

# **Contract Governance for Complex Products**

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## **Introduction**

The US federal government spends just under twenty percent of its budget buying everything from paper clips to complex weapons systems. State and local governments use some sort of purchasing for forty percent of their budgets. Contracting is no longer one among many alternatives to direct service delivery – it is now a standard service delivery mode (Kelman 2002). Yet, noteworthy gaps remain in scholarly and practical knowledge on how to effectively deliver services via contract.

We propose that the public sector contracting literature needs better ways to distinguish between easily contractible products and services and more difficult ones. Sometimes governments buy goods or services whose important attributes can easily and clearly be spelled out in advance and can be unambiguously verified once the product or service has been delivered. Because these products require standard production processes, they typically have many suppliers. We can call these simple products. Copy machine paper is a simple product: it's easy to describe the important qualities (size, color and so on), so it's easy to make, and straightforward to evaluate if a particular box of paper fits the description. Other products have important qualities that cannot be as easily and clearly spelled out in advance and are difficult to verify after the product or service has been delivered. These products also tend to require highly specialized production processes, and hence only a handful of suppliers have the capability to produce them. We call these complex products. Mental health services are a complex product because it is very difficult to specify in advance which services should be offered, in what amount, and through which processes, given the uncertainty about patient needs and the severity of their condition. The quality of mental health services is notoriously difficult to evaluate even after service delivery.

The distinction between simple and complex products has important implications for how governments should go about deciding what to purchase and how to manage contracting. Simple products are ripe targets for contracting. The market for simple products tends to be highly competitive, which allows public managers to make easy price comparisons across different quality and quantity combinations. Buyers and sellers can easily define the terms of the exchange and execute the contract. If for some reason the seller fails to live up to her obligations, government buyers can quickly and easily spot the transgression, and the competitive market provides a replacement vendor seeking similar terms.

Complex products are challenging targets for contracting. Markets for complex products tend to be "thin" (there are few buyers and few sellers), which means the market provides little information about the product and its price, quality and quantity tradeoffs. It is consequently difficult (and expensive) to define precise terms of exchange and ambiguous contract terms are often left to be negotiated as the product is produced and delivered. The result can be a risky combination of a purchasing government and a supplying vendor under informed about the product or service to be exchanged, and both are unconstrained by competitive market pressures. This creates opportunities for either party to exploit contract loopholes and ambiguities for its own advantage and threatens to raise costs, diminish quality and delay delivery. In order to understand how to strategically mitigate complex products' threats to contract success, our approach is to link contract management strategies to the causes of contract failure. Our theory starts with a diagnosis of the underlying sources of risk in contracting for complex products, namely the characteristics of the good or service to be exchanged and the resulting impact these characteristics have on market dynamics. Uncertainty about the products' dimensions typically push the buyer and seller towards an incomplete contract, in which certain elements of contract governance are left unspecified. The

lack of contract specification creates a wide berth for the behavior of the buyer and the seller to impact contract success – each can act scrupulously to pursue a win-win outcome or seek individual gain at the other’s expense. Our theory posits that under these conditions contract success is primarily a function of the cooperative behavior of both parties.<sup>1</sup> Each has discretion to seek gains from the exchange that will do even greater harm to the other, but both will be better off if they resist this temptation in favor of a collaborative spirit of the original agreement. Management strategies for contract success must ultimately promote cooperation in light of the uncertainty that both parties face in entering into such a risky exchange.

Our paper follows the trajectory of our theory. We start by examining the characteristics of complex products and showing how these characteristics create risks for the buyer and seller. In the second section, we describe how contracts for complex products are typically incomplete and show how this more flexible approach provides sufficient assurance to each party to secure the outlines of an exchange, but creates the opening for buyer and seller to exercise discretion. In the third section, we focus on the behavioral choices buyer and seller enjoy as a result of this discretion, and show that, all things being equal, each party is likely to pursue a behavioral strategy that harms the other party. The fourth section of the manuscript draws from our theoretical logic to provide managerial and governance solutions to this dilemma that promote cooperation over defection. A fifth section concludes the paper by summarizing our arguments.

