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A New Guide to Government's "Make-or-Buy?" Decisions: Leveraging Transaction Cost Economics (TCE)

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Leveraging Transaction Cost Economics (TCE)

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DISCLAIMER

"[T]he operation of the market costs something and by forming an organization and allowing some authority to direct resources, certain [transaction] costs are saved."

(Coase, p.392)

1. INTRODUCTION

Transactions Cost Economics (TCE) examines the boundaries of a firm in terms of its "make-or-buy" decisions. (Coase, 1937) Similarly, the boundaries of government agencies like the U.S. Department of Defense (DoD) are increasingly shaped by public-private (make-or-buy) competitions—or what the military calls "competitive sourcing." The key contribution of this paper is to apply lessons from TCE to develop new insights into public-private competitions. This effort leads to two important policy recommendations. First, one size does not fit all. To declare a victor in public-private competitions, the Office of Management and Budget (OMB) should apply different decision rules to different classes of transactions. Second, if the private sector wins, the type of contract chosen to govern the relationship should be based on an understanding of key characteristics that define the different classes of transactions.[1]

In launching the reinventing government movement, Osborne and Gaebler (1992) renewed interest in reviewing government support activities to assess whether savings might exist from outsourcing more government work to the private sector. At the federal level, these assessments have taken the form of public-private competitions guided by OMB Circular A-76 (OMB, 2003). Today, a single decision rule applies across-the-board. Regardless of the transaction, a private firm is declared the winner if *production-cost* savings from outsourcing are at least 10% or $10million (whichever is smaller) below the public alternative. Presumably, the differential is to compensate for the costs

of transitioning from the government to the private sector. What is missing is an explicit assessment of transaction costs.[2]

The TCE literature emphasizes the importance of counting both production and transaction costs in the "make-or-buy" decision. Applying TCE to evaluate OMB's decision rule reveals two important cases. The first involves a class of "good candidates" that represent missed opportunities to outsource. The second involves a class of "challenging candidates" where outsourcing might be regretted.

According to TCE, production-cost savings are neither necessary nor sufficient to warrant outsourcing. A missed opportunity can arise when a competitive sourcing decision focuses on *production* cost savings and ignores potential *transaction* cost savings. Where there are sufficiently low external transaction (and transition) costs, the threshold (10% or $10 million) production cost savings required to outsource might be too high. For instance, take an extreme case where internal suppliers enjoy a production-cost advantage, but where internal transaction costs (managing and monitoring personnel, sub-optimization, multi-tasking, etc.) are high enough to offset that advantage. Then even if private suppliers have higher *production costs*, if the *transaction costs* of contracting with them are low enough, this is still a "good candidate" for outsourcing. Since OMB's decision rule focuses exclusively on production cost savings, it misses opportunities to outsource.

The second case involves regretting an outsourcing decision. This can happen when external transaction (and transition) costs end up swamping the (10% or $10 million) production cost savings. Besides the usual quality, schedule and security concerns,[3] relying on external suppliers entails risks of opportunistic behavior along with

extra costs to manage the outsourcing transaction. In the case of "challenging candidates," high transaction costs can neutralize any production cost advantages used to justify outsourcing, leading organizations to regret the decision to outsource.

TCE offers a powerful analytical framework to help answer government's make-or-buy decisions, and in the case of outsourcing, to guide the type of contract. TCE views organizations as a web of contractual relationships. Each relationship—the acquisition of an input, employment of a worker, the exchange of a product or service between supplier and customer—is a transaction. Understanding the basic characteristics of a transaction is the key to answering the "make-or-buy" decision.[4]

Two costs typically drive an organization's "make-or-buy" decisions: production costs and transaction costs. Conventional economic analysis focuses on production costs (economies of scale and scope, learning curves, etc.). The "buy" (or outsourcing) option is routinely prescribed whenever external production costs are substantially lower than internal production costs. Although recognizing the importance of production cost savings in the decision to outsource, TCE emphasizes another key factor, transaction costs (e.g. search and information costs; bargaining, decision and contracting costs; and monitoring and enforcement costs). As Oliver Williamson rhetorically queries:

"What…does zero transaction costs mean? All of the relevant information is freely available and can be costlessly processed by the participants? Comprehensive contracting is feasible? Actions can be costlessly monitored? Decisions will always be made in a benign way?" [1999 p.316]

Regardless of the collective choice of voters on the appropriate scale of government, the fact remains many underlying support activities required for day-to-day government operations (accounting, personnel management, facilities management, customer service, etc.) can be provided by markets. This leaves public officials with the key challenge of government outsourcing.[5] Which support activities should the

government *make* itself and which should it *buy* in the marketplace? Whereas TCE offers an attractive theoretical foundation for a firm's "make-or-buy?" decisions (Coase (1937), Williamson (1971,1979), Alchian & Demsetz (1972), Klein, Crawford & Alchian (1978), etc.), it is rarely applied in a government setting (Pint & Baldwin (1997), Weingast & Marshall (1988), and Williamson (1999) are notable exceptions). The objective of this paper is to enlist the aid of a stylized bargaining game to apply key insights of TCE to help frame government "make-or-buy?" decisions.

Transaction costs typically faced by organizations dealing with outside suppliers include costs associated with: source selection; periodic competition and renegotiation; contract management; and measuring and monitoring performance. Coase (1937) was among the first to discuss how since market transactions are costly to manage, "by forming an [internal support] organization and allowing some authority to direct resources [internally], certain [transaction] costs are saved." (p. 392)   However, the cure—vertically integrating transactions inside the firm (or "make")—can be worse than the disease.

Examples of transaction costs that occur inside an organization include the costs of managing and monitoring employees and purchasing inputs. In fact, supplanting the market price mechanism requires internal coordination that involves some risks.[6] These include the risk of internal opportunistic behavior (costly lobbying for higher salaries or budget increases), multi-tasking ("what gets measured gets done"), and sub-optimization (success achieved at lower levels at the expense of the overall welfare of the organization).

The TCE literature evaluates the cost of both internal and external transactions to help guide make-or-buy decisions. While the literature focuses almost exclusively on business decisions, the goal of this paper is to integrate and apply key principles of TCE to guide government decisions. Government make-or-buy decisions mostly take the form of public-private competitions, or "competitive sourcing."

The issue of competitive sourcing is redefining the federal government. For example, what fraction of the defense budget should government "make" (or in-source), and what fraction should it "buy" (or out-source) in private markets?[7] The Department of Defense has been actively engaged in competitive sourcing (public-private competitions) for decades. Table 1 lists the top 15 items outsourced by the Pentagon from 1998-2003.

