

**JOURNAL ON EMERGING TECHNOLOGIES**

© 2023 Max Raskin & Jack Millman

ARTICLES

**AN INTRODUCTION TO PERSONAL GROWTH  
BETS: USING CONTRACT LAW TO LOSE WEIGHT  
AND QUIT SMOKING**

*Max Raskin & Jack Millman*

*Self-improvement is hard. Whether losing weight or quitting smoking, individuals have a difficult time honoring their commitments, especially if the only person they are disappointing is themselves. In this Article, we introduce a new legal mechanism for incentivizing personal growth. We describe this mechanism as a personal growth contract, which allows an individual to make an enforceable agreement with either a counterparty or himself with the aim of self-improvement. We propose the use of smart contracts to help execute unilateral personal growth contracts. Our conclusion is that personal growth contracts should be presumptively legal, provided they do not violate some otherwise applicable public policy or law.*

ABSTRACT..... 1

INTRODUCTION.....3

    I.    BACKGROUND ..... 8

        A. *Defining Personal Growth Bets* ..... 8

        B. *Monitoring and Enforcement Through Private Parties*...10

            1. *Accountability Apps*.....10

            2. *Commitment Bonds*..... 12

        C. *Government Regulation of Personal Commitments* ..... 13

            1. *Casino Laws (“Self-Exclusion Laws”)*..... 14

            2. *Covenant Marriage Laws* ..... 15

            3. *Psychiatric Advance Directives and Do Not Resuscitate Orders*..... 16

        D. *Issues with Third-Party Counterparties* ..... 17

- II. SMART CONTRACTS: A SOLUTION FOR SELF-CONTRACTS ..... 19
  - A. *An Alternative Framework: Self-Contracts* ..... 19
  - B. *Smart Contracts Overview* ..... 21
    - 1. Blockchains and Immutability .....23
    - 2. Strong and Weak Smart Contracts ..... 26
    - 3. Unilateral Smart Contracts for Personal Growth  
Bets.....27
    - 4. Normative Case..... 29
- III. RETHINKING CONTRACT LAW .....36
  - A. *Restricting Post-Contract Amendment* .....36
  - B. *No Efficient Breach, Only Specific Performance* ..... 38
  - C. *Consideration and One-Sided Contracts*..... 41
- CONCLUSION .....43

# AN INTRODUCTION TO PERSONAL GROWTH BETS: USING CONTRACT LAW TO LOSE WEIGHT AND QUIT SMOKING

*Max Raskin<sup>1</sup> & Jack Millman<sup>2,3</sup>*

## INTRODUCTION

People often want to improve themselves. But whether it's quitting smoking or losing weight, self-improvement is difficult. The idea for this Article came from a very real practice of its authors to make self-improvement a little bit easier.

Over the course of our friendship, each of us has had personal goals related to our growth as individuals. As a way of incentivizing this development and completing these goals, we would participate in what we called “personal growth bets” with each other. These bets can, and have, dealt with any number of goals, but the canonical example is weight loss. For example, a rough outline of such a bet would be: if Max does not lose 10 pounds over the next six months, he must pay Jack \$1,000. Whereas, if he does lose the weight, Jack must buy Max a steak dinner.

A vast amount of psychological research, as well as simple intuition, supports the conclusion that incentives matter. If someone knows he will either lose or make a meaningful amount of money related to a goal within his control, he is more likely to exert the effort. That does not mean incentives always work, but they have a real effect on the margins.<sup>4</sup>

These personal growth bets involve three parties: (1) the aspirant, (2) the monitor, and (3) the enforcer. The aspirant seeks to achieve a certain goal but does not fully trust himself, so he tries to bind his future

---

<sup>1</sup> Adjunct Professor of Law, New York University School of Law; Fellow, Institute for Judicial Administration.

<sup>2</sup> Adjunct Professor of Law, New York University School of Law.

<sup>3</sup> Thanks to Jacquelyn Thorbjornson, Bradley Bourque, Troy McKenzie, Ben Litchman, Derek Lyons, Barbara Tversky, David Gordon, the Mechanic's Liens Steering Committee, and Raina and Iris. We would also like to thank for the inspiration for this Article, in descending order of importance, Dan Doctoroff and Homer.

<sup>4</sup> See Leslie John, George Loewenstein, et. al., *Financial Incentives for Extended Weight Loss: A Randomized, Controlled Trial*, 26 J. OF GEN. INTERNAL MED. 621, 621-26 (2011); ADAM SMITH, AN INQUIRY INTO THE NATURE AND CAUSES OF THE WEALTH OF NATIONS 5 (Adam Smith ed., 5<sup>th</sup> ed. 1789).

self with some type of present commitment to either action or inaction. For the weight loss bet, that commitment is to forfeit \$1,000 if the aspirant does not lose 10 pounds. But the aspirant needs someone to monitor his future self to verify whether the commitment is satisfied (i.e., to ensure he actually loses ten pounds), and then enforce the bet if the future self fails (i.e., to ensure the \$1,000 is forfeited). As will be explained below, a new technology called “smart contracts” can serve the roles of enforcer and monitor, allowing an aspirant to effectively bind his future self without the need to involve another person.

This Article argues that a personal growth bet is best described legally as a contract. These bets fit the traditional definition of a contract—legally recognized promises to act or refrain from acting in a specified way.<sup>5</sup> They are not exactly “bets,” because the outcome is not uncertain in the same way most bets’ outcomes are. Like any contract, it is within the power of at least one of the parties to ensure that the bargained-for outcome occurs.<sup>6</sup> These “bets” also allow a party to accomplish his *ex ante* goal through legal commitment, which is a defining feature of contracts.<sup>7</sup>

We will therefore describe such personal growth bets as personal growth contracts, but they differ from standard commercial contracts in several important ways. *First*, the agreement principally involves only one party. A person’s present self seeks to make a commitment that leaves his future self better off and tries to bind his future self through some kind of monetary penalty or restraint on liberty. The monitoring and enforcement services generally require other parties, but as discussed more below, these services are just transaction costs tacked on to the real unilateral agreement. It is our belief that technology has advanced such that other parties may not be needed to execute the monitoring and enforcement functions. *Second*, the aspirant’s present self almost never wants to permit amendment of the contract after the initial terms are agreed to. But traditional contract law generally does

---

<sup>5</sup> See, e.g., RESTATEMENT (SECOND) OF CONTRACTS § 1 cmt. d (AM. L. INST. 1981).

<sup>6</sup> Compare with Nevada gambling law, which defines a wager as a sum of money or representative of value that is risked on an occurrence for which the outcome is uncertain. To be sure, someone could overestimate his ability to lose weight or build a house in a given time period, for instance, and no amount of willpower on his part could bend the physical laws of the universe. In this case, individuals who regularly overestimate their abilities will have deterrence that makes this overestimation costly. These are still contracts, although fall into the category where performance is impossible.

<sup>7</sup> See generally *Philosophy of Contract Law*, STAN. ENCYCLOPEDIA OF PHIL. (Nov. 23, 2021), <https://plato.stanford.edu/entries/contract-law/#:~:text=The%20first%2C%20and%20most%20famous,promoting%20efficient%20investment%20and%20exchange>.

allow parties to modify contracts after the fact.<sup>8</sup> This creates issues if the aspirant's future self changes his mind because, of course, the entire point of the bet is that the aspirant's present self is worried about the actions of his future self. *Third*, these types of personal growth bets interact oddly with the idea of "efficient breaches," i.e., situations where a party believes it is better off paying damages rather than performing the contract.<sup>9</sup> Some may object to bets with specific performance components because they could lead to cases where individuals prevent their future selves from engaging in activities that would make the person better off (because one's future self would be better off by breaching). Others may object to bets with monetary components because efficient breach theory would suggest an aspirant might often be justified in paying the money and engaging in the prohibited behavior, which just leaves the aspirant worse-off than had he not ever made the bet. One's view of this turns on whether the aspirant's present self has a more accurate assessment of the benefits and costs—perhaps because the future self will misjudge the costs—or if the aspirant is being unrealistic about the costs and benefits of achieving a desired future outcome.

These differences from traditional contracts can make it difficult to find a good monitor and enforcer for a personal growth bet. One can be fortunate—like the authors—and find friends willing to take on these roles. But this is a big commitment for a friend to take on, and it can put them in an awkward spot if the bet fails.<sup>10</sup> On the other hand, if the threat of enforcement is not serious, the purpose of the bet quickly falls apart.

One solution might be an impersonal third-party monitoring and enforcement service. These services do exist.<sup>11</sup> Users of these services commit to a goal—such as weight loss—and have to pay pledge amounts if they fail to adhere to the goal. But, although these services monitor one's progress, they rely on self-reporting. This works for many users,<sup>12</sup> but others might need a more aggressive monitor—particularly if the temptation is great. A final possible monitor and enforcer is the government.<sup>13</sup> In some situations, the government permits an aspirant

---

<sup>8</sup> See *infra* Part III.A.

<sup>9</sup> See *infra* Part III.B.

<sup>10</sup> For a contract to be legally enforceable, there must generally be mutual consideration, and so one needs to find a friend willing to commit some consideration to help his friend achieve his goals, e.g., the purchasing of a steak dinner in our case. And of course, even if that consideration exists, most friends will not actually go to court to enforce the bet if the aspirant fails to follow through.

<sup>11</sup> See *infra* Part I.B.

<sup>12</sup> Dreeves, *Combatting Cheating*, BEEMINDER BLOG (Aug. 23, 2013), <https://blog.beeminder.com/cheating/>.

<sup>13</sup> See *infra* Part II.A.

to pre-commit and legally enforces this commitment—a powerful example is so-called “self-exclusion” laws that allow a person to ban himself from casinos. People may exclude themselves from a casino or online gaming site, and the casino will expel them if they are found violating this “law.”<sup>14</sup> The gaming entity can also be required to check identification and confirm if someone is on an exclusion list. But of course, the government is generally not in the personal growth space, nor should it be given the unintended consequences and inefficiencies stemming from government’s involvement.<sup>15</sup>

The practice of individuals turning to third parties to help enforce their personal growth goals is at least as old as the mythical Trojan War. In the Greek epic *The Odyssey*, the hero Ulysses wants to hear the beautiful songs of creatures called Sirens but knows that doing so would lead his future self to death on the rocks below. So, he demands his sailors tie him tightly to the mast of his ship and then plug their own ears with beeswax so they won’t be tempted themselves. When Ulysses hears the Sirens’ song, he begs his sailors to untie him, but they only bind him tighter. Only when Ulysses is no longer in danger do the sailors release him. This so-called “Ulysses pact” involves third parties—in this case, the sailors. Third parties complicate things if the third parties turn out to be unreliable. A Ulysses pact with oneself, however, avoids this problem, but also raises some important questions about the nature of contract law.

There is a novel solution to some of these problems: smart contracts. Smart contracts are agreements wherein execution is automated, usually by computers.<sup>16</sup> Thanks to the rise of smart contracts, it is now possible to enter into a personal growth contract with oneself. When combined with interconnected devices capable of monitoring performance and enforcing breaches, smart contracts have made it possible for individuals to make commitments with their financial assets in a way that incentivizes their behavior without the need of a counterparty. Instead, technology permits automated devices to fulfill the roles of enforcer and monitor. Thus, aspirants’ *ex ante* decisions to bind their future selves cannot be easily undone and therefore form the basis of a self-enforcing contract. The ability to commit financial assets

---

<sup>14</sup> See *infra* Part I.C.; see also *Responsible Gaming Regulations and Statutes Guide*, AM. GAMING ASS’N (Sept. 1, 2022), [https://www.americangaming.org/wp-content/uploads/2019/09/AGA-Responsible-Gaming-Regs-Book\\_FINAL.pdf](https://www.americangaming.org/wp-content/uploads/2019/09/AGA-Responsible-Gaming-Regs-Book_FINAL.pdf).

<sup>15</sup> See generally MARIO J. RIZZO & GLEN WHITMAN, *ESCAPING PATERNALISM* (Timur Kuran & Peter J. Boettke eds., Cambridge Univ. Press 2020).

<sup>16</sup> See Max Raskin, *The Law and Legality of Smart Contracts*, 1 *GEO. L. TECH. REV.* 304 (2017).

to deterministic and automated processes has enabled a whole new world of possibilities. Many of these possibilities are already realities, such as the permanent destruction of digital assets or the minting of finite non-fungible tokens (NFTs). But self-contracting is a novel application of smart contracts that has not been explored in depth in either the legal or popular literature.<sup>17</sup>

One of the fundamental principles of a contract is that it is an agreement between at least two parties. The promises we make to ourselves, such as to quit smoking or lose weight, are informal and have not historically been enforced by the legal system. These promises are not enforced because if someone breaks a promise to himself, he would have to take himself to court and sue for damages—a nonsensical scenario.