## **Complex Products and their Risks**

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<sup>1</sup> Factors outside the basic interaction between the buyer and seller will also influence contract outcomes, but we contend that the behavior of the two parties to the exchange, often in reaction to the influence of these outside factors, are the principal contributors to contract success or failure.

The goal of buying is a win-win exchange: the seller seeks to secure resources to at least cover the expense of producing and delivering a product, while the buyer seeks a product that meets his needs at a price he can afford. Simple products make for unambiguous, and therefore more likely to be successful, exchanges. The seller can offer a fully specified, or complete, product (e.g. a box of blue copier paper) at a selected price, and the buyer can determine if the product meets his needs (e.g. fits his copier machine) at a price he can afford. In well-functioning markets for simple products, little needs to be written down to govern the exchange. Instead, all the information is readily available leading to a relatively frictionless transaction. The seller can advertise the product's qualities and price and never need to engage in a conversation with a potential buyer. If the terms are agreeable, the buyer merely provides adequate compensation to the seller in exchange for the product.

Complex products add friction to transactions. Buyers and sellers know less about the product and the effort and resources required to produce and exchange it. Consequently, the buyer and seller have to spend considerable time and effort to specify as much as they can about the product's parameters, as well as the terms of exchange, or the contract. The trouble begins with two inherent characteristics of complex products: measurability and asset specificity.

### *Measurability*

For simple products, a buyer can specify fully the objectives she wants to accomplish through purchasing and the products and features which can accomplish them. Simple products are easy to measure. For complex products, a buyer is unable to fully specify these elements. The product is difficult to measure. A buyer might know what she wants a product to do – prepare a field for planting – but might not know the array of products necessary to do so – tractors, plows,

fertilizers, pesticides, seeds, etc. In instances of high uncertainty, the buyer might even not know exactly what she wants the product to do. Perhaps she wants the product to produce food on a periodic basis, but isn't certain whether the best approach is to grow it herself (e.g. a farm) or acquire it from someone else (e.g. a grocery store). The buyer has value uncertainty – she does not know the value of different products' capabilities, qualities and tradeoffs among them. Complex product's measurement difficulties extend to the seller as well. Without specific information about exactly what the buyer desires, the seller cannot determine exactly what inputs he will need to acquire and what production processes he will need to establish to produce the product. The seller has cost uncertainty – he does not know the costs of producing the product with different capabilities and qualities to meet the buyer's objectives (Hart and Moore 2008).<sup>2</sup>

### *Asset Specificity*

Negotiating and executing a contract for a complex product often requires the buyer and seller to make asset specific investments. Types of investments might include creating a production facility solely to produce the product desired by the buyer, or locating a facility in a specific location. Other types of asset specific investments are specialized training, such as learning to use a buyer's unique software system. Asset specific investments in complex contracting often involve the buyer and seller customizing production processes to suit each others' idiosyncrasies. For example, some research in the US space program produced economic value outside the contract (e.g. Tang), while other research produced little value outside the contract (e.g. spacesuits, at least as of 2009). Expenditures are asset specific to the extent they

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<sup>2</sup> The problem here is akin to the information asymmetries which characterize basic principal-agent relations, although in this case, at the outset both parties lack information relatively equally. In short, there is a mutual information deficit, rather than information asymmetry.

have no economic value outside the product being produced and are lost if the contract is not executed (Williamson 2005).

Taken together these two characteristics are sources of risk in an exchange for a complex product. Both buyer and seller are uncertain at the outset about the qualities and costs of the product. This uncertainty is typically only reduced through the actual production and delivery of the product, with both buyer and seller knowing at the outset that producing the product will require the establishment and construction of a production process that is in many ways unique to the transaction. The terms of exchange have to simultaneously accommodate this uncertainty about key dimensions of the product, while providing sufficient assurance to both parties that they will receive the win-win outcomes effective contracting promises.