Table 1: **The top 15 items the Pentagon outsourced from 1998 to 2003** (L. Makison "Outsourcing the Pentagon," The Center for Public Integrity, Wash. D.C. Sept. 29. 2004 (**www.publicintegrity.org**)

Category	Cost ($bil)
Research & Development	140.2
Aircraft & Airframe Structural Components	86.5
Professional, Administrative & Mgmt Support Services	73.6
Construction of Structures & Facilities	42.4
Equipment Maint., Repair & Rebuilding	42.4
Maint. & Repair of Real Property	34.4
Data Processing & Telecom Services	33.0
Ships, Small Craft, Pontoons and Floating Devices	31.2
Communications and Detection Equipment	28.3
Medical Services	24.6
Fuels, Oils and Lubricants	24.5
Engines, Turbines and Components	23.3
Guided Missiles	22.8
Utilities, Food Service, Janitorial and Housekeeping	22.6
Transportation, Travel and Relocation Services	18.1

A recent study by Gansler & Lucyshyn reveals that since 1995, competitive sourcing initiatives have involved more than 65,000 Department of Defense (DoD) civilian positions and have yielded an average estimated savings of 44 percent of baseline costs, for a cumulative total of $11.2 billion dollars.[8] Although private contractors won a slight majority of these competitions (56 percent), the trend appears to favor public providers.[9] By 2003, in-house bidders won nearly twice as many competitions as contractors.[10]

The next section offers an overview of competitive sourcing. Section 3 provides a brief review and synthesis of the TCE literature in the context of a simple game theory model. Section 4 discusses new insights generated by the TCE model that can help guide government's competitive sourcing decisions. Section 5 discusses the choice of contract type to govern federal outsourcing decisions. Section 6 summarizes our results and offers a few policy recommendations.

2.   COMPETITIVE SOURCING

Every organization must decide how much of their production and support activities will be conducted within the boundaries of the organization ("make"), and how much will be performed outside the organization ("buy"). The typical competitive sourcing process can be broken down into six steps: 1) Identify Functions to be Competed; 2) Evaluate the Functions to be Competed (define baseline costs and performance); 3) Prepare a Comprehensive Request for Proposals (RFP); 4) Identify Potential Vendors (perform due diligence), 5) Select a Vendor (or multiple vendors); 6) Negotiate a Contract (including price and performance targets and incentives for improvement). The first two steps involve defining the product or service, the next two,

evaluating alternative sources of supply (public and private), and the last two, choosing a provider. TCE emphasizes a final step often overlooked in the make-or-buy decision process: forecasting the cost of managing the contract, including measuring and monitoring performance.

As in game theory, it helps to look forward and reason back. If it appears managing the contract (including future competitions and/or renegotiations), and evaluating and monitoring performance, are likely to be costly (in terms of dollars or disputes), then this should be taken into account in the original make-or-buy decision, as well as in negotiating the contract type.

Table 2 illustrates the outcome of over two thousand competitive sourcing competitions conducted by the U.S. Military over the period 1978-1994. (Trunkey, *et. al*., 1996) The competitions resulted in nearly an even split between continued public provision and decisions to outsource.

TABLE 2: Public-Private A-76 Competitions in the Military

GOGO=Government Owned Government Operated   Trunkey, et.al., 1996
COCO=Contractor Owned Contractor Operated

	COMPS	% GOGO WINS	% COCO WINS
DoD	54	54	46
Army	466	48	52
Air Force	760	60	40
Marines	44	41	59
Navy	807	43	57
		49	51

COMPETITIONS (1978-1994)

% GOGO WINS vs % COCO WINS (1978-1994)
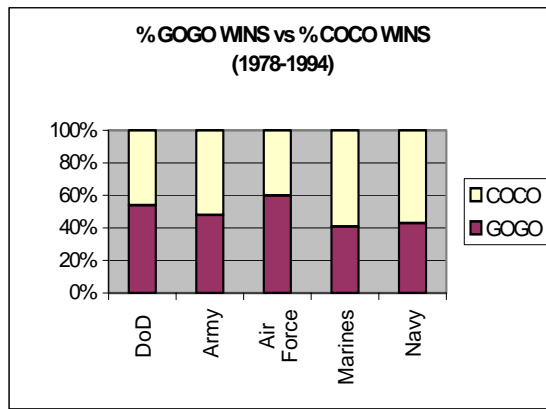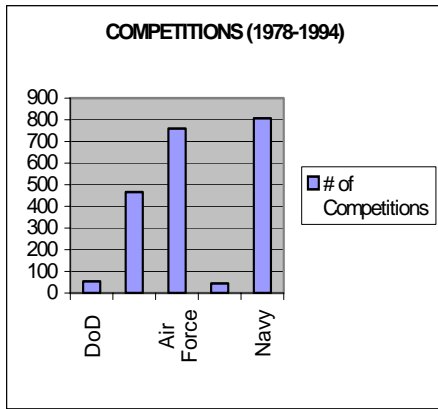
OMB Circular A-76 governs competitive sourcing initiatives. It requires the classification of all activities into two categories: "commercial" or "inherently governmental." Attachment A (Inventory Process) guides the selection of government activities deemed "commercial" in nature. Commercial activities are those "subject to the forces of competition." Attachment B (Public-Private Competition) specifies the competitive sourcing process.[11] Finally, Attachment C (Calculating Public-Private Competition Costs) specifies the rules and procedures for (mostly production) cost calculations. The policies and procedures that govern outsourcing at the federal level appear in OMB Circular A-76. According to the documents, five steps are required to conduct a public-private competition for an activity currently done by the government. The competitive sourcing process is summarized in Table 3 (also see Appendix).

**TABLE 3: The Competitive Sourcing Process in Brief**

1. Develop a Performance Work Statement (PWS) to define performance and a Quality Assurance Surveillance Plan (QASP) to measure performance.
2. Construct a Most Efficient Organization (MEO) for the in-sourcing (in-house) cost estimate
3. Prepare an Invitation for Bid (IFB) for well-defined, routine commercial activities, or a Request for Proposal (RFP) for ill-defined, complex, uncertain projects that involve specific assets.
4. Compare bids or proposals with the in-house estimate and select a winner. In the case of an IFB, the concern is to minimize costs. In the case of an RFP, the concern is cost-effectiveness. In the case of an IFB continue to in-source unless the government can obtain equivalent performance and threshold savings are above 10% of direct personnel costs or a cumulative $10million over the performance period. The same holds for the case of RFP, with the further possibility of outsourcing if it is judged significantly better performance can be achieved at the same cost as the MEO.
5. Address appeals.