Despite these issues, we side with Ulysses. We believe a person's aspirations are worthy of legal protection—even against his future self. Because these contracts are really between an aspirant's present self and an aspirant's future self, the law should permit self-contracting through smart contracts. These contracts avoid both the problems with informal monitors and enforcers and the problems with formal monitors and enforcers, while still allowing a person to achieve a better version of himself. This Article aims to put forth a coherent framework for how Ulysses contracts like our own personal growth bets may be made and executed through the use of blockchain technology.

Part I of this Article defines personal growth bets in more detail and discusses the concepts of aspirant, monitor, and enforcer. It also considers the circumstances under which we might want a person's present self to be able to bind that person's future self. Part I then examines existing private mechanisms for monitoring and enforcement, as well as the concept of "commitment bonds," through which an individual makes a commitment and agrees to pay money if he fails to meet it. The buyer of the bond receives the money if the individual fails. Part I also reviews state and federal laws that support personal growth commitments. Finally, Part I discusses issues with the current types of monitors and enforcers (informal private, formal private, and government). These issues fall into two categories: (1) general problems

---

<sup>17</sup> Part of the reason for this dearth of legal analysis is that these bets simply are not that popular. In addition to the high transaction costs of finding a counterparty, individuals generally are not interested in "gamifying" their self-growth. This is not only because of the inherent psychological discomfort in tying oneself to the mast—the kind of forethought many do not have or want—but also the time and energy spent to find escrow and other technical services to execute the bet.

with the monitors and enforcers and (2) specific kinds of precommitment actions the monitors and enforcers are ill-equipped to handle.

Part II proposes smart contracts as a solution to some of these problems. After explaining how smart contracts function, we go through potential upsides, such as reduced transaction costs, guaranteed enforcement, and automatic monitoring. We also review some potential downsides—such as a loss of flexibility if unexpected circumstances arise.

Finally, Part III explains how smart contracts executing personal growth bets fit into existing law. Certain assumptions about contract law would need to shift to accommodate self-executing smart contracts. The basic legal conclusion of this Article is that self-contracts should not be discouraged by courts, legislators, or regulators. To the extent courts can exercise power over these contracts, they should not do so unless there is some deeply compelling reason. The general rule in a free society is that individuals should be allowed to enter into consensual contractual relationships with one another and that such relationships provide mutual benefits to both parties. This rule should apply with equal force where the counterparty is not another individual but instead one's future self.

Above all, this paper hopes to introduce the concept of the personal growth bet in the hopes that our readers will use them, making the world a better place.<sup>18</sup> As far as we are aware, this is the first self-help law review article.<sup>19</sup> Or at least, the first self-help law review article involving smart contracts.

## I. BACKGROUND

### A. *Defining Personal Growth Bets*

“Personal growth bets,” as we use the term in this Article, are a mechanism for self-improvement wherein an individual makes an agreement to act or refrain from acting in a way that furthers his personal goals. If he does not follow through with his end of the bargain, the consequence is usually forfeiting some predetermined amount of money. This is a fun exercise with one's friends, but has not been the subject of

---

<sup>18</sup> This assumes our readers' accomplishment of their personal goals will lead to good in the world. For the evil readers of ours, please stop reading.

<sup>19</sup> We do not refer here to the legal concept of self-help, but rather to a genre of literature typified by such writers as Tony Robbins and Dale Carnegie.

much legal analysis, even though companies now exist that help individuals implement the concept.<sup>20</sup>

These contracts have all the elements traditionally required to establish a legally enforceable contract: offer, acceptance<sup>21</sup>, and consideration.<sup>22</sup> Take the example of the personal growth bet involving weight loss. The contract terms are that one party must lose 10 pounds in six months. If the weight is not lost, he must pay \$1,000 and if it is lost, his counterparty must buy him a steak dinner.

It is the general rule that for a contract to be enforceable there must be consideration.<sup>23</sup> Consideration is an act or forbearance made in exchange for an act or forbearance of another.<sup>24</sup> In our weight loss contract, there is consideration in the form of an action (i.e., losing weight) and the purchase of a steak dinner if the action is completed.

Another element of this contract is a liquidated damages clause—in this case the \$1,000 payment in case the weight goal is not reached. A liquidated damages clause sets out a specific penalty for breach, and is arguably the key provision of this type of contract, as it determines the costs of breach, and therefore the operative incentives. Liquidated damages clauses are the subject of much legal literature, but it suffices here to say that they are presumptively legal.<sup>25</sup> The other elements of a contract can easily be included in this bet, such as capacity to contract,<sup>26</sup> as well as offer and acceptance.

The traditional form of this contract occurs bilaterally or trilaterally. Two parties contract with one another or involve a third

---

<sup>20</sup> See *infra* Part I.B.

<sup>21</sup> It may be argued that there is no acceptance in such an agreement because one is binding one's future self without his consent. The trouble with this argument is that it proves too much—all contracts bind one's future self without his consent. See generally Robert Nozick, *Philosophical Explanations*, (Feb. 7, 2019) <https://scholar.harvard.edu/files/sberker/files/phil169-meeting2.pdf>.

<sup>22</sup> See RESTATEMENT (SECOND) OF CONTRACTS § 24 (defining “offer”), 50 (defining “acceptance”), 71 (defining “consideration”); for an overview of each of these elements in the context of an actual dispute, see *Allied Steel and Conveyors, Inc. v. Ford Motor Co.*, 277 F.2d 907 (6th Cir. 1960).

<sup>23</sup> See *infra* Part IV.C.

<sup>24</sup> See RESTATEMENT (SECOND) OF CONTRACTS § 71; *Hamer v. Sidway*, 11 N.Y.S. 182 (N.Y. Sup. Ct. 1890).

<sup>25</sup> See Luke C. Tompkins, *Issues Impacting Enforceability of Liquidated Damages in Construction Contracts*, 10 NAT'L L. REV. 297 (2020).

<sup>26</sup> See RESTATEMENT (SECOND) OF CONTRACTS: CAPACITY TO CONTRACT § 12 (“No one can be bound by contract who has no legal capacity to incur at least voidable contractual duties. Capacity to contract may be partial and its existence in respect of a particular transaction may depend upon the nature of the transaction or upon other circumstances. A natural person who manifests assent to a transaction has full legal capacity to incur contractual duties thereby unless he is under guardianship, or an infant, or mentally ill or defective, or intoxicated.”).

party who helps facilitate the contract, such as an escrow agent or a beneficiary like an anti-charity.<sup>27</sup>

### *B. Monitoring and Enforcement Through Private Parties*

There are a number of mechanisms—both speculative and already existing—for monitoring and enforcing personal growth bets.

On the speculative side, Professors Abramowicz and Ayres propose an instrument called the commitment bond that is designed to create incentives for commitment to a course of action or inaction.<sup>28</sup> But there are also real-world companies that currently act as counterparties in personal growth bets and provide monitoring and enforcement services. We will first discuss these current examples and then move to the realm of speculation.

#### 1. Accountability Apps

Many companies involved in personal growth bets advertise themselves as “accountability apps” that help users practice self-discipline and achieve their individual goals. These apps share a number of features: there is an aspirant who specifies a personal goal and pledges a monetary sum, a monitor (either a trusted third party selected by the aspirant or other health monitoring apps), and an enforcer—the app itself. Below are some examples of such services.

**StickK:**<sup>29</sup> one of the more popular accountability apps, StickK works by having users sign a “Commitment Contract”—a binding agreement with themselves. First, the user defines his own goal. StickK offers information on and preset contracts for a variety of goals, including those related to exercise and fitness, health and lifestyle, weight loss, family and relationships, money and finance, education, sustainability, and hobbies and recreation.<sup>30</sup> However, a user can specify any kind of goal in his customized Commitment Contract. Next, the user decides what the stakes of his “personal bet” will be.<sup>31</sup> Like the goal itself, the stakes

---

<sup>27</sup> An anti-charity is an organization selected by a donor or a counterparty to whom money is forfeited if certain goals are not met. For instance, a pro-life individual would have to give to NARAL or an anti-gun activist would have to donate to the NRA.

<sup>28</sup> Michael Abramowicz & Ian Ayres, *Commitment Bonds*, 100 GEO. L.J. 605 (2012).

<sup>29</sup> See STICKK, <https://www.stickk.com/> (last visited Sept. 15, 2022).

<sup>30</sup> See *How It Works*, STICKK, <https://www.stickk.com/> (last visited Nov. 26, 2022).

<sup>31</sup> See *Know Yourself*, STICKK, <https://www.stickk.com/> (last visited Nov. 26, 2022).

can be customized by the user, though StickK suggests imposing financial stakes.<sup>32</sup>

The app monitors the user’s progress toward achieving his goal through the user’s submission of self-reports, and, if the user chooses, through a “referee.”<sup>33</sup> A referee—an individual designated by the user—determines whether the self-report was genuine or not.<sup>34</sup> If the user fails to meet his goal, the payment method they provided will be charged the amount of money specified in the Commitment Contract. The destination of the forfeited money is also up to the user: he can send it to a charity or another person.<sup>35</sup> Interestingly, the “Terms and Conditions” of the Commitment Contract describe the contract as being between the user and StickK.<sup>36</sup>

**GoF\*\*kingDoIt:**<sup>37</sup> similar to StickK, this app employs a straightforward accountability mechanism: users enter a goal, provide a deadline, put some amount of money on the line, and provide the contact information for a friend to help keep them accountable by acting as a “supervisor” (not unlike the “referee” in StickK). The website gives examples of real users’ contracts, including “I will finish my paper or pay \$100” and “I will run a marathon or pay \$50.”<sup>38</sup> When the deadline arrives, the supervisor is asked to confirm whether the user completed the goal.<sup>39</sup> If the user did not, he forfeits the amount of money he pledged (which is charged to the payment method the user has provided).

**Beeminder:**<sup>40</sup> as with both StickK and GoF\*\*kingDoIt, Beeminder is an app that allows users to bet their own money on their own achievement of a goal. Unlike the others, though, Beeminder does not require the aspirant to designate a third-party “referee” or “supervisor” to validate successful achievement of a goal. Instead, the app connects to other tracking apps like Fitbit, Apple Health, and Strava. The app’s set-up is familiar: the user defines a goal, sets a deadline, and pledges money. The

---

<sup>32</sup> *Id.* (explaining that StickK’s internal data shows that imposing “financial stakes increase[s] your chances of success by up to 3x”).

<sup>33</sup> *How it Works*, <https://stickk.zendesk.com/hc/en-us/articles/206833157-How-it-Works> (last visited Nov. 26, 2022).

<sup>34</sup> *Id.*

<sup>35</sup> *See What is StickK?*, STICKK, <https://stickk.zendesk.com/hc/en-us/articles/206109308-What-is-stickK-> (last visited Nov. 26, 2022).

<sup>36</sup> *See Terms of Use*, STICKK, <https://www.stickk.com/faq/tou> (last visited Nov. 26, 2022).

<sup>37</sup> *See* GOF\*\*KINGDOIT, [https://gof\\*\\*kingdoit.com/](https://gof**kingdoit.com/) (last visited Sept. 15, 2022).

<sup>38</sup> *Id.*

<sup>39</sup> *Id.*

<sup>40</sup> *See* BEEMINDER, <https://www.beeminder.com/> (last visited Sept. 15, 2022).

goals a user can set are more limited on Beeminder: they must be “graphable,” because the app generates a trajectory based on the user’s starting point, end goal, and specified time frame. The user then signs a contract that commits him to paying if he goes “off track”—i.e., if he veers too far off the trajectory.<sup>41</sup> Each time the user strays from his trajectory line, the amount he must pay increases. Because of this structure, the “pledge amount” is not a fixed value, but rather a “pledge schedule,” which the user can customize within limits. Monitoring is done through a combination of self-reporting (e.g., Beeminder will “ask” how much the aspirant weighs) and synchronization with other monitoring apps that can automatically send data to Beeminder. The forfeited funds go to Beeminder.<sup>42</sup>

## 2. Commitment Bonds

In addition to the above companies, theoretical instruments called “commitment bonds” have been proposed and analyzed as a potential enforcement mechanism.<sup>43</sup> This new type of bond is structured around an individual’s commitment to a certain action or inaction and Abramowicz and Ayres were explicit in their hopes that this would be a mechanism for individuals, organizations, and government to “tie themselves to the mast.”<sup>44</sup>

Instead of putting money in an escrow account that is forfeited in the case of non-performance (as in the case of accountability apps), in a commitment bond, an individual “sells the right to receive any forfeited funds to a third party.”<sup>45</sup> The buyer of the bond is “contractually designated as the recipient of any amounts the bond seller forfeits.”<sup>46</sup> As outlined in their article, there are many interesting observations regarding the pricing of these bonds that demonstrate how theoretically a market could exist in such assets.