### **Contracting for Complex Products**

The archetypical vehicle for governing an exchange between two parties is a contract. A contract specifies the buyer and seller's obligations in an exchange, including the price, qualities and quantities of the product. The buyer's obligations can include the payment terms and the terms under which the product is to be received (e.g. timing of delivery). The seller's obligations vary under different price arrangements, but generally include some combination of output specifications such as product qualities and quantities and input characteristics such as time and materials.<sup>3</sup> The contract may also define each party's discretion, a range of activities and outcomes it can achieve without violating contract terms. Formal contract terms are explicit and often put in writing. Informal contract terms are the implicitly understood terms of an exchange. The explicit terms of a snow removal contract may specify payment terms and that the snow will be cleared

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<sup>3</sup> Fixed price contracts set compensation on the seller's outputs while cost reimbursement contracts set compensation on inputs, such as time and materials. These terms specify who generally bears cost risk: fixed price contracts place more of the cost risk on sellers and cost plus contracts place more of the risk on buyers (Bajari and Tadelis 1999).

from a driveway after at least three inches have accumulated. Implicit contract terms cover what happens to the snow once it has been removed (usually, dumped next to the driveway).

Contract completeness is the degree to which the contract defines buyers and sellers' rights and obligations across all future contingencies of the exchange (Hart and Moore 2008; Tirole 1999; Bajari and Tadelis 2001; Heinrich 1999; Martin 2004; O'Looney, 1998). Contracts for simple products tend to be more complete in that they identify clearly the buyer and sellers' exact obligations under all foreseeable conditions so the sale can be safely executed. With simple products, there's not much that could go wrong with the sale, so the contract can be relatively simple. However, all contracts are incomplete to some degree because the future contains an infinite number of scenarios, not all of which can be specified in advance. At some point the costs of writing contract terms for all future scenarios exceed the mutual gains from the trade and no contracting would occur, or a contract can be overly precise in that it does not allow for adjustment in response to unanticipated circumstances. In a broad sense, public law defines contracting default rights and obligations and the contract adjudication process for determining whether formal or informal contract terms were broken (Brown, Potoski and Van Slyke 2006).

Contracts are more likely to be incomplete to the extent that the products are complex. Ambiguity about how to design and build a complex product to meet the buyer's objectives means that the two parties cannot specify all contract elements in advance. Contracts for complex products are less specific relative to what is being purchased; such contracts often contain imprecise instructions for what the buyer and seller should do under different scenarios. Complex products tend to be bought with less specific contracts because their very complexity means that there are a large number of different scenarios and circumstances that could occur and it would be too expensive for the buyer and seller to spell them out in advance.

This is not to say that contracts for complex products are as short as contracts for simple products. Instead, the specifications tend to be less about the actual product, and more about how the exchange will actually be governed. For example, when disagreements arise in the production and delivery of the product, buyers and sellers can try to renegotiate contract terms or resort to adjudication through the legal system. Such renegotiations are costly, but these costs can be lowered by specifying a priori – before the contract is signed – each party’s renegotiation rights and obligations.

Contract terms that specify the governance structures of the exchange function akin to the way players organize a pick-up basketball game. Instead of spelling out the rules about fouls and infractions, pick up game players usually first state some broad parameters of play – “let’s keep it clean” – and then set rules for calling fouls as the game flows. “Offense calls fouls” or “defense calls fouls” are pick-up game property rights that are widely seen as fair – each team alternates calling fouls – and are readily flexible and adaptable to changing conditions – a team can tighten or loosen its standards in response to its opponents style of play and foul calls. These “calling fouls” property rights allow the players to more easily renegotiate contract terms as the game unfolds. Beneath this formal property rights structure lies an informal structure that defines the rules of behavior for the game. Some infractions are simply “good hard fouls” while others are so rough they could lead a player to be expelled from the game. The pick-up game contract is incomplete, however, in that there are behaviors covered neither by the formal or informal contract terms, such as a hard foul that, while not so egregious as to merit expulsion, is merely unsportsmanlike, whether from malice, recklessness, or otherwise upsetting to the spirit of that particular game. Sporting behavior makes the game more enjoyable for everyone whereas enough bad sports conduct on the court can ruin a good game.