The concept of competitive sourcing takes many of its lessons from the private sector. Companies tend to specialize in those "core" activities in which they have a comparative advantage, and "transact" with outside suppliers (or outsource) to acquire other goods and services. A key contribution of TCE is to introduce the nontrivial costs of managing these transactions into the "make-or-buy" decision. The question is whether resource inputs or intermediate activities should be produced internally (vertically integrated), or should be "outsourced"—i.e. purchased in spot markets or contracted through suppliers? The two costs that drive the "make-or-buy" decision in TCE are production costs and transaction costs. Answers to the make-or-buy decision ultimately define the boundaries of an organization.

Figure 1 offers a simple "make-or-buy decision tree." The recommendation whether to in-source (make) or outsource (buy) accounts for both Production Costs and Transaction Costs (TC).

Figure 1

[Competitive Sourcing Decision Tree]
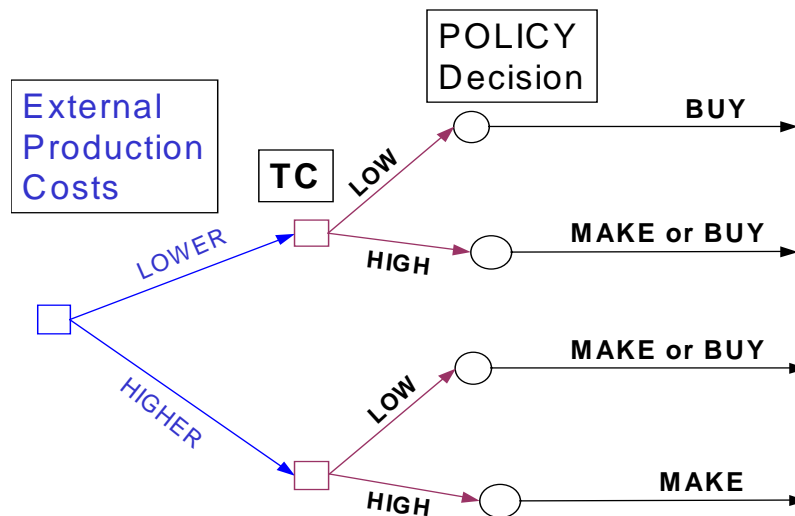
For instance, if the organization is conducting an activity where there exists "LOWER" *external* production costs, and outsourcing would involve "LOW" transaction costs (TC), then the policy decision is to "BUY" (or outsource). The higher the expected transaction costs (to manage the supply relationship), the lower external production cost (or the greater production cost savings) must be to support the decision to "BUY" or outsource.

In TCE the decision to outsource depends on an expectation of positive net savings, where: Net Savings = Production Cost Savings + Transaction Cost Savings. In Figure 1, if *external production costs* are "HIGHER" than *internal production costs*, and external *transaction costs* are also "HIGH," then the policy decision is to "MAKE" (or in-source). However, it is still possible to justify outsourcing if an internal production cost advantage is more than offset by sufficiently high internal transaction costs. In this case, if "HIGHER" external production costs are offset by sufficiently "LOW" external transaction costs, it might still pay to "BUY" (or outsource).[12] (See Figure 1)

Higher external production costs could look like a bargain to an organization if that organization suffers from sufficiently high internal *transaction costs* to conduct that activity. This is a key result that suggests OMB should reconsider its policy governing the choice of winner in public-private competitions. The current decision rule may be overlooking "good candidates," missing opportunities to outsource. Combining production and transaction costs advocates for a change in OMB policy.

Two key components of the "make-or-buy" decision are highlighted in TCE: coordination and motivation. The issue of coordination arises from the economic opportunity for specialization and exchange. Traditional economic analysis focuses on *productive* (cooperative) exchanges between parties that specialize in different activities. These transactions can generate substantial gains for the parties involved. The gain or "surplus" generated through specialization and exchange can take the form of more and better output, delivered more quickly, and with fewer resources. TCE recognizes these potential gains, but also acknowledges the dark side of the coordination problem— motivation.

TCE predicts parties involved in a transaction may benefit from cooperation and thereby generate a surplus. However, since they are assumed to be self-interested and opportunistic, they will not necessarily have the motivation to do so—particularly when specific assets[13] are involved and information is imperfect (incomplete or uncertain) and asymmetric. Whereas outsourcing opens possibilities of production cost savings, it exposes the organization to the costs of managing the outsourcing relationship and to the risks of bad (opportunistic) behavior on the part of outsourcing partners. Relation-specific

investments can improve the efficiency of some transactions. Investments in relationship specific assets can take on a variety of characteristics, including:

> **Site or Location specificity**:e.g., investments that locate the supplier's production facility close to its customer;

> **Physical asset specificity**: e.g., specialized investments by the supplier in plant and/or equipment tailored to the customer's needs, that are much less profitable if shifted to serve other customers;

> **Human asset specificity**: e.g., specialized investments by the supplier's work force in skills and knowledge oriented toward the primary customer's needs that are less valuable in transactions with other customers

> **Dedicated asset specificity**: e.g., specialized investments in excess capacity that provides a contingency in the event of a surge in demand

> **Temporal specificity**: e.g. specialized investments in potential bottleneck activities or assets that guarantee the timing of deliveries (just-in-time), scheduling in construction, or supply reinforcements in battle may be an issue in meeting surge requirements.

Relationship-specific investments are potentially valuable, but can increase risks to both parties. Having made a specialized investment (in location, physical, human, or dedicated assets), the supplier becomes the most efficient provider, and thus has an incentive to look for opportunities to extract more of the surplus (say by demanding steep prices for any slight changes to the contract). If a customer is "locked in" they may have little recourse. During the process of executing an outsourcing agreement, suppliers can acquire expertise in specific systems that confer a form of asset specificity. At some point, the relationship is transformed from a customer having the choice of a number of competing suppliers to a bi-lateral monopoly relationship between a single buyer and

single seller. At this point, close-in bilateral bargaining replaces the impersonal (arms-length) arrangements of the competitive marketplace.