These bonds differ in one crucial way from the third-party services outlined in the previous section. Abramowicz and Ayres would describe the previous escrow-forfeiture arrangement as a “one-way ratchet” that only offers the potential of loss.<sup>47</sup> The commitment bond allows the

---

<sup>41</sup> See *FAQ*, BEEMINDER, <https://www.beeminder.com/faq#qcom> (last visited Nov. 26, 2022).

<sup>42</sup> *Id.*

<sup>43</sup> Michael Abramowicz & Ian Ayres, *Commitment Bonds*, 100 *GEO. L.J.* 605 (2012).

<sup>44</sup> *Id.* at 606.

<sup>45</sup> *Id.*

<sup>46</sup> *Id.*

<sup>47</sup> *Id.* at 608

aspirant to actually make money if there is a willing counterparty on the other side to purchase the bond.<sup>48</sup>

Still, the commitment bond is similar to existing services in that it requires the existence of a counterparty, who must act as an enforcer and monitor. Another individual or institution must be willing to purchase the bond in the hopes that the aspirant does not achieve his goals. As discussed below, this creates perverse incentives, especially if there is no countervailing force like friendship on the part of the buyer.<sup>49</sup>

It is worth noting that the commitment bond has not caught on as a device for commitment.<sup>50</sup> We are unable to find any meaningful adoption of commitment bonds by individuals, governments, or corporate entities, and we are unaware of any secondary market on which they are traded.

Both third-party services and the commitment bond involve a contract with a counterparty. This counterparty is incentivized to monitor performance, though each method has a slightly different way of doing so. For our purposes, it is relevant that the monitoring falls along a spectrum, with the total excision of human reporting at one extreme and complete reliance on the aspirant himself at the other. The use of “referees” or “supervisors” that are designated by the aspirant falls closer to the self-reporting end of the spectrum, while integration with tracking apps or hired monitors falls closer to the other end. As will be discussed below, the existence of counterparties necessarily raises the costs of transacting.

### C. Government Regulation of Personal Commitments

Personal growth bets are a kind of “precommitment”—a concept whose difficulties have been analyzed before.<sup>51</sup> But, as discussed, a personal growth bet can also be thought of as a contract, which have, in some instances, been recognized by the law. That is, there are legal

---

<sup>48</sup> See *id.* at 610.

<sup>49</sup> Someone wouldn’t want a company incentivized to prevent him from achieving his personal goals.

<sup>50</sup> Another interesting commitment device that has not caught on is the “anti-insurance” contract proposed by Cooter and Porat in 2002. Robert Cooter & Ariel Porat, *Anti-Insurance*, 31 J. LEGAL STUD. 203, 204 (2002). Anti-insurance operates by having payments for the promisor’s breach made to a third party instead of to the promisee. *Id.* at 203. This increases the incentives for promisees to commit to the contract and not abandon once it becomes clear that performance is not 100% possible. See *id.* at 203–04.

<sup>51</sup> See John A. Robertson, “Paying the Alligator”: *Precommitment in Law, Bioethics, and Constitutions*, 81 TEX. L. REV. 1729 (2003) (analyzing precommitments in international law, norms and restrictions in bioethics, and constitutional governance).

mechanisms by which individuals may, in the present, commit their future selves to taking or refraining from taking a specific action. There are a handful of examples of so-called “self-restriction” laws, and they are worth discussing given that they illustrate how the government can take on the role of enforcer and monitor or compel private parties to take on those roles.<sup>52</sup> They also demonstrate that our concept of self-contracting is neither legally novel, nor practically infeasible.

### 1. Casino Laws (“Self-Exclusion Laws”)

A number of states have gambling self-exclusion statutes.<sup>53</sup> These laws allow individuals to voluntarily place themselves on an exclusion list.<sup>54</sup> Casinos are required by law to expel individuals on this list from the establishment.<sup>55</sup> Missouri was the first state to pass such a law, but the majority of states now have some form of a self-exclusion program.<sup>56</sup> One author describes the origin story of Missouri’s law as follows:

[Missouri added its self-exclusion law] at the behest of a citizen who saw himself as a compulsive gambler whose self-control was insufficient to keep him from entering casinos when his compulsion flared up. Nor, apparently, did it suffice simply to ask the casinos to exclude him. Reaching agreement with each casino individually would be time-consuming, and because the casino would merely

---

<sup>52</sup> Cecil VanDevender, Note, *How Self-Restriction Laws Can Influence Societal Norms and Address Problems of Bounded Rationality*, 96 GEO. L.J. 1775, 1777 (2008).

<sup>53</sup> California, Colorado, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Mississippi, Missouri, Montana, New Jersey, New Mexico, New York, Ohio, Oklahoma, Pennsylvania, Rhode Island, Virginia, Washington, West Virginia, and Washington D.C. See, e.g., ARIZ. ADMIN. CODE § 19-4-150 (2021); *Responsible Gaming Regulations and Statutes Guide*, AM. GAMING ASS’N (Sept. 1, 2022), <https://www.americangaming.org/resources/responsible-gaming-regulations-and-statutes-guide/>.

<sup>54</sup> Connecticut, for example, requires casino and gaming operators to “[e]stablish a voluntary self-exclusion process to allow a person to (A) exclude himself or herself from establishing an account, (B) exclude himself or herself from placing wagers through an account, or (C) limit the amount such person may spend using such an account.” CONN. GEN. STAT. § 12-863 (2022).

<sup>55</sup> See, e.g., 11 VA. ADMIN. CODE § 5-90-100 (2022) (“3. If an individual on the voluntary exclusion list is found on the premises of a facility, the facility operator: a. Shall immediately notify the department; and b. May pursue criminal charges against the individual for trespassing or any other appropriate criminal charge. 4. A facility operator may not: a. Permit an individual on the voluntary exclusion list to: 1. Enter the facility; or 2. Play a casino game.”).

<sup>56</sup> *Supra* note 53 (listing states).

be promising to exclude him, and not entering into a contract (because it would not be giving up anything as consideration), he would naturally doubt the vigor with which they would enforce this promise (businesses rarely being inclined to kick out their most spendthrift customers as soon as they walk in the door).<sup>57</sup>

While the mechanics of the self-exclusion program vary by state, there are some common features. First, the individual must demonstrate that they are acting both voluntarily and sincerely making the decision to self-exclude; often, he must meet with gaming personnel to complete the process and must have a witness or notary present.<sup>58</sup> The identifying information of the individual is then shared with gambling facilities within the state and used to keep him out. Casinos, for their part, are required to develop internal controls to identify and expel such individuals<sup>59</sup>—in this way, the casinos act as both monitors and enforcers. If an individual on the self-exclusion list violates the prohibition by entering a gambling establishment, he is removed, forced to forfeit any winnings, and, in some states, charged with criminal trespassing.<sup>60</sup>

Getting off of a self-exclusion list also varies by state. In Missouri, once an individual places himself on the list, he is on it for life.<sup>61</sup> Other states allow the individual to choose the length of the exclusion (sometimes from a pre-set menu of options, e.g., 5, 10, or 15 years), after which he is automatically removed from the list.<sup>62</sup> Still, others require the individual to petition for removal, but only after a requisite number of years has passed (as determined by the state).<sup>63</sup>

## 2. Covenant Marriage Laws

A second type of “self-restriction law” is a covenant marriage—a marital arrangement whereby both spouses agree, through the marriage

---

<sup>57</sup> VanDevender, *supra* note 52, at 1779–80.

<sup>58</sup> See Andy Rhea, *Voluntary Self-Exclusion Lists: How They Work and Potential Problems*, 9 GAMING L. REV. 462, 464 (2005); ILL. ADMIN. CODE tit 11, § 1770.240 (2008).

<sup>59</sup> *Id.*

<sup>60</sup> *Id.* at 464–65; VanDevender, *supra* note 52, at 1781.

<sup>61</sup> VanDevender, *supra* note 52, at 1780.

<sup>62</sup> *Id.* at 1780–81.

<sup>63</sup> *Id.* at 1780.

contract, to “renounce[] their right to no-fault divorce and adopt[] certain legal duties to one another.”<sup>64</sup>

Covenant marriage laws are far less ubiquitous than casino self-exclusion laws; they are recognized in only Arizona,<sup>65</sup> Arkansas,<sup>66</sup> and Louisiana.<sup>67</sup> While covenant marriage serves an expressive function—signaling a couple’s intention to remain married their entire lives—it has real legal ramifications. Namely, the couple cannot get a divorce other than for a limited number of reasons (adultery, conviction of a serious crime, abuse, substance abuse, etc.).<sup>68</sup>

A covenant marriage, therefore, allows individuals to deprive their future selves of a right they would otherwise have, i.e., no-fault divorce. As with casino self-exclusion laws, covenant marriages must be entered into voluntarily. In all three states where covenant marriage is allowed, the couple must receive premarital counseling before they will be permitted to enter into a covenant marriage. They must also sign a “Declaration of Intent” agreeing to such terms.

### 3. Psychiatric Advance Directives and Do Not Resuscitate Orders

While not quite a self-restriction law, psychiatric advance directives (“PAD”) represent a legally binding precommitment. A PAD is “a legal tool that allows a person with mental illness to state their preferences for treatment in advance of a crisis.”<sup>69</sup> A PAD usually has an advance instruction and also provides for a healthcare power of attorney for an individual who will have decision-making authority in the event of a psychiatric emergency.<sup>70</sup> A PAD can only be entered into by an adult of sound mind, and goes into effect when that adult is deemed by a physician or psychologist to be incapable of making decisions for themselves.<sup>71</sup>

---

<sup>64</sup> *Id.* at 1789.

<sup>65</sup> ARIZ. REV. STAT. ANN. § 25-901 (2023).

<sup>66</sup> ARK. CODE. ANN. § 9-11-803 (2020).

<sup>67</sup> *Covenant Marriage*, LA. DEP’T HEALTH, <https://ldh.la.gov/page/695> (last visited Apr. 16, 2023).

<sup>68</sup> *See Covenant Marriage Information*, ARIZ. COURT HELP (Mar. 10, 2022), <https://azcourthelp.org/topics/marriage/covenant-marriage>.

<sup>69</sup> *See* SUBSTANCE ABUSE & MENTAL HEALTH SERVICES ADMIN., A PRACTICAL GUIDE TO PSYCHIATRIC ADVANCE DIRECTIVES (2019), [https://www.samhsa.gov/sites/default/files/a\\_practical\\_guide\\_to\\_psychiatric\\_advance\\_directives.pdf](https://www.samhsa.gov/sites/default/files/a_practical_guide_to_psychiatric_advance_directives.pdf).

<sup>70</sup> *Id.*

<sup>71</sup> *Id.*

Do Not Resuscitate Orders (DNRs) are another form of legally binding healthcare precommitments that have life-and-death consequences. In a DNR an individual will commit his future self to refusing life-saving medical treatment. An individual, who is incapacitated, with no ability to consent or refuse treatment, will use a prior commitment from his past self to inform doctors of his current preferences. Federal law requires certain medical institutions to provide information to patients on their options with respect to medical precommitment.<sup>72</sup>

#### *D. Issues with Third-Party Counterparties*

Although numerous people seek self-improvement in the United States,<sup>73</sup> issues with each type of monitor and enforcer prevent personal growth contracts from being anything more than a niche activity. Informal monitors and enforcers, like good friends, can provide a lot of flexibility in how a bet is monitored and enforced, but there is significant downside in the form of damage to the personal relationship or an unwillingness to enforce the contract if the aspirant fails. Formal monitors eliminate the risk of damaging a personal relationship and add credibility to enforcement, but greatly increase transaction costs and often cannot effectively monitor. Government enforcement also carries enforcement credibility, and the government can require other parties to monitor, but in most circumstances, laws governing personal growth would be extremely inefficient, inflexible, or otherwise problematic.