Specifying governance terms in contracting can be a flexible approach that still supplies sufficient assurances to buyers and sellers to allow for an exchange to occur. It responds to the uncertainty inherent in the product, not by specifying the product's qualities and costs, but by specifying how the exchange will occur and who gets to decide when one side has run afoul of both the formal and informal terms of the contract. Such governance terms do not eliminate contracting risk, as we will discuss shortly, just as "offense calls fouls" does not confine all fouls in basketball to sporting behavior. Risk still remains, but that risk has now been channeled into a narrow range of possible outcomes.

While specifying the products' qualities and dimensions is perhaps the most direct means to reduce the risks of failed contracting, entering into an incomplete contract shifts the locus of the risks more towards the behavior of the buyer and the seller. Complete contracts limit the buyer and seller's discretion in the exchange. Incomplete contracts, on the other hand, create space for each party to divert from the spirit and letter of the agreement. The consequence of an incomplete contract, coupled with asset specific investments and an unpredictable future, is the classic "lock-in" problem (Williamson 1996). A party becomes locked into a contract because it can not redeploy its asset specific investments to other profitable endeavors, allowing the other party to exploit unforeseen events and contract ambiguities for its own advantage. For the buyer, the "lock-in" risk is that once a seller has been selected, no other potential sellers have made the necessary investments, and the advantaged seller may look to opportunistically exploit contract ambiguities perhaps by "gold plating" the product with costly features that increase his profits, but for the buyer add little value and considerable expense. Likewise, because the seller has only one buyer for its products, the buyer may also opportunistically exploit contract terms for its own favor. The buyer may force a seller, for example, to make changes to a product that raise costs above the

negotiated price even though it well knows that a cheaper product would meet her needs almost as well. In these circumstances, the exploiter's gains can be smaller than the exploited party's losses.<sup>4</sup> The market structure for complex products, even if competitive prior to the contract award, becomes essentially dyadic as asset specific investments leave the buyer and seller with only each other as competitive contract partners.

For the seller there is only one buyer (a monopsonist). The buyer winds up handcuffed to a single seller because other sellers have now departed from the market for the particular complex product or service. Absent lock-in problems, the buyer can simply replace an opportunistically behaving seller with a more suitable one, and a seller can likewise replace an opportunistic buyer. Lock-in problems coupled with incomplete contracts weaken the disciplining power of market forces. Within a single complex contract, each party may find itself simultaneously advantaged in some areas and vulnerable to exploitation in others. Lock-in problems transform a contract from a market exchange to an interdependent relationship whose outcomes are determined less by market forces and more by the strategic behavior of both the buyer and seller.

### **Complex Product Contracting Strategy**

With the table set, the source of risk shifts from the product's characteristics and the structure of the contract that governs the exchange to the actual behavior of the buyer and the seller. The promise of an incomplete contract for a complex product is a mutual partnership that results in the classic win-win. In contracts for simple products, the self-interest of both parties leads to win-win outcomes. With complex products, narrow self-interest jeopardizes win-win

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<sup>4</sup> In classic principal-agent models, opportunism is manifest as goal incongruence between the buyer and seller. If both shared the same goals, the risk of opportunism would diminish.

outcomes and makes lose-lose outcomes more likely. Successful contracts for complex products need to structure incentives so that each party takes into account their own interests along with those of the other party, leading to win-win outcomes. In this section, we show how this is difficult to achieve given the nature of complex contracting.