Outsourcing relationships of this type entail a *basic transformation* of the supplier from competitive bidder (prior to source selection) to monopoly supplier (after source selection), especially if there are no close substitutes for this particular contractor's services. Accordingly, the customer is now vulnerable to "opportunistic behavior"[14] from the contractor. Unforeseen circumstances combined with newly inelastic demand may prompt the supplier to extract more of the surplus created in the relationship.[15] The supplier can exploit its power in the relationship to renegotiate the basic agreement to its advantage, otherwise threatening to dissolve the agreement. The TCE literature refers to this as a "hold-up."[16]

Both parties to the transaction might be tempted to behave opportunistically, if they feel they can capture the value of specific investments made by the other. For example, either party can hold up the other by threatening to change the terms of the contract (relationship). If the supplier makes specific investments in assets that are only valuable in the context of the relationship with a specific customer, it is vulnerable to any changes in demand from that customer. Whereas relation-specific investments increase the total gains from the outsourcing arrangement, they also increase risks of opportunistic behavior, where either party can hold up the other. The danger is that if neither party feels like it can recover the full costs of its investment in the relationship/transaction (say through a continuation or renewal of the contract), then efficiency generating specific investments will not be made, resulting in higher costs, schedule delays or lower quality.[17]

While corporate partnerships and relation-specific investments increase the benefits to both parties, they leave both vulnerable to opportunistic behavior, or a holdup, by the other party. These vulnerabilities can be overcome with well-crafted contracts. However, contracting (a) involves an expenditure of resources, and (b) cannot eliminate all risks associated with opportunistic behavior from partners in the transaction.[18]

The process of contracting includes drafting the relevant documents, negotiating a version of the contract that is signed, taking actions to enforce that contract, and renegotiating when needed. These tasks entail, at minimum, the services of skilled people who develop local knowledge of the specific business relationship. There may also be costs associated with litigation, to include both direct (e.g., monetary) and indirect (e.g., time delay) components. Furthermore, the basic contract may well need considerable administrative and management attention throughout its life, even if full-scale renegotiation is not undertaken. Accomplishing these tasks satisfactorily involves expenditure of resources and management attention. Transaction costs (source selection, contract management and performance monitoring) can negate a significant portion of the production cost savings involved with outsourcing.

The interaction of opportunism with imperfect and asymmetric information raises the possibility of unproductive bargaining/influence or rent-seeking activities.[19] The ultimate outcome—a balance of productive efforts and unproductive bargaining—depends on the characteristics of the transaction, and the incentive structures that govern the parties involved.[20]

3. A TCE Bargaining Game

In TCE, whereas parties involved in a transaction may benefit from cooperation and thereby generate a surplus, since they are assumed to be self-interested and opportunistic they will not necessarily have the motivation to do so—particularly when specific assets are involved and information is imperfect (incomplete or uncertain) and asymmetric. The interaction of opportunism with imperfect and asymmetric information raises the possibility of unproductive bargaining/influence or rent-seeking activities.[21] The ultimate outcome—a balance of productive efforts and unproductive bargaining—depends on the characteristics of the transaction, and the incentive structures that govern the parties involved. In TCE, the successful resolution of resource allocation problems rests on designing mechanisms (markets, contracts, organizations, etc.) that allow opportunistic individuals to overcome their collective action problems in pursuit of gains from exchange. (Williamson and Masten 1999)

In the stylized bilateral bargaining game below, two parties to a transaction each engage in measures and countermeasures—*unproductive* bargaining/influence or rent-seeking activities—to preserve, capture, or extract a larger share of a *surplus*. The surplus itself is generated endogenously through the combined actions—*productive* efforts/investments—of the two players. The combined costs of productive and unproductive activities (to generate and capture the surplus respectively) are assumed to dilute the surplus. This simple bargaining game generates interesting and intuitive comparative static results that reinforce the potential for TCE to guide government outsourcing decisions. The results of the model are later applied to investigate regulations embedded in OMB A-76 that govern most federal public-private competitions.

An underlying objective of TCE is to contribute to the design of contracts, organizations, and other governance structures that reduce transaction costs and improve the gains from exchange. In the stylized bargaining game below increasing the gains or surplus enjoyed by parties to a transaction depends on encouraging productive effort and discouraging unproductive influence and rent-seeking activities.

The game is developed between two parties in a transaction (i=1,2) whose combined productive *efforts*, e_i, endogenously generate the surplus:

(1) $S = Ae_1^{\alpha_1}e_2^{\alpha_2}$; where the standard Cobb-Douglas assumptions are satisfied.

In the case of government outsourcing, the two parties might be an internal government customer and external private contractor.[22]

Each player can also engage in unproductive *bargaining*, b_i. This influence and rent-seeking activity consists of measures and counter-measures designed to preserve, capture or extract a larger share of the surplus. While *effort* expands S for both parties in the transaction, *bargaining* determines the share each player realizes. The combined costs of engaging in productive and unproductive activities (to generate and capture the surplus respectively) are assumed to dilute the share of surplus enjoyed by each player.

Player 1 chooses productive effort, e_1, and unproductive bargaining, b_1, to maximize its utility function:

(2a) $U_1 = [1/2 + (b_1^{\sigma} - b_2^{\sigma}) - (1/2)(\gamma_1 b_1^2 + \beta_1 e_1^2)]S$;

Similarly, player 2 chooses e_2 and b_2 to maximize its utility function:

(2b) $U_2 = [1/2 + (b_2^{\sigma} - b_1^{\sigma}) - (1/2)(\gamma_2 b_2^2 + \beta_2 e_2^2)]S$.

The first two terms in brackets in (2a,b) represent the net benefit to each player above ½ derived from bargaining over their share of the surplus, S. The last term represents the

quadratic costs to each player of engaging in unproductive bargaining activities and productive efforts (respectively), as a share of S.

From (1), the parameter associated with the marginal benefit of *effort* (for each player I=1,2) is α_i. From (2a,b), the parameter associated with the marginal cost of *effort* is β_i. Meanwhile, the parameter associated with the marginal cost of *bargaining* is γ_i. Under the simplifying assumption the marginal benefit of *bargaining* (σ) is the same for both players, the first order conditions (four equations derived from maximizing 2a with respect to e_1 and b_1, and 2b with respect to e_2 and b_2) can be solved independently for the optimal bargaining activity of each player:

(3a) $b_1^* = (\sigma / \gamma_1)^{1/(2-\sigma)}$,

and

(3b) $b_2^* = (\sigma / \gamma_2)^{1/(2-\sigma)}$.

Substituting (3a,b) into the first order conditions yields the optimal effort contributed by each player:

(4a) $e_1^* = \{2\alpha_1 /(\beta_1(2+\alpha_1)[1/2 + (b_1^* - b_2^*) - (\gamma_1/2)(b_1^*)^2]\}^{1/2}$,

and

(4b) $e_2^* = \{2\alpha_2 /(\beta_2(2+\alpha_2)[1/2 + (b_2^* - b_1^*) - (\gamma_2/2)(b_2^*)^2]\}^{1/2}$.

This combined effort generates the surplus (substituting (4a,b) into (1)):

(1') $S^* = A(e_1^*)^{\sigma_1}(e_2^*)^{\sigma_2}$.

Finally, substituting (3a,b), (4a,b) and (1') into (2a,b) yields the utility each player achieves as a result of the joint decisions of the two parties to the transaction: (2a') U_1^*, and (2b') U_2^*.