*First*, one could use an informal monitor and enforcer like a friend. The benefit of going through an informal counterparty is that it avoids the expenses inherent in other methods. However, common sense suggests the problems this creates. One problem is that this places a high burden on the informal party, often a friend, who has to do the work to monitor the bet, intervene if the bet goes off-track, and then enforce the bet against an unfulfilled aspirant if it all goes wrong. A second problem

---

<sup>72</sup> *The Patient Self-Determination Act (PSDA)*, AM. CANCER SOC'Y (June 15, 2009), <https://www.cancer.org/treatment/treatments-and-side-effects/planning-managing/advance-directives.html?sitearea=MIT> [https://web.archive.org/web/20100222233709/http://www.cancer.org/docroot/MI T/content/MIT\_3\_2X\_The\_Patient\_Self-Determination\_Act.asp?sitearea=MIT].

<sup>73</sup> John LaRosa, *\$10.4 Billion Self-Improvement Market Pivots to Virtual Delivery During the Pandemic*, MARKET RESEARCH.COM (Aug. 2, 2021), <https://blog.marketresearch.com/10.4-billion-self-improvement-market-pivots-to-virtual-delivery-during-the-pandemic>.

is that it may damage the personal relationship if the transaction goes awry. We need no citations<sup>74</sup> to make the observation that if two friends make a bet with significant stakes and the outcome is not how the aspirant hoped, this can lead to some serious problems. The friend acting as enforcer must decide how much he actually wants to push to collect (or refuse to return) the money. But, the weaker the threat of enforcement, the weaker the chance the ropes binding our would-be Ulysses hold.

*Second*, one could use a formal private monitor, like one of the services discussed earlier. A benefit of using such a service would be that there would be no risk of damaging a personal relationship. And there would be much more certainty about enforcement. However, there would be some downsides relative to the informal monitors and enforcers. For one, using a third-party service introduces transaction costs of paying the third party. And many of the third-party services require the aspirant to fill out the details of the progress of the bet, opening it to manipulation. Additionally, the third-party services have other limits, such as only permitting certain types of bets.

This private monitor and enforcer could also take advantage of informal dispute mechanism systems. In a number of areas of law,<sup>75</sup> alternative dispute resolution mechanisms—e.g., private mediation, arbitration, or restorative justice processes—have become increasingly prevalent, though they are certainly not new. Indeed, the Federal Arbitration Act has, since 1925, provided for judicial enforcement of private arbitration agreements.<sup>76</sup> Arbitration, like other alternative dispute resolution mechanisms, has a number of benefits: the absence of government involvement provides a level of flexibility; the parties can tailor the procedure to their particular needs; parties can usually obtain a resolution more expeditiously than through traditional litigation, and often at a cheaper price.<sup>77</sup> In the international context, arbitration is a popular choice because it provides a neutral decision maker who can

---

<sup>74</sup> *But see* Orin S. Kerr, *A Theory of Law*, 16 GREEN BAG 2D 111 (2012).

<sup>75</sup> For example, arbitration is common in international commercial law, labor law, securities regulation, and family law. *See Alternative Dispute Resolution*, LEGAL INFO. INST., [https://www.law.cornell.edu/wex/alternative\\_dispute\\_resolution](https://www.law.cornell.edu/wex/alternative_dispute_resolution) (last visited Apr. 16, 2023); *see also* Joan F. Kessler, Allan R. Koritzinsky & Stephen W. Schlissel, *Why Arbitrate Family Law Matters*, 14 J. AM. ACAD. MATRIMONIAL L. 333 (1997); *see generally* GARY B. BORN, *INTERNATIONAL ARBITRATION: LAW & PRACTICE* (3d ed. 2021).

<sup>76</sup> 9 U.S.C. §§ 1–16.

<sup>77</sup> *Arbitration vs. Litigation: The Differences*, THOMSON REUTERS (Oct. 4, 2022), <https://legal.thomsonreuters.com/blog/arbitration-vs-litigation-the-differences/>.

apply internationally neutral procedural rules.<sup>78</sup> However, arbitration is not without costs. Because the process happens behind closed doors, the decision does not create a precedent that will bind future parties—and while this may be a benefit from the perspective of the parties to the arbitration, it arguably hinders the development of the *corpus juris*. For employees subject to mandatory arbitration with corporations, they may be restricted from raising claims under a number of federal employment statutes.<sup>79</sup> Additionally, there is some evidence that arbitration tends to favor corporate parties, so defendants who have an incentive to collect payment may try to game the system.<sup>80</sup>

*Third*, one could contract the problem out to the government. There would be several benefits. There should be no question about the threat of enforcement. And the government could enforce non-damages forms of relief such as casino-exclusion-like laws. However, there would be numerous downsides that likely preclude using the government for most personal growth bets. One could be the very high-transaction costs of using government agents to act as monitors and enforcers. For a few categories of bets (reducing gambling or alcohol consumption), it may be possible to shift the cost to private parties, but in most cases the private sector would be better able to provide the service. That is because the system would have to be one-size-fits-all and relatively inflexible (for example, consider covenant marriage laws).

## II. SMART CONTRACTS: A SOLUTION FOR SELF-CONTRACTS

### A. *An Alternative Framework: Self-Contracts*

We propose a newer form of this contract that occurs unilaterally and we describe as a “self-contract.” On its face, the concept of a self-contract is a contradiction. As discussed above, the traditional view of contracts defines them as *mutual* promises enforceable by law.<sup>81</sup> This typically means that there are at least two parties who enter into an agreement — a “meeting of *two* minds” to perform certain acts (or forbearances).

---

<sup>78</sup> See BORN & RUTLEDGE, INTERNATIONAL CIVIL LITIGATION IN U.S. COURTS 1149–62 (6th ed. 2018).

<sup>79</sup> STONE & COLVIN, THE ARBITRATION EPIDEMIC: MANDATORY ARBITRATION DEPRIVES WORKERS AND CONSUMERS OF THEIR RIGHTS (2015), <https://files.epi.org/2015/arbitration-epidemic.pdf>.

<sup>80</sup> *Id.*

<sup>81</sup> See RESTATEMENT (SECOND) OF CONTRACTS § 17(1) (1977) (“[T]he formation of a contract requires a bargain in which there is a manifestation of mutual assent to the exchange and a consideration.”).

In most circumstances, it is true that the idea of a self-contract is contradictory. Suppose Max writes a “contract” with himself that says, “If Max does not lose 10 pounds by January 1st, Max will have to pay Max’s designated charity \$1,000.” Supposing this “contract” is breached, what remedy does Day 1 Max have against Day 365 Max? Day 1 Max is the one with the claim because Day 365 Max is in breach, but because it is Day 365 Max who has the actual ability to bring the claim in court (because Day 1 Max no longer exists), and since Day 365 Max has already made the decision not to bring the claim, the concept is nonsensical. But, let us note something important—the reason why the concept is nonsensical is not because there is anything wrong with treating Day 1 Max and Day 365 Max as two contracting parties;<sup>82</sup> it is nonsensical because, as a technical matter, there is no way to empower Day 1 Max to bring or enforce a claim. The hallmark of a right is the ability to enforce it, and Day 1 Max is powerless. This is where a new invention called smart contract changes the situation.

Now it may be said that we are simply replacing one form of law professor pipe dream (i.e., the commitment bond) with another that will also not catch on (i.e., the self-contract). The response to this is that self-contracts have already caught on<sup>83</sup>, and their aims are often to further personal commitments. Similarly, the use of smart contracts today in many financial transactions, including art markets, demonstrates the use of technical precommitment as a popular tool.

Aspects of many cryptocurrencies incorporate the self-contract and have simply not been labeled as such. Let us take for example what is called a “multi-signature wallet” on the bitcoin network. The bitcoin network uses public key-private key cryptography to establish ownership of bitcoin.<sup>84</sup> When an individual has possession of a private key, he is able to transfer bitcoin, and therefore possession of a private key establishes possession of a bitcoin.<sup>85</sup> But there are more complex ways of creating a private key, namely what are referred to as “multi-signature” wallets.<sup>86</sup> These wallets essentially divide a private key into a certain

---

<sup>82</sup> This does bring up an issue of Day 365 Max not being a party to the original contract because he is non-existent at the point of the contracting, so he cannot give his consent. Framing these contracts as bilateral agreements does not make sense.

<sup>83</sup> See *infra* Section I.B.1.

<sup>84</sup> See SATOSHI NAKAMOTO, BITCOIN: A PEER-TO-PEER ELECTRONIC CASH SYSTEM (2008).

<sup>85</sup> See Gunnar Lindqvist et al., *How Do Bitcoin Users Manage Their Private Keys?*, 7TH INT’L WORKSHOP ON SOCIO-TECH. PERSPECTIVE IN I.S. DEV. Oct. 11-12, 2021 at 11, (“Private keys provide bitcoin ownership and can create Bitcoin addresses and digital signatures for transactions on the Bitcoin blockchain.”).

<sup>86</sup> See Colin Harper, *Multisignature Wallets Can Keep Your Coins Safer (If You Use Them Right)*, COINDESK (Feb. 9, 2023, 8:17 AM),

number and require a certain number of those sub-keys to transfer bitcoin.<sup>87</sup> For example, a private key may be divided into three and two of the sub-keys are needed to transfer bitcoin.<sup>88</sup> This system is used in a number of different applications, but primarily it is thought as a mechanism for increasing security by involving multiple parties in the ownership and transfer of bitcoin.<sup>89</sup> Escrow services, for instance, use this multi-signature technology.<sup>90</sup>

For our purposes, however, what is important is that many cryptocurrencies represent an existing form of self-contracts for commitment purposes. When an individual takes his bitcoin private key and divides it, he is “tying himself to the mast.”

### *B. Smart Contracts Overview*

A smart contract is an agreement whose execution is automated. One powerful example of a smart contract is the vending machine.<sup>91</sup> A vending machine has been defined as “self-contained automatic machines that dispense goods or provide services when coins are inserted.”<sup>92</sup> In other words, a vending machine is a device that automates performance of a sales contract by tendering a good once the offer for the good has been accepted through performance. To illustrate, suppose a vending machine contains an offer on the part of the seller to tender one can of Coke in exchange for 10 U.S. dollars.<sup>93</sup> Once the buyer accepts the offer by inserting money into the machine, the machine executes the contract by dispensing the can of Coke. The reason this contract is “smart” is that once the offer has been accepted and the contract formed, no human activity is needed to perform the contract, and the agreement is executed automatically by a machine.

---

<https://www.coindesk.com/tech/2020/11/10/multisignature-wallets-can-keep-your-coins-safer-if-you-use-them-right/>.

<sup>87</sup> *Id.*

<sup>88</sup> *Id.*

<sup>89</sup> See Freeman Law, *Cryptocurrency Transactions: Multi-Signature Arrangements Explained*, FREEMAN L. INSIGHTS BLOG (Nov. 11, 2022, 5:10 PM), <https://freemanlaw.com/cryptocurrency-transactions-multi-signature-arrangements-explained/> (“Multi-signature transactions provide an increased level of security.”).

<sup>90</sup> *Id.* (“A common use of the multi-sig approach is the ‘Multisig Escrow’—a trading arrangement designed to offer security to both buyers and sellers.”).

<sup>91</sup> See Nick Szabo, *Formalizing and Securing Relationships on Public Networks*, 3 (1997), <http://myinstantid.com/szabo.pdf>; see also Raskin, *supra* note 16.

<sup>92</sup> See KERRY SEGRAVE, *VENDING MACHINES: AN AMERICAN SOCIAL HISTORY* (MCFARLAND & CO. 2002).

<sup>93</sup> Given central banks’ tendencies to inflate, and our desire for this paper to remain fresh and relevant in the future, we have assumed a higher price of Coke than exists at the time of publication.

These contracts are distinct from traditional contracts where the parties themselves are required to act or refrain from acting in order to ensure completion of the agreement. For example, in a contract to build a house, a general contractor and his subcontractors must build the house themselves. Human action is required.<sup>94</sup> Not so with the smart contract. In the smart contract, once the agreement has been made, performance is automated.

Automation can exist in a number of forms. As in the case of a vending machine, one method of automation is through a physical device. Another example of a physical device instantiating a smart contract is a “starter interrupter” device. These devices prevent ignition of an automobile and are used by creditors to render their collateral, i.e., the vehicle, non-functional if the debtor is not in compliance with the terms of his financing arrangement.<sup>95</sup>

Another method of automation is computer code linked to digital financial assets.<sup>96</sup> Computer programming languages are highly amenable to contract creation execution because the foundation of computer logic is “if/then” statements. This is also the foundation of contractual thinking. For example, *if* a debtor is in default, *then* his secured collateral returns to the creditor.