*Contract Strategy: Consummate v. Perfunctory*

When performing in areas where the contract is vague, the buyer and seller's behavior can be either *perfunctory* or *consummate*, using the terminology of Hart and Moore (2008) and Williamson (1975, p. 69). Perfunctory behavior conforms to the bare minimum "letter" of the contract as enforceable by a court of law, while consummate behavior goes beyond what the bare minimum that contract requires and towards greater win-win outcomes. Perfunctory behavior produces greater gain for the performer, but imposes greater costs on the other side. In other words, the seller may save a dollar in its costs, but reduces the value the purchaser receives from the transaction by two dollars. Consummate behavior means forgoing a large unilateral gain in exchange for a smaller individual payoff from a potentially larger mutual gain. The degree to which the payoffs and penalties from consummate and perfunctory behavior affect contract behavior increases the more incomplete the contract and the greater the lock-in problems.

The lock in problem, coupled with an incomplete contract, creates room for the buyer and seller to choose either consummate or perfunctory behavior. For example, a nightclub owner might hire a comedian for evening entertainment. The complete portion of a contract can specify the number of jokes a hired comedian must tell or how long he will perform, along with payment terms. But it is impractical to specify how funny the comedian should be when he tells them. A consummate comedian would strive for big laughs while a perfunctory comedian would

settle for mild giggles. Being funny takes extra effort, but an extremely tough crowd may be impossible to please. The nightclub owner is locked into the contract with the comedian: if the comedian turns out to be unfunny, it may not be easier to find another on short notice. The comedian is likewise locked into the contract: if confronted by a tough crowd, he can not easily walk off the stage to find a more a more receptive audience in another venue.

### *Complex Contracting as a Prisoners' Dilemma*

Game theory can be a useful way for describing situations where the consequences of people's choices depend not just on what they choose, but also on what other people choose (Axelrod 1984). The outcomes each player receives are jointly determined because the choices they make are interdependent. The nature of this interdependence and the payoffs from players' choices determine how difficult it is for the players' choices to produce win-win versus lose-lose outcomes. Unfortunately, all too often the strategic implications of the lock-in contracting problem resemble a prisoners' dilemma, which is a particularly difficult situation for achieving optimum win-win outcomes. While not all contracting situations end up as prisoners' dilemma problems – buying simple products, for example, is likely to produce win-win outcomes. Viewing complex contracting through the prisoners' dilemma lens helps diagnose the problem and raise the question as to why the risk of failure is so high for these contracts while also helping to identify solutions for managing these contracts and transforming lose-lose conflict into win-win cooperation.

Before dissecting the prisoners' dilemma game, consider first a stylized game describing the payoffs a buyer and seller receives from contracting for simple products. Since we are discussing bilateral contracting, we will confine our discussion to two player games. In a simple

contracting game, each player has the option of cooperating or defecting, where cooperating means engaging the contract to sell (or buy) the product and defecting means not selling (or buying) the product. If the exchange occurs, that is the buyer buys the product and the seller sells, each receives some positive payoff because the price was less than it cost the seller to produce the product and the buyer's satisfaction is greater than the price paid. If the exchange does not occur, neither side receives a payoff. An exchange occurs only if both parties receive a positive payoff from the exchange. The structure of the contract guarantees the win-win outcome from simple product contracting: unless both the buyer and seller have a positive outcome from a sale, the exchange does not occur and neither is penalized. For example, a misbehaving seller causes little harm when selling a simple commodity, like flour; absent lock-in problems, troublesome sellers can easily be replaced with better ones.

Complex contracting does not promise such win-win outcomes because the players are locked into a prisoners' dilemma game. In the classic prisoners' dilemma game, two or more players choose whether to cooperate or defect, with the payoff of their choices jointly determined. Table 1 describes the payoffs each receives depending on the combination of player choices. If both choose to cooperate, each receives a moderately high payoff and if both choose to defect, each receives a moderately lower payoff. If one elects to cooperate while the other defects, the defector receives a very high payoff and the cooperator a very low one. The highest social payoffs – the average amount received by all players in the game – come from mutual cooperation, while the lowest social payoff comes from mutual defection. The problem is that no matter what the other player chooses, a player can always improve her own payoff by choosing defection. In Table 1, if player one chooses to cooperate, player two's payoffs are 1 for cooperating and 4 for defecting. If player one instead chooses defection, player two's payoffs are 2 for cooperating and

3 for defecting. No matter what player one chooses, defection increases player two's payoffs. And of course, player one's payoffs are the same as player two's, leading to a situation where each player's choices increases his individual payoff and leads to an outcome where the joint payoff for the pair is the smallest.