A reasonable simplifying assumption is that the marginal cost of bargaining is the same for both parties in the transaction, or that $\gamma_1 = \gamma_2 = \gamma$. From (3a,b), this implies symmetric bargaining (or influence) activity by each player at the optimum, or $b_1^* = b_2^* = b^*$. The comparative static results from the model appear in Table 4 below.[23]

<div align="center"><u>TABLE 4: Comparative Static Results</u></div>

		e1	e2	b	S
Productive Effort Parameters	α_1	+	0	0	+
	α_2	0	+	0	+
	β_1	-	0	0	-
	β_2	0	-	0	-
Unproductive Bargaining Parameters	σ	-	-	+	-
	γ	+	+	-	+

TCE emphasizes four key characteristics of transactions: *complexity*, *uncertainty*, *frequency*, and *asset specificity*. In general, the less *complex* and *uncertain* a transaction, the lower the degree of *asset specificity*, and the greater the *frequency*, then the lower β and σ, and the higher γ. From Table 4, at the optimum, reducing β increases productive effort, e_i, and the surplus, or gains from exchange, S. Also from Table 4, reducing σ and increasing γ lowers unproductive bargaining, b, and boosts productive efforts, e_i, and consequently the surplus, S. The higher the combined effort (e) and joint surplus (S), the greater the potential returns from outsourcing.[24]

4. Model Results: Public-Private Competitions

A fundamental insight of TCE is the importance of uncovering both production and transaction costs associated with the "make-or-buy?" decision. Here, comparative static results from Table 4 are applied to the special case of public-private competitions.

This approach reveals characteristics of transactions that can be used to distinguish between two classes of internal government transactions: "good" and "challenging" candidates for outsourcing. Good candidates reveal possible missed opportunities to outsource, and challenging candidates, outsourcing decisions likely to be regretted.

A) Characteristics of "Good Candidates" for Outsourcing

Where a transaction requires little in the way of specific assets (no hold-up problem), and involves a product or service that is a) well-defined and homogeneous (IFB), b) easy to measure (limited complexity and mild information asymmetry), c) routinely used (recurring/frequent purchases), d) not subject to change (limited demand uncertainty), and e) is offered by competing suppliers, then there is little room for negotiation (price and performance are market-driven), and the marginal benefit of unproductive bargaining, σ, is near zero. With little room for bargaining over such routine and uncomplicated transactions substantial production and transaction cost savings can be expected from out-sourcing, or from purchasing directly in spot markets (say over the Internet). This can be seen directly from (3a,b): since if the marginal benefit of bargaining σ =0, then unproductive bargaining b=0.

Moreover, since administrative, incentive, and enforcement costs tend to be low for goods and services produced in competitive markets, the marginal cost of engaging in the transaction, β_i, is small, and the marginal cost of unproductive effort, γ, is high. From Table 4, this encourages greater effort, e_i, and investment in the transaction and, ceteris paribus, tends to generate a larger surplus, S, or a higher return to outsourcing.

In general, the less complex and uncertain a transaction, the easier it is to write an explicit contract that covers all relevant contingencies. Moreover, the lower the

administrative and enforcement costs of that contract, the higher the expected marginal cost of ex-post bargaining or rent-seeking activity (the greater γ), and the lower the expected return from that activity (the smaller σ). From Table 4, it is clear this reduces optimal ex-post bargaining, b, thus lowering transaction costs associated with outsourcing. The favorable characteristics of these so-called good candidates tend to encourage greater productive effort that in turn contributes to a larger surplus enjoyed by both parties, increasing the returns from out-sourcing. [25]

B) Characteristics of "Challenging Candidates" for Outsourcing

More challenging candidates include transactions that involve a non-standard (less homogeneous or highly differentiated) product or service, and thus takes place in a bilateral contractual setting. In this case, assuming no specific assets are required, the results (bargaining, b, effort, e, and surplus, S) depend on the degree of contractual ambiguity governing the transaction, as well as on any administrative and enforcement costs involved. However, as complexity, uncertainty, and opportunism due to specific investments increase, so does the marginal benefit of bargaining or ex-post renegotiation, σ. This results in higher external transaction costs that need to be offset by more substantial production cost savings in order to justify outsourcing. [26]

Productive investment (or effort) involves two types of assets: general and specific. The greater the ratio of specific assets to total investments required in the relationship, the greater the risk of "hold-up." Moreover, as the threat of bilateral dependency increases, the more incomplete the contract (and the lower the penalty for reneging or renegotiation), the lower the marginal cost to each party of engaging in unproductive bargaining or influence activities. In the face of incomplete contracting, the

hold-up problem poses a hazard Williamson calls "maladaptation." The risk of maladaptation is captured here as an increase in the return to both parties in unproductive bargaining or influence activities. As the marginal return to bargaining increases and the marginal cost decreases, a greater amount of unproductive bargaining, and a lower productive effort or investment can be expected which erodes the surplus that can be enjoyed by both parties to the transaction.

Any time ex-ante competition among suppliers is transformed into an ex-post bilaterally dependent relationship additional governance structures may be required to induce cooperative adaptation.[27] The challenge is to write a contract with enough precision to encourage desired performance, but enough flexibility to allow productive adaptation (adjustments), as circumstances require. But in the case of complex transactions and uncertain outcomes, "bounded rationality" precludes comprehensive ex-ante contracting (contracts are inherently incomplete) which raises the possibility of gains from (unproductive) ex-post opportunistic renegotiation (e.g. the "hold-up" problem).

Contracting therefore offers an imperfect solution to opportunism. What is required are additional governance mechanisms (rules and regulations, reputation mechanisms, GOCO, etc.) to settle disputes and adapt to new conditions, and ex ante efforts to screen for reliability and reputation or to safeguard and protect transaction-specific investments (i.e. lowering the marginal return to bargaining, σ, and raising the marginal cost, γ). These structures can include anything from agreements to share and verify cost and performance information through incentive contracts, to the careful crafting of dispute settlement mechanisms. However, such agreements often increase

external transaction costs. The higher external transaction costs, the larger production cost savings need to be to support the decision to outsource.

