy instead considers what conditions are necessary to justify the coercive power of institutions.¹⁹⁸ This Article contends that smart contract platforms—particularly in their current incarnations—fail to justify the novel power and wealth distributions that code-based enforcement creates.¹⁹⁹

First, smart contracts are indeed instances of coercion. Again, as Morris Cohen recognized, contract enforcement enlists the machinery of the state to force people to do something that they may find unpleasant.²⁰⁰ For that reason, smart contract enforcement—like traditional enforcement—compels parties to make good on their promissory obligations. If parties to a contract thought performing was unequivocally desirable, then there would be no need for an enforcement apparatus, either from code or law.

Second, and relatedly, the outcomes smart contracts create are different than those created by the current system of contract law. For example, smart contracts enforce agreements that the state might not require to be honored. In particular, a system of smart contracts fails to account for foundational contract doctrines like unconscionability and other considerations that limit the enforceability of mutual promises.

If smart contract platforms simply enforced the outcomes of contract law, then these platforms might be able to co-opt legitimacy from the state, which is presumptively legitimate. Yet, smart contracts represent a new and distinct system for enforcing mutual obligations. And, importantly, decisions (or omissions) about what constitutes a valid smart contract transform the power of participants leading to novel wealth distributions.

And yet, smart contract platforms fail to preserve the legitimacy of results created by these new systems. Institutions derive legitimacy of

197. Buchanan, *supra* note 195, at 689–90; *see also* Fabienne Peter, *Political Legitimacy*, STAN. ENCYCLOPEDIA PHIL. (Apr. 24, 2017), <https://plato.stanford.edu/entries/legitimacy/>.

198. *See generally* JOHN RAWLS, *POLITICAL LIBERALISM* (2005).

199. This claim is purely negative. I take no position on what steps a system of smart contracts could take to gain legitimacy or even whether it is possible for smart contracts to be legitimate.

200. Morris R. Cohen, *Property and Sovereignty*, 13 *CORNELL L. Q.* 8, 12 (1927).

decisions through desirable outcomes, processes, or some combination of the two. Cryptoeconomists, like *Lochner*-era theorists, attempt to preserve legitimacy by appealing to the seeming naturalness of private ordering and its outcomes. However, as the Realists demonstrated, this project is chimerical.²⁰¹ The background rules of contract law—and smart contracts—are underdetermined.²⁰² People can reasonably disagree about what rules properly demarcate the bounds of valid contracts. To that end, the content of background contract rules cannot validate or legitimate the outcomes created by either contract law or smart contracts.

Of course, the content of background rules might be sufficient to conclude that individual transactions and the system itself are *illegitimate* exercises of power. Smart contracts, then, might be normatively undesirable simply in reference to the content of background rules or, more accurately, the rules created by omission. For example, the failure of smart contract platforms to distinguish between legitimate coercion (voluntariness) and illegitimate coercion (duress) is sufficient to question the legitimacy of wealth distributions created by such a system.

Nevertheless, the background rules of contract do not admit of a single, “right” answer.²⁰³ Instead, a limited universe of potential rules could be reasonably adopted. Importantly, the choice among possible rules or regimes is not inert; different rules subtly constitute the power of individuals in the contract system and affect the distribution of gains and losses. Contract law, then, derives the legitimacy of outcomes that result from choices about different rules by ensuring normatively desirable processes govern how background rules are selected and modified.

By contrast, smart contract platforms have not developed similar procedures to validate choices about competing rules, or to resolve other governance decisions. Yet, while the DAO episode alerted some participants to background governance issues, advocates have not yet recognized the full scope of political decisions contained within the system. Moreover, the failure to affirmatively choose the content of background rules nonetheless still creates rules—but through an inadequate process. As a result, the distributions of wealth and power that result from smart contracts should be considered with deep skepticism.

B. Who Decides?

Even if cryptoeconomists recognized the full scope of governance

201. HORWITZ, *supra* note 16, at 194–203.

202. *Id.* at 195.

203. See generally HORWITZ, *supra* note 16; see also Singer, *supra* note 76, at 537–39 (discussing the Legal Realists’ assertion that law and politics are intertwined, resulting in no right answer to judicial decision making).

decisions inherent in smart contracts, there are other significant problems involved in crafting normatively desirable decision-making procedures. Implementing a set of desirable processes for collective decision-making in a system of smart contracts does not fully guarantee that these decisions are valid or legitimate.