Smart contracts executed by computers must translate the terms of agreement into computer-readable and executable programs. A vending machine is an example of this. Inside of the vending machine is a system of computers and physical devices that instantiate the terms of the contract. The computer program directs machinery by using a system of if/then statements combined with Boolean operators.

Connecting contract terms to physical instruments involved in the performance of the contract is termed “contractware.”<sup>97</sup> Contractware is defined as the physical or digital instantiation of a computer-decipherable contract.<sup>98</sup> In other words, contractware is a device that control some object connected to the performance of a contract. In the case of the vending machine, the innards of the machine, including the device that dispenses the Coke, is contractware. To give a fanciful

---

<sup>94</sup> Even in the case of a spot transaction, like a sale at a cash register, a human must hand over payment and human must make the goods available.

<sup>95</sup> See Kwesi D. Atta-Krah, *Preventing a Boom from Turning Bust: Regulators Should Turn Their Attention to Starter Interrupt Devices Before the Subprime Auto Lending Bubble Bursts*, 101 IOWA L. REV. 1187, 1191 (2015).

<sup>96</sup> It is worth noting that cryptocurrency is not the only digital financial asset. Most of the money base today does not, in fact, come in the form of physical dollar bills, but rather exists digitally as accounting conventions governed by the Federal Reserve.

<sup>97</sup> See Raskin, *supra* note 16, at 307.

<sup>98</sup> *Id.* at 312.

dystopian example, take the case of a debtor wished to secure lower interest rates and was willing to install a bomb in his skull such that it would explode if he missed a payment or tried to remove it. The bomb-computer device would be an example of contractware because it helps to ensure performance in the real world of a contract between the debtor and creditor.

### 1. Blockchains and Immutability

Until recently, smart contracts and their contractware was most commonly seen in vending machines.<sup>99</sup> But the rise of blockchain technology has enabled the use of contractware in financial transactions.

This was achieved through the use of public key-cryptography. Digital currencies like bitcoin or Ether are financial assets, but their technical specifications distinguish them from other financial assets. We will proceed with bitcoin for an overview of what makes cryptographically-secured digital assets unique, but many digital assets share the same structure.

Bitcoin exists in bitcoin addresses, which can be thought of as accounts. This public address has an associated private key. A user who possesses the private key associated with the public address can authorize transactions to send funds from one address to another.

Each address' balance can be viewed on a ledger called the blockchain, which is a public recording of all bitcoin addresses and all transactions between those addresses. This ledger is public and can be viewed by anyone who downloads the blockchain.<sup>100</sup> To use a helpful analogy, a bitcoin address is like a safety deposit box on the Internet that is made of glass. Anyone can see what is inside any safety deposit box by viewing its public address, but only an individual with the private key associated with a particular box can open the box and send its contents to another box.

A blockchain operates such that once a decision is made on behalf of an owner to send funds, those funds are irrevocably sent. The sending of funds is immutable and recorded forever on the ledger.<sup>101</sup> If an

---

<sup>99</sup> For more on the radical history of the vending machine, *see id.* at 315.

<sup>100</sup> *See* DYLAN YAGA ET AL., BLOCKCHAIN TECHNOLOGY OVERVIEW, NISTIR 8202 5 (Oct. 2018), available at <https://nvlpubs.nist.gov/nistpubs/ir/2018/nist.ir.8202.pdf> (“Permissionless blockchain platforms are often open source software, freely available to anyone who wishes to download them.”).

<sup>101</sup> *Id.* at 46 (“Once data is recorded in a blockchain, that data is usually there forever[.]”).

individual sends his savings from one safety deposit box to another that he does not own, he no longer controls those funds. It is practically impossible to undo a transaction by rewriting a blockchain<sup>102</sup>—this is the entire point of the blockchain schema of operation.

This immutability also serves as the basis for smart contracts existing on a blockchain. Just as the command to send funds exists on the blockchain, so too do more complex commands that involve concepts like making payment conditional on certain occurrences. The ability of blockchains to execute conditional commands is the basis of smart contract technology. The Ethereum blockchain was in large part designed to execute these more complex conditional statements in an immutable fashion.<sup>103</sup> Indeed, an entire programming language, Solidity, was created solely to write smart contracts on the Ethereum blockchain.<sup>104</sup> This programming language enables a more complex set of contracts.

One example of such a contract enabled by blockchains is the decentralized escrow contract. In most instances, a third party service acts as the intermediary between two parties to execute an escrow contract.<sup>105</sup> A buyer of a house, for instance, deposits money into the third party's account, and the funds are not released until the third party makes a judgment that the seller has done what he needs to do per the terms of the contract (i.e., provide the buyer with possession).

Escrow services that exist on blockchains remove this third party from the equation. The buyer of an asset sends his money to a public address that is encoded with certain conditionals that release the funds to the buyer only if those conditions are met. Unlike the third party that uses its judgment to determine whether funds are released, in a smart contract escrow service, what is called an "oracle" makes a determination whether certain conditions are met, and the funds are then sent automatically, without having to rely on a third party.

---

<sup>102</sup> *Id.* at 1 ("At their basic level, [blockchains] enable a community of users to record transactions in a shared ledger within that community, such that under normal operation of the blockchain network no transaction can be changed once published.").

<sup>103</sup> See Vitalik Buterin, *Ethereum: A Next-Generation Smart Contract and Decentralized Application Platform*, ETHEREUM (2014), [https://ethereum.org/669c9e2e2027310b6b3cdce6e1c52962/Ethereum\\_Whitepaper\\_-\\_Buterin\\_2014.pdf](https://ethereum.org/669c9e2e2027310b6b3cdce6e1c52962/Ethereum_Whitepaper_-_Buterin_2014.pdf).

<sup>104</sup> See *Solidity*, ETHEREUM, <https://docs.soliditylang.org/en/v0.8.17/> (last visited Sept. 15, 2022).

<sup>105</sup> See Troy Segal, *Understanding the Escrow Process and Requirements*, INVESTOPEDIA (last updated June 13, 2022), <https://www.investopedia.com/mortgage/escrow-process-requirements/>.

A blockchain oracle is a method of connecting a smart contract to real world information.<sup>106</sup> This is most often accomplished through programs called application programming interfaces (“APIs”). APIs are a method for computers to talk to one another automatically.<sup>107</sup> The publisher of certain real-world information will use an API to connect to other computers that are interested in that information. For instance, the federal government’s National Weather Service has an API that includes daily temperature readings from around the country.<sup>108</sup> Likewise, various stock markets have APIs that relay information about stock prices through the day.<sup>109</sup>

Now, we can tie everything together to show how a smart contract bet can be executed without the use of a third party. Let us suppose two individuals made a bet using a smart contract about the temperature on a given date in New York City. In a world where they use a third-party escrow service to settle the bet, the third party would use some method of determining the temperature and then use its judgment to determine whether the conditions had been satisfied such that one person won. An oracle, however, would operate automatically by connecting to the National Weather Service’s API that publishes the daily temperature in Central Park.<sup>110</sup>

The oracle connected to the National Weather Service would automatically inform the public address, which has been encoded with a smart contract, what the temperature was. As stipulated by the immutable if/then statements, a party would be the winner of the bet and the funds would be automatically released once the data was published.

It is a hop, skip, and a jump from bilateral bets about the temperature in Central Park to a person making a bet with himself about

---

<sup>106</sup> See *What Is a Blockchain Oracle?*, CHAINLINK (last updated Sept. 14, 2021), <https://chain.link/education/blockchain-oracles>.

<sup>107</sup> See *What Is an API?*, AMAZON, <https://aws.amazon.com/what-is/api/> (last visited Sept. 15, 2022).

<sup>108</sup> See National Weather Service, *API Web Service*, NAT’L OCEANIC & ATMOSPHERIC ADMIN., <https://www.weather.gov/documentation/services-web-api> (last visited Sept. 15, 2022).

<sup>109</sup> See United Fintech, *Everything You Need to Know About Stock Market APIs*, UNITED FINTECH BLOG (Aug. 25, 2021), <https://unitedfintech.com/blog/everything-about-stock-market-apis/>. See also NEW YORK STOCK EXCHANGE, <https://www.nyse.com/market-data/real-time> (last visited Sept. 15, 2022); NASDAQ, <https://data.nasdaq.com/tools/api> (last visited Sept. 15, 2022).

<sup>110</sup> There is some question as to the honesty of oracles—like all technology, APIs can be manipulated. For instance, hackers could change the National Weather Service’s data or the government itself could publish corrupt data. Dealing with corrupt oracles is beyond the scope of this paper, but suffice it to say that there are many novel technical workarounds to such problems.

his weight, and then verifying with an oracle connected to an API published by an Internet-connected scale.

## 2. Strong and Weak Smart Contracts

Before assessing the legality of smart contracts for personal bets, there is one more concept that must be introduced: the distinction between strong and weak smart contracts.

Not all smart contracts are created equally; they exist along a spectrum of how “smart” they are. This spectrum classifies smart contracts according to their cost of revocation and modification.<sup>111</sup> Smart contracts are said to be stronger when these costs are higher, and they are said to be weaker when these costs are lower.<sup>112</sup>

The above bomb-in-skull example that a debtor would use to obtain a lower interest rate from a creditor would be a strong smart contract because if one tries to modify or revoke the contract by surgically removing the device, the bomb will explode. There is an infinitely high cost of revocation to the debtor and so this would be deemed a strong smart contract.

On the other end of the spectrum is a weak smart contract. An example of this would be a standing purchase order with Amazon. Suppose an individual has a standing order to buy paper towels once a month from Amazon. Once the contract is formed, it executes automatically through Amazon’s distribution system. There may be human beings at the last mile, but given their relative lack of autonomy over the execution of the contract, this could be considered a smart contract of sorts.

The reason is that if the buyer realizes he no longer needs paper towels that month and tries to revoke the order, there is a point at which Amazon cannot stop performance. Suppose the hour before the paper towels were scheduled to be delivered, the buyer tried to cancel the order—it is true that Amazon could refund him after the fact and demand a return, but the paper towels would likely still be delivered. It is not a strong smart contract, however, because Amazon has a number of ways to prevent the automatic execution of the contract. If the order was canceled early enough the company could instruct their robots not to execute certain commands to get the paper towels. It is a weak smart

---

<sup>111</sup> See Max Raskin, *The Law and Legality of Smart Contracts*, 1 GEO. L. TECH. REV. 304, 310 (2017).

<sup>112</sup> See *id.*

contract in the sense that there are many ways the parties can get out of it without a high cost.

Courts may not be in the business of modifying or revoking contracts, but it is important to them that they have the ability to do so.<sup>113</sup> This is why the existence of strong smart contracts pose a greater challenge than weak smart contracts to the government and its legal system. These distinctions and the approach of the legal system to strong and weak smart contracts will be important when thinking about personal growth bets.

### 3. Unilateral Smart Contracts for Personal Growth Bets

With the above, we can proceed to describe a unilateral smart contract used for a personal growth bet.

Any unilateral personal growth contract has two legs that mimic the two sides of a bilateral contract. The first leg is the action or inaction that is the aim of the contract. The second leg is the consequence of performance or breach of the terms.

For example, an individual who wants to stop smoking will define the first leg of the contract as abstaining from smoking cigarettes for 30 days following execution of the contract. The second leg will be that if the individual does not stop smoking cigarettes for the next 30 days, then he will forfeit \$10,000. The terms of this contract are fairly straightforward and if two parties were to enter into this contract, as seen above, it would be a legally enforceable contract.<sup>114</sup>

By removing the counterparty from the contract, the dual problems of monitoring and enforcement arise.

Counterparties have incentives to monitor performance. Whether it is a homeowner monitoring compliance by a general contractor or an employer monitoring his employees' timecards, parties to a contract are incentivized to ensure performance from their counterparties.

In the case of a bilateral non-smoking contract, the counterparty who will win \$10,000 if the individual smokes is incentivized to monitor the individual's behavior. One website, funded by the National Institutes of Health, provides breathalyzers to detect carbon monoxide to ensure compliance with the terms of the agreement.<sup>115</sup> Smokers have elevated

---

<sup>113</sup> See *infra* Part III.A.

<sup>114</sup> There may be a question of adequate consideration on the part of the friend who is acting as the monitor or enforcer, but this can be easily rectified by his staking \$10 in the case of his friend accomplishing his bet—serving the role of the steak dinner in our personal example.