If such agreements turn out to be too costly to implement and enforce—or "maladaptation hazards" are too great—then out-sourcing can give way to in-sourcing or vertical integration. When asset specificity, bounded rationality, and opportunism make contracting problems too difficult or costly, these problems can be relieved by internalizing transactions. But when transactions are integrated within an organization, transaction cost calculations must also include the cost of managing, monitoring, and motivating activities, and personnel, with low-powered incentives. Some key challenges of internal production include sub-optimization, strategic internal lobbying for resources, multitasking, and the difficulty of coordinating and monitoring the quality, quantity, cost, timeliness and improvement of goods and services.[28]

When asset specificity, bounded rationality (complexity and uncertainty), and opportunism make contracting problems too difficult (or external transaction costs too high), "the problems of incomplete contracting are often relieved by unified ownership."[29] (Williamson 1999 p. xii) But when transactions occur within an organization, calculations must also include the costs of internal coordination and motivation. Whereas vertical integration brings transaction-specific assets under the control of one organization and reduces opportunism from hold-up, hierarchies can't control costs as effectively as markets—or suffer from "low-powered" incentives. Moreover, bounded rationality limits the span of effective internal managerial control, so that lower level managers and employees often engage in multitasking, sub-optimizing, and unproductive rent-seeking behavior. (Prendergast 1999)

Hierarchy in a government organization can lead to legitimate sub-optimization, where the joint pursuit of lower-level goals fails to coincide with the global objectives of the organization. This often happens in the budget planning process with internal lobbying for resources. However, opportunism can compound the problem by introducing strategic efforts to gain local advantage at the expense of the larger group. Sub-optimization can thus expand to include the strategic use of asymmetric information for local benefit. As a consequence, while government in-sourcing can reduce ex-post opportunism due to hold-up, the tradeoff includes: a) low-powered incentives, b) internal opportunistic behavior, and c) an increase in administrative costs. [30]

It is instructive to return to OMB Circular A-76. Examining the threshold cost savings criteria required to declare a victor in public-private competitions, the results of our analysis suggest OMB should review its one-size-fits-all threshold of greater than 10% (or $10 million) estimated production cost savings before a federal activity is outsourced. Applying TCE to evaluate OMB's decision rule reveals two important cases. The first involves missed opportunities to outsource. The second, outsourcing decisions that are likely to be regretted.

A missed opportunity can arise when a decision focuses on *production* cost savings and ignores potential *transaction* cost savings from outsourcing. In the case of what we termed "good candidates" for outsourcing, the threshold production savings specified in OMB A-76 could be reduced considerably, since external transaction costs tend to be low or negligible. Where there are sufficiently low external transaction (and transition) costs, the threshold (10% or $10 million) production cost savings required to outsource might be too high.

The second case involves regretting an outsourcing decision. This can happen when external transaction (and transition) costs end up swamping the (10% or $10 million) production cost savings. For the "challenging candidates," the 10 percent or $10 million threshold of production cost savings might need to be raised to account for the likelihood of substantial external transaction costs required to govern the ongoing relationship—including encouraging productive effort and discouraging unproductive bargaining (hold-ups and renegotiation).

5. Choosing a Contract Type

An underlying objective of TCE is to contribute to the design of contracts, organizations, and other governance structures that reduce transaction costs and improve the gains from exchange. TCE recognizes that transactions can be organized under a spectrum of governance structures ranging from vertical integration (make) to markets (buy). Between these two poles are contracts of increasing duration and complexity— from Fixed Price (FP) to Cost Plus (C+)), and from simple short-term contracts, to incentive, long-term, and relational contracts. (see McAfee & McMillan 1988) Outsourcing involves a move away from vertical integration, to spot market transactions or one of the intermediate or "hybrid" contracting options. A crucial insight of TCE is that different ex-ante contracts offer different incentives for unproductive ex-post bargaining and influence activities.

Four main contract types are specified for out-sourcing under OMB A-76 : Sealed bid, firm fix price (FP), Cost sharing and Incentive Fee (C+), and Time & Material. Table 5 reveals the types of outsourcing contracts under which the top 10 military contractors operated over the period 1998-2003

Table 5: Details on the type of contracts won by he top 10 unclassified contractors on items outsourced by the Pentagon from 1998 to 2003. Percent of contracts awarded that were Cost-Plus, Fixed Price and Time & Materials. (L. Makison "Outsourcing the Pentagon," The Center for Public Integrity, Wash. D.C. Sept. 29. 2004 (www.publicintegrity.org)

Category	Cost-Plus (C+)	Fixed Price (FP)	Time & Materials
1. Lockheed Martin	50%	47%	2%
2. Boeing Co.	27%	70%	2%
3. Raytheon Co.	38%	58%	3%
4. Northrop Grumman	42%	50%	2%
5. General Dynamics	39%	60%	0%
6. SAIC	52%	21%	15%
7. Carlyle Group	44%	46%	9%
8. Newport News Ship	78%	22%	0%
9. TRW	71%	23%	2%
10. Computer Sciences	41%	26%	24%

If the performance work statement (PWS) describing the desired product, service or project can be specified precisely (IFB), and there are no transaction-specific assets involved, then FP type contracts have the benefit of creating cost-reducing incentives that reward the buyer through ex-ante competition between potential suppliers. In this case, FP contracting increases contractor incentives to invest in cost reduction, and ex-ante competition can transfer these cost-savings directly to the buyer. Since there are no unresolved issues, $\sigma = 0$, and no costly renegotiation occurs ex-post, or b=0.

In contrast, if the PWS cannot be specified precisely (RFP) or there are significant specific assets involved in the transaction, then $\sigma > 0$, and some surplus will be eroded by the frictions of ex-post negotiation, b>0. This loss from bargaining activity is part of the cost of using a FP contract in this case. The more complex and uncertain the transaction, the less complete the PWS, the greater the cost in using FP, and the more attractive other contracting options become.[31]

TCE emphasizes four key characteristics of transactions: *complexity*, *uncertainty*, *frequency*, and *asset specificity*. Evidence uncovered by Bajari and Tadelis (1999) reveals that in cases where a construction transaction is easy to define and measure—i.e. there is little complexity, and only a few minor changes are expected—i.e. there is little uncertainty, FP type contracts tend to dominate. However, the more complex the transaction—the more difficult/costly it is to define and measure performance, and the more uncertain—the more likely it is a change in the contract will be required, the more severe the adversarial relationships experienced ex-post when FP contracts were chosen. In the latter case, FP type contracts often ended in costly renegotiations where any surplus generated was dissipated in the course of those negotiations through unproductive bargaining and influence activities. Thus, *complexity* and *uncertainty* can force parties to turn away from FP type contracts and towards C+ type contracts, and to rely heavily on reputation and other enforcement mechanisms, to avoid ex-post opportunistic behavior that threatens to dissipate the surplus generated by a transaction.