The legitimacy of decisions—and background rules in particular—may still falter because the people making these choices lack relevant expertise. For example, most of the core participants in blockchain and smart contract platforms like Ethereum are technologists. Yet many of the choices that are determinative in a system of smart contracts are necessarily political questions, and ones that legal scholars in particular are well suited to handle. Thus, even while the process is valid, the participants may lack the requisite skills and experience to select among competing political principles—or even identify such principles in the first instance.

Some decisions about smart contract platforms may be primarily technological questions with necessarily political outcomes. These choices might be examples where technologists possess the requisite expertise to delineate and then decide among competing alternatives. However, most decisions about the content of background rules are almost exclusively political. Granted, some rules may be more easily incorporated into the technology than others, or the technology may embody certain rules by default. However, the foundational question about what set of rules is most desirable turns on nontechnical considerations.

Similarly, conflicts of interest may arise between the decision-makers and other people involved within the system of smart contracts. One instance of this potential split exists at the design level of the blockchain. Recall the decision by the Ethereum community to fork the blockchain in the wake of the DAO hack. Though many community members favored the fork, it still needed to be implemented. This, however, required that a majority of the network agree to incorporate the change. By design, final decision-making authority rests with those who control the majority of network nodes: each person's "vote" is proportional to the percentage of computing power they supply to the overall system. And yet, the cryptoeconomist vision suggests that many people who use the platform to form smart contracts will not necessarily contribute to the network's computing power. Thus, their interests are not necessarily represented in governance choices due to how blockchain governance is technologically structured.

This raises difficult questions. Do the members of the network have any obligations toward other community members? If so, and these are not simply moral obligations, how will they be enforced?

CONCLUSION

The debate about the desirability of smart contracts is emblematic of a larger, underexplored theme in information law—that is, the normative stakes that attend pursuing policy goals by code rather than law. Descriptively, on one hand, Professor Tim Wu suggests that using code to regulate behavior can be usefully studied as an aspect of interest group behavior.²⁰⁴ In particular, groups may choose to invest in technology (code) or lobbying campaigns (law) in order to bring the regulatory system closer to their preferences.²⁰⁵ When and why groups pursue policy through technological design rather than using the legal system is, of course, an interesting and worthwhile project. Yet even though code and law may generate the same regulatory effects, these competing strategies have unique—and distinctively normative—considerations.

An interest group's decision to use code or law to bring about desirable regulatory outcomes emerges across several information law debates. For example, in response to the Snowden revelations about warrantless NSA surveillance, some advocated for using encryption clients and other technical solutions—or code—to protect privacy.²⁰⁶ Others, by contrast, advocated for a dramatic reorganization of the legal landscape to achieve these same ends.²⁰⁷ Yet, while both strategies can conceivably lead to the same results, they are not equivalent.

As with smart contracts, many attempts to regulate behavior by code undervalue the decision-making processes that are central to legitimate constraints on behavior. In many cases, code regulates by technological fiat, while legal regulation is, ideally, the product of reasoned debate by members of democratically responsive institutions. To that end, technical restrictions are normatively undesirable when they undervalue collective decision-making processes.

Alternatively, regulation by code may be normatively suspect because it preempts legal regulation or the state's power to constrain behavior. To that end, when code displaces legal regulation, it should be reviewed more searchingly. More simply, when interest groups use design choices to circumvent law in an area that is highly regulated by the state, we should be more critical of its outcomes. For example, because smart contracts displace contract law—a central, highly regulated domain of the

204. Tim Wu, *When Code Isn't Law*, 89 VA. L. REV. 679 (2003).

205. *Id.* at 707–09, 750.

206. Philip Bump, *So, You Want to Hide from the NSA? Your Guide to the Nearly Impossible*, ATLANTIC (July 9, 2013), <https://www.theatlantic.com/technology/archive/2013/07/so-you-want-hide-nsa-your-guide-nearly-impossible/313510/>.

207. David Ruiz, *Groups Line Up for Meaningful NSA Surveillance Reform*, EFF DEEPLINKS BLOG (Jan. 8, 2018), <https://www.eff.org/deeplinks/2018/01/groups-line-meaningful-nsa-surveillance-reform>.

state—both the processes and distributions that attend a system of smart contracts should be presumed normatively deficient unless proven otherwise.