<sup>115</sup> See QUITBET, <https://www.quit.bet/> (last visited Sept. 15, 2022).

levels of carbon monoxide in their exhaled breaths. The organization established a threshold of 6 parts per million, such that if a breathalyzer detects 7 or more parts per million of carbon monoxide, he will be considered having smoked.

The important thing to note here is that monitoring involves some interaction between the contract and the real world. The contract lays out certain events or non-events that trigger certain conditional clauses of the contract. Determining whether those events or non-events happened is a central part of the contract. For any contract to be enforced, determining whether events occur is of paramount importance, but it is a condition often taken for granted because of the presence of a highly incentivized counterparty.

The second important aspect of a contract that becomes problematic without a counterparty is enforcement after either performance or breach. When a party to a contract breaches, a counterparty has legal and non-legal remedies available to him.<sup>116</sup> A wide variety of non-legal recourse is available to an aggravated party, ranging from civil discussion<sup>117</sup> to extreme social pressure.<sup>118</sup> Legal recourse in this context normally entails the use of the court system to sue for breach of contract. Without a counterparty, the concept of suing for breach is nonsensical. No one either would or could take himself to court. The reason he would not is because any of the damages he would sue for, e.g., forfeiting money, he would be either willing or not willing to pay himself.<sup>119</sup> If he was unwilling, he would not bring himself to court because the end of a successful case would be his paying himself the money. If he was willing, he would simply forfeit the money without

---

<sup>116</sup> See RESTATEMENT (SECOND) OF CONTS. § 1 (AM. L. INST. 1981) (“A contract is a promise or a set of promises for the breach of which the law gives a remedy, or the performance of which the law in some way recognizes as a duty.”); UCC §§ 2-708, 2-713, 2-716 (AM. L. INST. & UNIF. L. COMM’N 2021).

<sup>117</sup> Civil discussion can occur informally between the parties, or as a formal type of alternate dispute resolution known as mediation. See *Mediation*, NEW YORK STATE UNIFIED COURT SYSTEM, <https://ww2.nycourts.gov/ip/adr/mediation#:~:text=In%20mediation%2C%20a%20person%20called,or%20wrong%20in%20the%20past> (last visited Apr. 5, 2023).

<sup>118</sup> In a recent high-profile contract dispute, video game developer Epic Games provoked a public shaming campaign against its counterparty, Apple. See Gene Park, *‘Fortnite’ Is Trying to Change Public Opinion About Apple. But Small Developers Are Lost in the Debate.*, WASH. POST (Aug. 21, 2020), <https://www.washingtonpost.com/video-games/2020/08/21/fortnite-is-trying-change-public-opinion-about-apple-small-developers-are-lost-debate/> (“Epic Games continue[d] this momentum of publicly shaming Apple by announcing a #FreeFortnite tournament[.]”).

<sup>119</sup> This assumes there is no third party to act as a party to the suit.

going to court. And anyway, a court would never entertain a person suing himself.<sup>120</sup>

What follows is an outline for a non-smoking smart contract, which solves the problems of both enforcement and monitoring. The smart contract is set up first with a public bitcoin address that is created by the aspirant or a third-party service.<sup>121</sup> The aspirant then sends \$10,000 worth of some digital currency to that address.<sup>122</sup> The address is encoded with an oracle that is connected to the API of a breathalyzer. To ensure that there is no cheating, the device can either be housed in a healthcare facility or use some technology like facial recognition to ensure no tampering or fraud.

Then a series of if/then statements are encoded onto the public address. The primary statement might read: “*If* a carbon monoxide reading over a threshold level is detected at any of the readings during the 30 days, *then* the \$10,000 is forfeited.” A number of conditions would be written into the code that would evolve over time—how often a reading must be registered—how to deal with impossibility of a breathalyzer reading in the case of emergency, etc. As most individuals do not write code, it is likely that such smart contract software bases would exist in services or as open-source projects.

This contract is just one of many that are possible. The crux of the development of such contracts will be the appetite of the aspirants as well as the ability for oracles to enable individuals to take monitoring and enforcement into their own hands. The following section addresses the legality of such contracts.

#### 4. Normative Case

There is nothing doctrinally challenging about the use of smart contracts in personal growth bets. They can be characterized as unilateral or “self-contracts” and then can be analyzed within the corpus of traditional contract law.

---

<sup>120</sup> *But see* Christopher Coble, *Can You Sue Yourself? In Fatal Car Crash Case, Utah Court Says Yes*, FINDLAW: COURTSIDE (last updated Mar. 21, 2019), <https://www.findlaw.com/legalblogs/courtside/can-you-sue-yourself-in-fatal-car-crash-case-utah-court-says-yes/>.

<sup>121</sup> It may seem paradoxical to use a third-party service to execute a unilateral bet, but given the open-source nature of the code, these third-party coders are really just acting as agents for the aspirant.

<sup>122</sup> Given the volatility of digital assets, there are a number of hedging mechanisms, including stablecoins, that exist to ensure the constancy of the \$10,000.

One of the first principles of contract law is a presumption that contracts ought to be enforced.<sup>123</sup> This presumption is not absolute and there are a number of doctrines and rules that courts use to prevent the enforcement of otherwise legal contracts.<sup>124</sup> As shown above, there is no structural reason why smart contracts cannot be formal contracts; they contain the requisite consideration and other elements of a valid contract, including offer and acceptance. Therefore, the presumption is that they should be enforced and not voided by the state, either through the courts or the legislature's police power.

There are, however, exceptions that the state uses to void otherwise legitimate contracts.<sup>125</sup> For our purposes, the relevant one here is a court's invalidation of a contract on public policy grounds. The idea behind invalidating a contract on public policy grounds is that even though the two parties make and formalize a bargain that they believe *ex ante* will be of mutual benefit, there are other parties involved that are harmed and therefore the state has the power<sup>126</sup> to invalidate those contracts.<sup>127</sup>

A classic example of such a contract would be a sales contract with a citizen in a country that has been embargoed. Even though an American buyer and a Cuban seller may execute an otherwise legitimate contract for the sale of cigars, because the United States has a policy of embargoing Cuba and there exist laws that establish this policy, a court will invalidate a contract between two willing parties on the grounds that it is illegal. Courts can also make determinations that certain contracts violate public policy without an explicit determination by a legislature.<sup>128</sup>

---

<sup>123</sup> See, e.g., *Daynard v. Ness, Motley, Loadholt, Richardson & Poole, P.A.*, 188 F. Supp. 2d 115, 123 (D. Mass. 2002) ("The Court presumes that, if a contract was formed in this case (which is assumed to be true for purposes of summary judgment), the parties expected it to be enforced.").

<sup>124</sup> *United States v. Bethlehem Steel Corp.*, 315 U.S. 289, 326 (1942) (Frankfurter, J., dissenting) ("[I]s there any principle which is more familiar or more firmly embedded in the history of Anglo-American law than the basic doctrine that the courts will not permit themselves to be used as instruments of inequity and injustice? Does any principle in our law have more universal application than the doctrine that courts will not enforce transactions in which the relative positions of the parties are such that one has unconscionably taken advantage of the necessities of the other? These principles are not foreign to the law of contracts. . . . More specifically, the courts generally refuse to lend themselves to the enforcement of a 'bargain' in which one party has unjustly taken advantage of the economic necessities of the other.").

<sup>125</sup> By legitimate, we mean under principles inherent in the nature of the contract itself under established principles of contract law.

<sup>126</sup> As a positive matter.

<sup>127</sup> See RESTATEMENT (SECOND) OF CONTS. § 179 (AM. L. INST. 1981).

<sup>128</sup> See *id.*; see, e.g., *Henningsen v. Bloomfield Motors, Inc.*, 161 A.2d 69 (N.J. 1960) (striking warranty provision in a contract for the sale of a car where the car manufacturing industry operated as an effective oligopoly).

In a traditional contract, which has no self-enforcing mechanisms, neither courts nor police are needed to ensure that the contract is not executed. This is because many steps of human action are still needed to make the contract a reality and at each step along the way, either law enforcement or the courts can step in to invalidate the contract. The mere writing of a contract that says “Bob will sell Alice 10 pounds of heroin” is not as problematic as taking actual steps to make the contract a reality, for instance, by planting opium poppy seeds or manufacturing heroin. Law enforcement does not have such a problem with the writing and executing of contracts that are contrary to public policy because there is ample ability to invalidate the contract down the road after concrete actions have been taken.<sup>129</sup>

This is not the case with smart contracts. Because smart contracts aim to excise human performance from their operation, law enforcement and the state, generally, should have more of an issue with their “mere” creation. Another way to think of this is that the concrete actions that are problematic from the point of view of the state are taken before the offer and acceptance of the smart contract. The actual creation of the contract can pose problems.<sup>130</sup>

As with all regulation, there are two possible methods for regulating smart contracts—through *ex ante* and *ex post* regulation and enforcement. In a free society, the general method of regulation and law enforcement is through *ex post* actions by the state.<sup>131</sup> This is to say that governments generally do not require individuals to seek permission before acting, even if those actions *could* be illegal.

Take the example of a cigarette vending machine, which, as we have discussed above, is a classic example of a strong smart contract. As of the time of writing, cigarettes by themselves are not illegal. Vending machines are not illegal either. But the United States federal government has a policy of not allowing individuals under the age of 21 to purchase

---

<sup>129</sup> See RESTATEMENT (SECOND) OF CONTS. § 178 (AM. L. INST. 1981) (“A promise or other term of an agreement is unenforceable on grounds of public policy if legislation provides that it is unenforceable or the interest in its enforcement is clearly outweighed in the circumstances by a public policy against the enforcement of such terms.”).

<sup>130</sup> See, e.g., *U.S. Treasury Sanctions Notorious Virtual Currency Mixer Tornado Cash*, U.S. DEP’T OF THE TREASURY (Aug. 8, 2022), <https://home.treasury.gov/news/press-releases/jy0916> (describing actions taken against a developer’s creation of a decentralized service that the state viewed as contrary to law and public policy).

<sup>131</sup> See generally Samuel Issacharoff, *Regulating After the Fact*, 56 DEPAUL L. REV. 375 (2007).

cigarettes. These facts taken together pose a conceptual problem for cigarette vending machines as a smart contract.

The United Kingdom, for instance, has banned cigarette vending machines.<sup>132</sup> Different states in the United States have different approaches, but New York City, for instance, has banned their use in public places.<sup>133</sup> Bans on the use of these smart contracts demonstrate that certain strong smart contracts fall within the ambit of the state's police power.<sup>134</sup> The cost of revocation or modification for certain smart contracts are so high that governments have made a determination that their mere existence should be prohibited.

For example, an individual about to drive a car could potentially commit the crime of drunk driving. Driving under the influence of alcohol is a crime that could be regulated either before or after the crime takes place—either through an *ex ante* regulation or *ex post* policing. There exist devices called ignition interlock devices that prevent cars from starting unless the driver's breath-alcohol level is below a certain threshold.<sup>135</sup> Some private bus companies use these devices to ensure that their drivers are not driving drunk and endangering their passengers. But the government does not generally require these devices in every car,<sup>136</sup> and has instead opted for an *ex post* policing regime for the crime of drunk driving. Police monitor the roads and only when a certain threshold of suspicion is met for a search does law enforcement police the crime.

It is important to note here that *ex ante* prohibitions are certainly the exception to the general rule of *ex post* enforcement. There are very

---

<sup>132</sup> See *Cigarette Vending Machines Banned in Eng.*, BBC (Oct. 1, 2011), <https://www.bbc.com/news/uk-15132529>.

<sup>133</sup> See Eric Pace, *N.Y.C. Moves Against Cigarette Machines*, N.Y. TIMES (Oct. 16, 1990), <https://www.nytimes.com/1990/10/16/nyregion/new-york-city-moves-against-cigarette-machines.html>.

<sup>134</sup> An interesting analogue is developing in the case of Tornado Cash, where courts will have to determine whether a smart contract executing a certain money transaction is per se problematic. See Jerry Brito & Peter Van Valkenburgh, *Coin Center Is Suing OFAC Over its Tornado Cash Sanction*, COIN CENTER (Oct. 12, 2022), <https://www.coincenter.org/coin-center-is-suing-ofac-over-its-tornado-cash-sanction/>.

<sup>135</sup> See *What Is an Ignition Interlock Device?*, INTOXALOCK, <https://www.intoxalock.com/ignition-interlock-devices/what-is-an-ignition-interlock-device/> (last visited Apr. 9, 2023).