[Insert Table 1 here]

The buyer's and seller's complex contracting strategy options are analogous to prisoners' dilemma strategies. Perfunctory performance is analogous to defecting: it increases the performer's gains but by a smaller amount than it causes in losses for the other party. Consummate behavior likewise costs the performer some amount, but produces greater gains for the other party. Consummate behavior produces the higher mutual payoff for both, but risks the suckers payoff (a payoff of 1 in Table 1) if the other player elects to pursue perfunctory performance.<sup>5</sup> The reality of contracting is obviously more complicated than the simple game we lay out here. External factors may also influence contract outcomes. For example, returning to our game of pick-up basketball, a wet spot on the court may cause two opposing players to inadvertently careen into each other, causing a significant disruption in play and potential harm to each player. Each player may perceive that the harm (or potential harm) done to them resulted from the perceived aggressiveness of the other player, when in fact underlying conditions caused the mishap. Uncertainty about these external factors or ambiguity about the impact of future events or states (Heide and Miner 1992) can undermine the prospects of cooperation. Consequently, we keep our focus at this point on the

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<sup>5</sup> Our examples assume symmetrical payoffs for buyers and sellers. In practice, one side's advantages are likely to be greater, although the underlying logic of our theory holds so long as each side has some lock-in advantage over the other.

behavior of the two parties to the exchange. Solutions to the complex contracting prisoner's dilemma need promote cooperation.

### **Solving the Dilemma: Binding Commitments and Reputations**

We can draw on collective action theory to suggest solutions to the collective action problems that arise in complex contracting. Achieving win-win outcomes in a prisoners' dilemma requires the players' incentives be changed so that cooperation becomes both the individual and collectively beneficial outcome for both sides. Here we draw on the collective action literature for guidance in transforming lose-lose conflict into win-win cooperation (Lichbach 1996). One class of solutions is for the actors to adopt binding institutional commitments, such as imposing the specter of punishment for non-cooperative behavior (i.e., financial penalties, legal). A second class of solutions is to burnish or tarnish actors' reputations in response to their cooperative or non-cooperative behavior. These solutions have both internal and external variants. An internal solution uses only the relation between the two parties in the game by looking to restructure the payoffs so that cooperation becomes more likely. An external solution draws on the influence of parties external to the game to achieve cooperation by altering the players' payoffs within the game. Fortunately, these solutions—building a reputation for cooperation and adopting binding institutional commitments—have real-world counterparts that /care available to buyers and sellers. For example, many contract award procedures include allowing a buyer to evaluate a seller's past performance and reputation as a component of the award decision. Similarly, sellers often impose some degree of higher cost on buyers that are reputed to be difficult to deal with or engage in perfunctory behaviors. Because markets for many products and services have some degree of competition pre-award, information is used to signal rewards or potential future penalties for the

type of behavior enacted in the contract exchange. Below we discuss internal and external varieties of the binding institutional commitments and reputational solutions to the prisoners' dilemma game.

### *Binding Commitments*

One approach to solving the complex contracting dilemma is for the buyer and seller to pursue binding credible commitments to cooperate. Such a commitment may be a simple promise to forgo opportunities for unilateral gain where such opportunities also produce greater losses for the other side. Such promises are weak solutions because in a single iteration game they do not change the players' underlying payoffs, leaving mutual defection the most likely outcome. Promises can be made more credible and effective if they are backed by a mechanism for monitoring and sanctioning each party's behavior. Allowing each side to punish the other for defection can increase cooperation, if the size of the punishments is greater than the gains from defection. Such mutual punishment regimes require that each side be able to accurately discern cooperative behavior from defection, that the transaction costs of administering the punishment are sufficiently low, and that each side have some means for punishing the other. If such internal solutions were practical, they would be written into the contract in the first place.