Relating these observations to government outsourcing, empirical evidence uncovered by Crocker and Reynolds (1993) for the manufacture of U.S. Air Force aircraft engines mirror the findings in Bajari and Tadelis (1999). In the initial production stages—when modifications were expected—contracts that governed transactions tended to be of the cost reimbursement variety (C+). In the later production stages—after initial problems had been ironed out—contracts tended to be of the fixed price variety (FP). For purposes of illustration, Table 6 summarizes prescribed contract types employed by the U.S. Air Force and Navy at each stage of development of a new product. (see http://cno-n6.hq.navy.mil and Federal Acquisition Institute 1998)

Table 6: Stages of Product Development and Contract Types

Stages of Product Development	Basic Research	Exploratory Development	Test & Demonstration	Full-Scale Development	Production	Follow-on Production & Spares
Contract Specification (PWS)	Not Well-Defined (C+) ←			→	Well-Defined (FP)	
Contract Type (see list below)	C+I	C+I, C+FF	C+I, FPIF	C+I, FP, FPI	FP, FPI, FPEPA	FP, FPI, FPPR
Gov't Cost Risk	High ←				→	Low

1. **Fixed Price Contracts (FP)**
   a. FP—Fixed Price: Ex-ante negotiated contract price is not subject to any adjustment based on actual ex-post costs of performing the contract.
   b. FPI—Fixed Price plus Incentive Fee: Contract provides for incentive based on pre-determined share of actual costs (profits) over (under) target costs (profits), or based on subjective measures of performance against standards. Firm ceiling price limits overall payments.
   c. FPEPA—Fixed Price with Economic Price Adjustment: Contract provides for price adjustments to reflect exogenous cost increases/decreases.
   d. FPPR—Fixed Price with Prospective Re-determination: Contract provides fixed price for first period and timetable for re-pricing over subsequent periods.
2. **Cost Reimbursement Contracts (C+)**
   a. C+FF—Cost-plus-fixed fee: Contract pays allowable costs plus fixed fee (If FF=0 then same as Time & Materials, If FF<0, then Cost Sharing between government and contractor).
   b. C+I—Cost-plus-incentive fee: Contract pays allowable costs plus incentive fee based on assessments of performance (such as actual costs and delivery dates, and/or more subjective measures)

Table 6 indicates FP (C+) type contracts are prescribed in later (earlier) stages of product development when complexity and uncertainty have (have not) been resolved, and the performance work statement is well (not well) defined, and that this results in relatively low (high) risks to the Government. Note that while these prescribed contracts focus on the characteristics of *complexity* and *uncertainty*, apparently overlooked are the vital roles of *frequency* and *asset specificity*—two key components of TCE.

In the case of *frequency*, recurrent transactions often justify the setup costs of specialized assets and special governance requirements. They also offer the opportunity to apply learning curves (cumulative cost-quantity relationships) to lower production

costs, and for gradual reductions in uncertainty as both parties learn more about costs. Recurring transactions also offer the possibility for the accumulation of goodwill and to build reputations..[32]

Ashley & Workman (1986) caution that providing cost incentives in a contract is more likely to lead to disagreements and spoiled relationships and ex-post friction in interpreting the outcomes. In fact, avoiding these frictions and reducing the advantages to renegotiation (or driving σ to 0) can be accomplished by investing in a more complete PWS, and by adopting alternative mechanisms (reputation, GOCO, etc.) to reduce the return from opportunistic behavior. TCE suggests that the degree of completeness of the PWS and the contract is an optimizing decision by both parties that reflects their trade-offs between an ex-ante investment in the PWS and contract design, and the potential ex-post cost of opportunistic renegotiation. Moreover, since the principal insight of TCE is that the choice of optimal governance structure depends on the characteristics of the transaction, the dual focus of any outsourcing evaluation should be: a) to sort transactions into categories based on their principal characteristics (asset specificity, uncertainty, complexity, and frequency), and b) to evaluate the costs and consequences of alternative contracts, organizational structures and mechanisms available to govern those transactions.

6. Conclusions and Policy Recommendations

The key contribution of this paper is to apply lessons from TCE to develop new insights into public-private competitions. The model and discussion leads to two important policy recommendations. First, one size does not fit all. To declare a victor in public-private competitions, the Office of Management and Budget (OMB) should apply

different decision rules to different classes of transactions. Second, if the private sector wins, the type of contract chosen to govern the relationship should be based on an understanding of key characteristics that define the different classes of transactions.[33]

Ideally, contracts can be written that specify measures of performance, conflict resolution procedures, and conditions under which the contract can be modified, as well as provisions for sharing gains from transaction-specific investments.[34] In reality, the tradeoff as it applies to out-sourcing might be stated as follows. On the one hand, efforts to suppress opportunism contractually are limited by the costs of writing and enforcing contractual agreements, and rise with the complexity, uncertainty, and asset specificity associated with the transaction. This works against out-sourcing. On the other hand, while integration within the organization mitigates these problems, internal principal-agent issues arise that sacrifice the high-powered incentives of the market and consequently requires greater monitoring and administrative costs. This works in favor of out-sourcing.

Production-cost savings are neither necessary nor sufficient to warrant outsourcing. Applying TCE to evaluate OMB's "one size fits all" competitive sourcing rule reveals two important cases. The first involves a class of "good candidates" that represent missed opportunities to outsource. The second involves a class of "challenging candidates" where outsourcing might be regretted. In the case of "good candidates," a missed opportunity can arise when a competitive sourcing decision focuses on *production* cost savings and ignores potential *transaction* cost savings. In the case of "challenging candidates," high transaction costs can neutralize production cost savings, leading organizations to regret the decision to outsource.

In evaluating their "make-or-buy?" decisions, TCE recommends firms go beyond evaluating production costs to include transaction costs. It may be time for government to do the same. In summary, like private firms, government "make-or-buy?" decisions should look beyond production cost savings and forecast likely transaction costs associated with outsourcing. Moreover, government rules that prescribe particular contract types should be based on the four principal characteristics of transactions (asset specificity, uncertainty, complexity and frequency), and should offer contracts and mechanisms that encourage productive effort, protect transaction-specific investments, and discourage unproductive bargaining, influence and rent-seeking activities.

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APPENDIX

The competitive sourcing process governed by OMB Circular A-76 consists of several stages summarized below:

1. Create an inventory of agency activities, classify them as commercial or governmental, and determine how to bundle the competition(s).

2. Announce intention to undertake a competitive sourcing study, both to the affected government work force and to potential commercial sources.

3. Develop and announce the terms of the competition to include expectations (Performance Work Statement, PWS), various study teams, and a quality assurance plan (QASP). Specify the criteria for source selection.

4. Issue a solicitation, or Request for Proposal (RFP), seeking bids from the commercial sector.

5. Develop the in-house alternative. This consists of a management plan, cost estimate, performance plan, and transition plan from the current organization to the "Most Efficient Organization" (MEO). This alternative is automatically one of the finalists.

6. Compare the public (in-source) alternative with qualifying private (outsource) proposals both in terms of cost and in meeting the terms of the PWS.

7. Award the contract (issuing agreement), after appeal if applicable. The decision to outsource requires that the private alternative offer cost savings of at least 10 percent or $10 million below the MEO, whichever is less.