<sup>136</sup> There are instances, however, where state legislatures have made the determination that repeat DUI offenders shall be required to have such devices in their vehicles. See, e.g., *New York Enforces Mandatory Interlock Device Use for All DUI Offenders*, LERNER & LERNER, P.C., <https://www.lernerandlerner.com/articles/new-york-enforces-mandatory-interlock-device-use/#:~:text=New%20York%20mandates%20that%20all,National%20Conference%20on%20State%20Legislatures> (last visited Sept. 15, 2022).

few devices in society that are *per se* illegal. Even for cigarette vending machines, there is no outright ban, as they are allowed in establishments where patrons must be 21 years or older to enter. Another example of *ex ante* regulation is with respect to certain classes of firearms. Fully automatic weapons, like machine guns, are generally prohibited for private ownership in the United States.<sup>137</sup> A very strict preclearance regime exists, and only certain licensed individuals are allowed to own such automatic weapons.<sup>138</sup> But millions of pistols and rifles are not illegal in the United States and their ownership is constitutionally protected, even though they can be used to commit crimes.<sup>139</sup> It is true that a preclearance regime with varying degrees of strictness exists in many states, but the objects themselves have not been banned.

Turning to personal growth bets, using the above framework, there should be a strong presumption to allow the use of smart contracts in personal growth bets. As mentioned above, there are two aspects of smart contracts in personal growth bets that differentiate them from traditional contracts with counterparties. These two areas of monitoring and enforcement are the two areas that the state may object to on public policy grounds.

Let us tweak the example of the non-smoking personal growth bet and turn it into a non-drinking personal growth bet. An individual sets up a smart contract such that if his blood alcohol level ever goes above .02, he will forfeit \$10,000. In this bet, an individual will need an oracle to monitor his blood alcohol level. This is not technically difficult and would be similar to diabetic individuals who have blood sugar monitors attached to them perpetually. This monitor will act as an oracle and be connected to a digital currency account. The smart contract will be set up such that the value of the escrow account will be either donated or destroyed if the conditions are not met.

There is nothing inherently problematic about this contract from a legal perspective.<sup>140</sup> There are ways in which this contract could,

<sup>137</sup> See, e.g., N.Y. PENAL LAW § 265.02(2), (3) (McKinney 2022).

<sup>138</sup> Peter Suci, *Yes, Machine Guns Are 'Legal' (But Here Comes All the Catches)*, NAT'L INT. (July 2, 2020), <https://nationalinterest.org/blog/reboot/yes-machine-guns-are-legal-here-comes-all-catches-163921>.

<sup>139</sup> *New York State Rifle & Pistol Association, Inc. v. Bruen*, 142 S. Ct. 2111 (2022).

<sup>140</sup> One possible objection is that the forfeiting of currency poses a problem to the central bank's control of the money supply. It is illegal to burn federal reserve notes, i.e., U.S. dollars. 18 U.S.C. § 333. Stemming from this, it is impermissible to instruct an executor of an estate to burn one's estate. See RESTATEMENT (SECOND) OF TRUSTS, § 124 cmt. G (AM. L. INST. 1959) (describing "capricious purposes"); see also *Everman v. Mercantile Trust Co.*, 524 S.W.2d 210 (Mo. App. 1975) (citing the Restatement section); *In re Scott's Will*, 386, 93 N. W. 109 (Minn. 1903) (citing the Restatement section and *Evermen*). To begin with, if the personal growth bet is denominated in

however, become problematic. Suppose instead of forfeiting money, an individual, so committed to sobriety, set up his monitoring device to include a cyanide pump such that he would be injected with cyanide if a BAL of over .08 was detected. The government would obviously not allow this contract, *ex ante*.

This demonstrates a spectrum of contractware that instantiates contracts. A general rule can be gleaned from the above examples and existing legislation: a smart contract executing a unilateral personal growth bet should be presumptively allowed so long as the damages for breach do not violate an otherwise applicable law. Any regulation of such contracts and the technology making them a reality should be done *ex post*, if at all.

The most powerful existing precedent for such a rule is the self-exclusion rules mentioned above. The most important thing to note about the existence of these laws is that they explicitly recognize the use of punishment to give precedence to a person's earlier will over his later will. In some sense, all contracts do this, but these laws are unique in that they are a close example to a self-contract because there is really no third party involved.<sup>141</sup>

These laws also prevent a person from doing something that otherwise would be permitted. Like all contracts, personal growth bets involve taking on additional obligations. A general contractor does not have to build a house, but when he agrees to take on the obligation, we give this agreement legal force. So too with self-exclusion laws. An individual does not have to ban himself from a casino, but once he does, we give legal force to this commitment. The same holds for unilateral smart contracts. An individual does not have to commit to sobriety or weight loss, but once he does, we give the contract legal force.

Another thing to note about self-exclusion laws is that there is nothing inherently illegal or against public policy to prevent an individual from entering a casino. So long as the casino is not running afoul of any anti-discrimination laws, they are allowed to refuse entry to whomever they decide.<sup>142</sup> Thus, the punishment does not involve anything illegal.

---

U.S. dollars, there are many workarounds to this rule. An individual could simply lock his currency in a digital safe that scrambles its password if the conditions are not met. Secondly, if the bet is denominated in a digital currency, the statute does not apply.

<sup>141</sup> It is true that self-exclusion laws bind third parties, i.e., the casinos. In this sense, the unilateral smart contract for personal growth bets is actually less problematic because they do not use state power to bind non-parties to the contract.

<sup>142</sup> See *Madden v. Queens Cnty. Jockey Club*, 72 N.E.2d 697, 698 (N.Y. 1947) ("In our opinion [the racetrack operator] has the power . . . to exclude others solely of his own

This rule can be applied to the above case of the personal growth bet to avoid alcohol consumption. Two consequences were proposed—one in which money was forfeited and the other in which cyanide was injected if a BAL above a certain number was detected. In the first case, it is clear that the contract should be presumptively allowed and any technology instantiating the contract should be allowed because there is no law against an individual giving his money away.<sup>143</sup>

On the other hand, there are many laws against suicide and promoting suicide,<sup>144</sup> which would make this hypothetical cyanide device likely illegal. In a world where the state has arrogated to itself the police power, it would be within its right to police the existence of the technology that instantiates the contract. As a practical matter, this means the ability to ban the devices like automatic syringe injectors.

This is a relatively bright line and will allow individuals to take on obligations that may not be strictly illegal but may be extremely unpleasant. Some may want to extend the rule beyond protecting bodily integrity and move towards protecting property or economic value. Those who believe in the concept of efficient breach will want to draw this line in a different manner. To these critics, there is a great deal of economic loss that will be created if we make it functionally impossible to breach a contract, even with oneself. To take a fanciful example, suppose an individual who has committed to sobriety through a smart contract is presented with the opportunity to enter a beer drinking contest. The prize for this contest is one million dollars. While *ex ante* he committed to not drinking, the possibility for efficient breach is presented. It makes sense to breach if the individual only staked \$10,000 to forfeit, but at a certain point there are circumstances that the individual *ex ante* did not consider that if he did, he would have been okay with his breach. Depending on the stakes, smart contracts make such a breach impossible.

This is not a reason to prohibit such contracts. Such a rule would prove too much as it would allow the state to intervene in any instance where an individual was generating economic loss. Commitment is always difficult because circumstances change.

---

volition, as long as the exclusion is not founded on race, creed, color or national origin.”).

<sup>143</sup> More problematic would be an individual who commits to burning his money instead of donating it. This would appear to violate 18 U.S.C. § 333, which prohibits the destruction of Federal Reserve notes. *See* 18 U.S.C. § 333. There is, however, a simple workaround, which is to convert the U.S. dollars into bitcoin or some other crypto currency and then destroy the value that way.

<sup>144</sup> *E.g.*, N.Y. PENAL LAW § 120.30 (McKinney 1967).

### III. RETHINKING CONTRACT LAW

Should one accept the normative case for self-contracts for personal growth—and, as discussed above, we very much believe one should—then several long-standing contract law doctrines such as the presumption of post-execution modification and consideration requirements will need to be modified. These modifications not only permit the creation of value-adding self-contracts (which is good), but are also consistent with these long-standing doctrines once one conceives of the present self as a separate party from the future self.

#### A. *Restricting Post-Contract Amendment*

An obvious doctrine that jurisdictions would need to adjust is the traditional rule that parties can always amend a contract after its initial execution if they all agree.<sup>145</sup>

In the standard two or more parties contracting scenario, the parties are almost always around to consent (as successors are generally appointed if the original party dies or goes out of business). But, for self-contracts, where the parties are one's past self (at the time of contracting) and future (now-current) self, one party, the past self, is not available to consent. Further, permitting the future self to amend would often defeat the purpose of the bet, just as permitting Ulysses to change the terms of his arrangement the moment he hears the Sirens is ill-advised.

But never permitting amendment would also produce undesirable results, especially in cases where unexpected events making meeting the commitment far more difficult or impossible than the past self would have expected (e.g., a commitment to run a marathon followed by contracting a serious illness). After all, there are a number of good reasons parties may wish to modify an existing, enforceable contract, which support the traditional rule. First, no party has the ability to foresee any and all contingencies that may materialize after the contract is signed. What may have been an efficient and value maximizing allocation of risks *ex ante* may subsequently prove to be inefficient; reestablishing an efficient allocation might require modification. Contract law may want to facilitate such a modification.

It should be noted, however, that even in traditional multi-party contracts the story may not always be so benign. If, after a contract is

---

<sup>145</sup> See RESTATEMENT (SECOND) OF CONTS. § 89 (AM. L. INST. 1981); U.C.C. §2-209 (AM. L. INST. & UNIF. L. COMM'N 2021).

signed, one party is in a position to “hold up” the other—for example, when the party being held up has made a transaction-specific investment that can’t be transferred, and which he can only recover if the other party performs—the law may want to prevent modifications (to deter such opportunism).<sup>146</sup>

When it comes to self-contracts, a possible solution would be to create a default rule that such contracts cannot be modified absent circumstances a reasonable person would deem to have made the original goals of the aspirant impossible or impractical. This would not defeat the purpose of the smart contract as long as the costs of revocation still remain high (i.e., requiring that the aspirant go to arbitration and show impossibility or impracticability by a preponderance of the evidence). At common law, modifications to existing contracts would only be upheld if they were supported by some additional consideration (i.e., the promisor must promise something in addition to his existing obligation).<sup>147</sup> This reflected the concern that a modification without additional consideration was likely to be a “hold-up” situation.<sup>148</sup> The Restatement Second of Contracts strikes a balance between the common law rule and the desire to facilitate benign amendments, allowing modifications that are “fair and equitable in view of the circumstances.”<sup>149</sup> If, for example, A agrees, by written contract, to dig an inground pool for B for a stated price, but unexpectedly encounters solid rock which will make the job much more difficult, A and B may orally agree to modify the contract by reasonably increasing the price. B would be bound to this amount. Similarly, the Uniform Commercial Code permits modifications made in good faith.<sup>150</sup>

In addition, a contract can differentiate between knowable circumstances that create impracticability problems and unknowable unforeseen circumstances. Take the example of the starter interrupter devices mentioned above. An example of a knowable frustration to a contract is the length of time a secured creditor must wait until he is allowed to repossess property. This time could change, but it could be written into the code that an oracle will consult with legislative pronouncements that are published online. An unknowable frustration would be something like Congress’ enactment making it much more

---

<sup>146</sup> For the classic case on this point, see *Alaska Packers Ass’n v. Domenico*, 177 F. 99 (9th Cir. 1902).

<sup>147</sup> This is called the pre-existing duty doctrine. See *Pre-Existing Duty Doctrine*, LEGAL INFO. INST., <https://www.law.cornell.edu>, (last visited Apr. 9, 2023).

<sup>148</sup> RESTATEMENT (SECOND) OF CONTS. § 89 (AM L. INST. 1981).

<sup>149</sup> *Id.*

<sup>150</sup> U.C.C. § 2-209 (AM. L. INST. & UNIF. L. COMM’N 2021).

difficult to foreclose on military veterans.<sup>151</sup> This is unknowable in our terminology because it is a criterion, unlike time-to-repossess, that did not exist at the time of the contract's drafting. This is why it makes sense to have human judgment still involved in some way.

*B. No Efficient Breach, Only Specific Performance*

Another area of the doctrine that may need to be adjusted for smart self-executing contracts is the practice of so-called "efficient breach." Efficient breach describes a situation where a party to a contract voluntarily ceases performance and pays damages because to perform the contract would result in an "economic" loss to both parties involved. Under an efficient breach theory, courts should treat contractual obligation not as obligation to perform in all circumstances, but as an obligation to choose between performance and compensatory damages.