External binding commitments rely on third parties to ensure both sides cooperate (Milgrom, North, and Weingast 1990; Ostrom 1990). In an externally enforced binding commitment, each side submits their behavior to external monitoring who verifies whether it is cooperative and sanctions defection. Parties have more incentive to cooperate knowing that they and the other side will be sanctioned for defection. A medieval guild, for example, can be seen as a third party that monitored its member's behavior to ensure they treated customers according to a

standard code of conduct. Third parties can be used to monitor each party's behavior to determine if it is consummate or perfunctory. Third party monitoring may include mechanisms for how the buyer monitors the seller, how the seller monitors the buyer, and how third parties can monitor each. However, third parties can raise contracting transaction costs because external enforcement is often costly and requires institutions the parties see as fair and objective.

### *Reputations*

Cooperation in a single shot prisoner's dilemma is difficult to achieve because, barring external sanctioning, defection always produces higher individual payoffs (though lower collective ones). If a game is played many times, cooperation becomes more likely if the players care about future payoffs and their strategies in earlier games affect their opponents strategies in subsequent rounds (Axelrod 1984, Hardin 1982). In such circumstances, the payoffs from strategies in the current round of play reflect not just the payoff from cooperation in the current round, but also the payoffs in later rounds. Tit-for-tat, in which one player reciprocates her partner's previous round move in a repeated play prisoners' dilemma, is a strategy that can be both individually and collectively advantageous. In such cases, defection in the current round may generate a higher payoff in the current round, but may cause greater future losses in future rounds if defection induces future playing partners to be more likely to engage in defection rather than cooperation.

When the same players interact in repeated prisoners' dilemma, cooperative outcomes become possible. Buyers and sellers can initiate a cooperative cycle by voluntarily revealing their consummate behaviors when perfunctory behaviors would have gone undetected, including actions to boost cooperative credibility similar to those of a "gift exchange" (Akerloff 1982). Because reputation building takes time and is expensive, the desire to benefit from an existing trustworthy

reputation may create incentives to shun opportunism. For reciprocity to be achieved in bilateral exchanges there must be some prospect of repeated interaction over some future timeline.

Reputation is an important evaluative mechanism for assessing and signaling consummate behavior. On the positive side, as trust begets more trust over time and good reputations become solidified, a virtuous circle of cooperation may evolve in place of the vicious circle of opportunism predicted in the simple prisoner's dilemma.

Reputations can also have an external role in inducing cooperation in single shot prisoners' dilemma games if players are engaged in multiple sequential games with different players. Sharing a player's choice of cooperation or defection with players in future prisoners' dilemma game has an effect similar to playing a repeated game against the same player: if players care about future returns it can be rational to cooperate in the first round and then choose the same strategy as the other player in her previous game. If both players choose such a tit-for-tat strategy, where they look to their opponents' actions in other games, a virtuous cycle of cooperation becomes possible across multiple, single shot prisoners' dilemma games. For example, perfunctory behavior may damage a firm's reputation, making it a less attractive partner to other future complex contracts, while consummate behavior may signal a more attractive partner. Such external reputational signals are not always clearly communicated. What is required is a mechanism for recording and distributing players' choices and reputations across the players in the different games. This could ensure that each player correctly interprets how cooperation and defection are evaluated over future rounds. In one case, cooperation or defection can be monetized in future rounds where the other party benefits or is sanctioned because of a decisions made in previous rounds. Signaling externally what actions are taken in response to behaviors can lead to more cooperative forms of

behavior, especially where parties fear that a long shadow of the future could preclude them from the potential benefits of such exchanges.

## **Conclusion**

The contract management advice for public managers is unfortunately thin. Public administration graduate programs spend little class time on the subject and professional guidance tends to lack a strategic and analytical focus. The canon of advice is full of items on "steps for effective contracting" and aphorisms such as "don't row, steer!" or "keep 'core government functions' and contract for peripheral activities." Some advice gets condensed into convenient checklists or summaries of "best practices." In political debates, one side warns managers to treat vendors as "treacherous thieves" and the other encourages embracing them as "trusted partners", echoing academic discussions about whether governments should pursue more "relational contracts" grounded in trust and reciprocal relations with vendors

Taken individually the case for each piece of advice seems quite compelling: Steering seems preferable to rowing and checklists can offer helpful reminders to combat information overload. We all want our practices to be "best" and our sellers trustworthy. Yet when governments choose to steer, it's still important for them to at least watch the rowers to keep the boat on course. And even if everyone could agree on a list of government's core functions, some of these government agencies cannot make them on their own and will need to purchase them. Viewed as a whole, however, the contracting advice becomes problematic because so much of it is too vague or contradictory to be of much value to those deciding how and when to use it. Every core government function has been successfully contracted by some government and there is no shortage of contracting scandals for non-core functions. Following "best practices" can be a

straightjacket that stifles creativity. The checklists have different items and are so long and detailed that paying close attention to every item on the list requires some heavy rowing. While trust is certainly valuable, it's not clear what managers should do to build trust: if I end up buying substandard office supplies, I'm probably better off finding a new vendor than trying to build a more "trusting partnership" with my current one.

Each item in the contracting canon offers its guidance without clear guidelines for choosing the conditions under it should be applied. Contracting is contingent: win-win outcomes for buyers and sellers are more likely in some scenarios than others, and the suitability of contract management strategies depends on many elements, including the unique contextual conditions in which contracting occurs. No contracting approach works for all the different things that governments consider buying.

The distinction between complex and simple products sheds light on how public managers can use the contracting canon more strategically. The "simpler" the product the easier it is for government managers to "steer": simple products require fewer hands on contract management. Many "core" government functions (policing, social services, etc) are clearly complex products just as many "peripheral" functions are simple products (building maintenance, etc). Much of the other contracting canon can be read as a way to transform "complex" products into "simpler" ones. Contracting checklists contain many items for gathering information necessary to contract for complex products: information about cost, quality and quantity tradeoffs, the reputation of the vendor, mechanisms for verifying the quality of the product before delivery, and so on. And while the fruits of trust and cooperation in contracting are highest for complex products, so too are the downside risks when trust breaks down and the contracts fail.

Aphorisms, lists, and prescriptive best practices are not the only or perhaps even the best approaches to thinking about contract governance challenges. An alternative way of thinking about contracting decisions is to draw from social science theory to inform and support decision making. The theoretical discussion in this paper suggests some contract design principles for complex products. First, as with any contract, property rights need to be clearly defined. This means both ex ante contract terms defining the terms of exchange as well terms delineating roles and responsibilities for ex post negotiations. Second, credible information about each party's consummate and perfunctory behavior as well as about the qualities and tradeoffs of the product can improve outcomes. Third, repeated interaction allows the opportunity for tit-for-tat strategies and reputations to improve the likelihood of win-win cooperation. Finally, third parties can be used for verification of information, enforcing property rights, and resolving contract ambiguities through remediation.

These are not cookbook recipes, but rather a set of guideposts for thinking analytically about how to solve a problem. In the case of complex contracting, the problem is developing a contract between a buyer and seller where there is information uncertainty, risk, and the potential for lock-in problems. Under such conditions, contracting becomes a relationship in which each side can behave cooperatively or perfunctorily, with payoffs resembling those of a prisoners' dilemma. Collective action problems can be solved, through binding commitments and the use of reputation. But these solutions are contingent and have their own strengths and weaknesses, which means the value of different solutions varies under different conditions.

**Table 1: A Simple Prisoners' Dilemma**

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		<i>Player 2</i>	
		Cooperate	Defect
<i>Player 1</i>	Cooperate	3, 3 S, B	1, 4 S, B
	Defect	4, 1 S, B	2, 2 S, B

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