Proponents of this theory contend that giving a promisor the choice between performance and breaching-and-payment results in a more efficient outcome. This is because the promisee is fully compensated in either case, while the promisor is better off if he does not have to perform but can pay damages instead.<sup>152</sup> The promisor will only exercise his breach-and-pay option if he gains more from a third party or alternative course of action than he would have from the original promisee or promise. A third party, too, is better off because he has now secured a performance that he previously did not have.

Let us take Richard Posner's famous example:

Suppose I sign a contract to deliver 100,000 custom-ground widgets at \$.10 apiece to A, for use in his boiler factory. After I have delivered 10,000, B comes to me, explains that he desperately needs 25,000 custom-ground widgets at once since otherwise he will be forced to close

---

<sup>151</sup> Forclosure Relief and Extension for Servicemembers Act of 2017, S. 1661, 115th Cong. (2017).

<sup>152</sup> The earliest scholarship putting forward the concept of efficient breach was Birmingham. See Robert L. Birmingham, *Breach of Contract, Damage Measures, and Economic Efficiency*, 24 RUTGERS L. REV. 273, 284 (1970) ("Repudiation of obligations should be encouraged where the where the promisor is able to profit from his default after placing his promisee in as good a position as he would have occupied had performance been rendered."). It has been perhaps most famously championed by Posner. See RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* (Little, Brown and Co. ed. 3d ed. 1986). But see Ian R. Macneil, *Efficient Breach of Contract: Circles in the Sky*, 68 VA. L. REV. 947 (1982) (arguing that permitting breach is not the only way to achieve an efficient result).

his pianola factory at great cost, and offers me \$.15 apiece for 25,000 widgets. I sell him the widgets and as a result do not complete timely delivery to A, who sustains \$1000 in damages from my breach. Having obtained an additional profit of \$1250 on the sale to B, I am better off even after reimbursing A for his loss. Society is also better off. Since B was willing to pay me \$.15 per widget, it must mean that each widget was worth at least \$.15 to him. But it was worth only \$.14 to A – \$.10, what he paid, plus \$.04 (\$1000 divided by 25,000), his expected profit. Thus, the breach resulted in a transfer of the 25,000 widgets from a lower valued to a higher valued use.<sup>153</sup>

Suppose, however, that the boiler factory owner *ex ante* sensed that he could have holdout value and to protect this value had his widgets designed with in such a way so as they could never be used outside of his own boiler facility, frustrating the purposes of the pianola producer. On Posner's theory, this forethought of tying his widgets to the mast would be inefficient.

This is a fanciful example, to be sure, but it illustrates an important point: the use of technology combined with *ex ante* desires can raise the cost of efficient breach to be prohibitively high. These costs effectively serve as liquidated damages clauses that must be enforced given the nature of the technology installed.

Depending on the strength of the smart contract and the contractware instantiating the contract, the costs to modify may make efficient breach impossible. This bolsters at least one vision of contract law that finds promises important in their own right.<sup>154</sup> Indeed, it adheres more closely to the view of vocal critics of efficient breach theory who argue that, to the extent that efficient breach encourages parties to breach their contractual obligations, it may undermine important societal understandings of promise by allowing promisors to “profit from the unilateral exercise of their power to perform or not.”<sup>155</sup> Should not

---

<sup>153</sup> RICHARD POSNER, *ECONOMIC ANALYSIS OF THE LAW* 151 (Aspen, 8th ed. 2011).

<sup>154</sup> CHARLES FRIED, *CONTRACT AS PROMISE: A THEORY OF CONTRACTUAL OBLIGATION* (Harv. Univ. Press 1981).

<sup>155</sup> Richard R. W. Brooks, *The Efficient Performance Hypothesis*, 116 *YALE L.J.* 568, 572–73 (2006). See also Daniel Friedmann, *The Efficient Breach Fallacy*, 18 *J. LEGAL STUD.* 1 (1989); Peter Linzer, *On the Amoralism of Contract Remedies—Efficiency, Equity, and the Second “Restatement”*, 81 *COLUM. L. REV.* 111, 112 (1981) (arguing that “it is both fair and appropriate to hold people to promises that they freely made,” and that, as such, the concept of efficient breach is an amoral one).

the promisee, a victim of the intentional breach, receive a portion of that profit?<sup>156</sup>

An intentional breach of contract—however “efficient” it may be—seems to conflict “with a basic premise of both the common law and other Western legal systems, namely, that property (including contractual rights) is not to be taken and given to another without the owner’s consent.”<sup>157</sup> Further, without some assurance that a counterparty may not ultimately hold up their end of the bargain if it finds a more lucrative alternative, one may, *ex ante*, be deterred from entering into otherwise profitable transactions.

In the case of a personal growth bet, efficient breach may be justified if the aspirant picks a number that raises the cost of breach to the appropriate amount, thus aligning his future incentives with the desired outcome, and then circumstances justify a breach. For example, a proper personal growth bet contract should raise the cost of a pleasurable vice (e.g., smoking cigars) to a high enough amount to properly account for otherwise unaccounted for negative externalities (e.g., cancer). A properly aligned bet would therefore eliminate issues such as hyperbolic discounting by an aspirant’s future self.<sup>158</sup> However, it may still justify occasional breaches, such as enjoying a fantastic cigar with friends for a special occasion. This is true even though most people would not make a personal growth bet contemplating efficient breach because the whole point of the contract is to achieve some purpose. But, this is true for all contracts *ex ante*. Although in the case of the personal growth bet, the concept of efficient breach seems more egregious than in a world where businessmen deal with widgets.

However, in other situations the aspirant may desire to eliminate any risk of a future breach, such as with Ulysses and the Sirens. In that case, the penalty would have to be so high as to make breach ruinous, with the only escape hatch an unalterable default rule permitting breach if fulfillment of the contract is impactable or impossible. One may not want to permit efficient breaches in such a case, because the purpose of the bet is to ensure no breach occurs.

Finally, jurisdictions may want to permit forms of injunctive relief. This would be similar to casino exclusion laws, except the aspirant

---

<sup>156</sup> Brooks, *supra* note 155, at 573.

<sup>157</sup> Friedmann, *supra* note 155, at 13-14.

<sup>158</sup> Hyperbolic discounting occurs when a person greatly discounts the future cost of taking an action in favor of the immediate benefits, leading to serious long-term regret. See Mario J. Rizzo & Douglas Glen Whitman, *The Knowledge Problem of New Paternalism*, 2009 BYU L. REV. 905, 924-28 (2009) (discussing hyperbolic discounting issues).

would have more flexibility in selecting which type of activity he or she would be prohibited from engaging in. In some cases, this might be preferable to a ruinously high monetary penalty, which might leave a person both destitute and then willing to engage in the prohibited behavior. However, this raises the concerns with government enforcement discussed above, including issues with using of force and state power to enforce the injunction.

This Article takes no position on the efficient breach debate but recognizes that some smart contracts may be designed to make efficient breach prohibitively expensive, and whether we should permit such a contract will be a difficult issue.

### *C. Consideration and One-Sided Contracts*

Another area of the doctrine that would need modified is the requirement for consideration. Under the common law, for a valid contract to exist, there must be an offer, an acceptance, and consideration. Consideration requires that “a performance or a return promise must be bargained for,” and may take the form of an act, forbearance, or change to a legal relationship.<sup>159</sup> Consideration serves to distinguish between contracts—i.e., bargained-for exchanges—and gifts.

For example, if A promises to gift \$10 to B, there is no consideration for A’s promise—even if B relied on that promise.<sup>160</sup> Similarly, if A agrees to give B a \$1,000 gratuitous loan, B’s promise to accept the loan is not consideration for A’s promise to make it.<sup>161</sup> This distinction matters: in order for an agreement to have legal force—for there to be legal remedies for breach—there must be consideration.<sup>162</sup> In

---

<sup>159</sup> See RESTATEMENT (SECOND) OF CONT. § 71:

- (1) To constitute consideration, a performance or a return promise must be bargained for
- (2) A performance or return promise is bargained for if it is sought by the promisor in exchange for his promise and is given by the promisee in exchange for that promise
- (3) The performance may consist of
  - a. An act other than a promise, or
  - b. A forbearance, or
  - c. The creation, modification, or destruction of a legal relation
- (4) The performance or return promise may be given to the promisor or to some other person. It may be given by the promisee or by some other person.

<sup>160</sup> *Id.* at § 71 cmt. b. illus. 2.

<sup>161</sup> *Id.* at § 71 cmt. b. illus. 8.

<sup>162</sup> See RESTATEMENT (SECOND) OF CONTS. § 1 (AM L. INST. 1981) (“A contract is a promise or a set of promises for the breach of which the law gives a remedy, or the performance of which the law in some way recognizes as a duty.”).

this way, consideration is proof that a contract exists; it draws a line between those promises that are enforceable, and those which are not.<sup>163</sup>

Consideration serves a number of important purposes, purposes that should be considered for self-contracts. First, as discussed above, consideration differentiates between contracts and gifts, the latter of which is not generally considered to be the kind of thing the law enforces.<sup>164</sup> Second, requiring consideration prevents hasty or joke promises from being enforced.<sup>165</sup> Third, consideration signals a change made (in behavior) in return for a promise, which might itself reflect the parties' *ex ante* belief that the exchange was worth engaging in—that is, that it was value-maximizing. Consistent with an economic view of contract law, we want to enforce promises that appear to be value maximizing for both parties; consideration serves as a proxy for that.

In the case of the personal growth bet, consideration should be considered to exist only if clear benefits for the future aspirant exist at the time the aspirant makes the contract. The consideration is not for the monitoring and enforcing, which is only a means to the end of achieving the goal. The actual consideration is the benefit the future aspirant will achieve, paying the price of the threatened penalty. Therefore, a personal growth contract should only be enforceable if it provides real benefits to a future self.

One may also argue that the lack of “real” consideration in personal growth contracts shows they are outside the scope of the legal system, similar to gifts. However, the difference with gifts is that personal growth contracts share the same characteristics as contracts when it comes to their seriousness or attempt at creating additional future value through voluntary exchange. First, going through the formalities of creating a smart contract is and would be similar to a real contract (specific terms, specific penalty for breach, method of enforcement), as opposed to a hasty joke or comment. Second, people generally enter into personal growth contracts to create future value (especially if contracts are enforced only if the future self-benefits), making them more akin to value-creating contracts than one-sided gifts.

---

<sup>163</sup> Lon Fuller, *Consideration and Form*, 41 COLUM. L. REV. 799, 800 (1941) (explaining that consideration serves an “evidentiary function,” providing evidence of the existence of a contract in the event of dispute). However, note that some promises that lack consideration may still be enforced through the doctrine of promissory estoppel. See RESTATEMENT (SECOND) OF CONTS. § 90 (AM L. INST. 1981).

<sup>164</sup> See Henry Winthrop Ballantine, *Mutuality and Consideration*, 28 HARV. L. REV. 121 (1914); see also Fuller, *supra* note 163.

<sup>165</sup> Fuller, *supra* note 163, at 800 (describing the “cautionary function” of consideration).

## CONCLUSION

For those who read just the abstract and conclusion, we hope you take away one thing from this article: personal growth bets are a powerful tool for making life better. By staking money on achieving a personal goal, whether it is losing weight or writing a law review article, a person is more incentivized to accomplish that goal. Those incentives lead to real world improvements.

Existing contract law doctrines lend a great deal of support to making these bets legally enforceable. These bets, which can be described as personal growth contracts, contain all of the necessary elements of a legally enforceable contract. While such contracts can be made with counterparties, including existing companies, involving counterparties necessarily increases transaction cost and adds another layer to what should be a *self*-improvement process.

This added cost is the reason why we propose using smart contracts for personal growth bets. Smart contracts excise (to varying degrees) human discretion in the performance of a contract. They allow an individual to tie himself to the mast and enforce the *ex-ante* bargain with an individual's aspirational self.

To be sure, this program is a speculative and aspirational one—smart contracts are only in the beginning phases of their development as a legal and business tool, even if they have a long and rich history of use without doctrine or formal recognition.

We encourage software developers to build tools around smart contracts for personal growth. This is a worthwhile goal because the personal growth bet is a powerful concept that does not take much upfront cost to radically change a person's life. We hope that the personal growth bet will catch on and grow in popularity because it truly is a tool that can make life better.