8. Transition to the in-house organization (if applicable) or to the winning commercial source.

9. Conduct post-award contract administration (if applicable) and quality assurance.

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[1] These characteristics include: the extent of any relation-specific (site, human or physical) assets that might be required for the transaction; complexity (the degree of uncertainty about demand, quality, cost, etc.); frequency of the transaction; information (asymmetries); market structure; etc.

[2] While the traditional production function approach to public resource management is helpful in relating outputs to inputs and ultimately to *production costs*, it abstracts from several key issues. Perhaps most notable is the "make-or-buy?" decision. The conventional production function view of a public organization is a technological "black box" that converts inputs into outputs. Applied to the public sector, traditional production theory stresses the technological and cost constraints faced by government organizations that transform scarce productive resources into intermediate products or publicly valued final goods and services. In this model, selfless public servants transform inputs into outputs economically and efficiently. Given a budget, the resource manager identifies the most efficient combination of inputs to maximize output. Alternatively, given an output goal, the resource manager identifies the most economical combination of inputs to minimize costs (or the budget). The conventional approach to resource management leaves a host of unanswered questions: What motivation do mangers have to achieve economy and efficiency solutions? How do managers identify and exploit cost-savings and product and process improvements? Which of the raw materials, capital, and other physical resources employed in the production of a good or service will the organization own, and which will it purchase or lease from other firms/organizations? Which of the business activities associated with the production (and distribution) of a product will the organization undertake internally, and which will be performed externally? Which functions will be brought inside the boundaries of the organization and which will be performed by other firms/organizations? What governance structure does the organization adopt and what methods do managers employ to coordinate the various business functions organizations undertake? How do managers appraise and control the performance of the people, equipment and materials under their supervision? An important limitation of neoclassical production theory is that it abstracts from the institutional details that describe how organizations acquire productive resources and how the owners of these resources are compensated.

[3] Enterprise operations involve information, some of which is proprietary, classified or otherwise sensitive. Close coordination with an outside supplier of goods or services involves the exchange of information, some of which is sensitive. Passing this information outside corporate boundaries accordingly lessens ability to control its dissemination. Thus, involving outside suppliers involves risks of compromising corporate (or government) secrets.

[4] Non-core business transactions commonly outsourced by private companies include: IT services; back-office accounting; benefits management; customer service; engineering design; help-desk management and operations; human resource management; legal services; facilities management; physical and electronic

security; printing services; mailroom management and operations; payroll services; some procurement activities; secretarial and administrative support; internal audit and accounting; temporary staffing; transportation, distribution and shipping services; and warehouse management and operation.

[5] In this study, the term "outsourcing" is used to encompass any situation that involves a government evaluation of whether to (continue to) produce a publicly provided good, service, or intermediate product or activity internally, or to purchase it from the private sector. An underlying assumption is that a decision has previously been made—presumably through a democratic process—for government to *provide* the good or service. The outsourcing evaluation determines whether the current government supplier, another government entity, or the private sector is best suited to *produce* it—or any necessary intermediate products or activities. The U.S. Navy uses the term "strategic sourcing," the U.S. Air Force "competitive sourcing" (the British call it "market testing"). Office of Management and Budget (OMB) Circular A-76 spells out rules and procedures that govern outsourcing at the federal level. In the context of this paper "privatization" can be interpreted as the outcome of an outsourcing evaluation where it has been decided the private sector will take over public assets to *produce* the good, service, or intermediate product, and where in many cases the government also relinquishes its role to *provide* it.

[6] Efficient production requires extensive synchronization of a number of complex activities. This is especially true in the practice of "lean" production, featuring "just-in-time" deliveries with attendant reduction in inventory costs. The more complex the transaction, the more difficult (costly) coordination is with an outside enterprise. There may be more commonality of objectives between two divisions of the same enterprise than with an outside firm. Also, any disagreements about deliveries, schedules and similar issues are generally settled more quickly and in ways more suitable to the enterprise if it has authority over all parties. One way to achieve that authority is to "make," i.e. vertically integrate or in-source.

[7] Transaction costs may help to redefine public goods. A government decision to "buy" reveals activities currently done by the public sector that are private goods. A decision to continue to "make" indicates that while it may not meet the traditional definition of a public good, the government can produce it at a lower overall production + transaction cost.

[8] J. Gansler and W. Lucyshyn, "Competitive Sourcing: What Happens to Federal Employees," Wash D.C.: IBM Center for The Business of Government, 2004.

[9] Note that if bureaucratic power increases with the size of a bureau (as suggested by Mueller 1987), then Niskanen's (1968) theory of budget-maximizing bureaucracy lends support to Wagner's (1976) prediction that the public sector share of national income will tend to rise over time—in this example there would appear to be a built-in bias favoring the "make" decision.

[10] The number of bids won by the in-house "most efficient organization" in many cases reflects costs that do not properly account for capital expenses—costs that are generally sunk, and which public sector organizations have difficulty estimating. However, the A-76 process inserts an aspect of competition in providing the services in question; therefore, these public-private competitions can, and often do, result in savings to the government regardless of who wins. In testimony to the Congress in 2000, the General Accounting Office (GAO) reported Department of Defense estimates that 286 of the A-76 competitions completed since 1995—involving some 10,660 government positions—may have generated savings of $290 million in fiscal year 1999. (General Accounting Office, 2000). Part of these estimated cost savings occurred even when the government supplier retained control. Although difficult to calculate, it is likely even more savings were generated from newly contestable internal government markets—or the threat of entry—introduced by A-76 competitions in federal operations. (Baumol, *et. al.*, 1982) Notably absent from these calculations, however, is an explicit account of the costs of conducting the competitions, and the transaction costs associated with implementing newly redesigned programs and the burden of ongoing contract administration—including costs of negotiating, writing, monitoring and enforcing federal contracts. This is a central theme that is addressed in the rest of the paper.

[11] Actually, at least two competition processes—the streamlined process is discussed in Attachment B, Section C; the standard process in Section D.

[12] At first glance, introducing transaction costs into the mix suggests lower external production costs (or positive production cost savings) are necessary but no longer sufficient to justify outsourcing. Now we can see that production cost savings may not even be necessary to justify outsourcing!

[13] Asset specificity comes in a variety of flavors: human, location, physical, etc. These are specialized assets that generate high returns in the context of a specific transaction, but offer very little value outside that relationship.

[14] Williamson defines "opportunism" as "self-interest seeking with guile…"

[15] Besanko and others have labeled the transition from one prospective buyer and many sellers to one buyer and one seller, from competitive market to a one-on-one relationship as the "fundamental transformation." This transformation occurs, at least to a certain extent, after the completion of every source selection process.

[16] An even worse case is the possibility that a holdup might be unilaterally executed. According to Besanko, "a holdup problem arises when a party in a contractual arrangement exploits the other party's vulnerability due to relationship-specific assets."

[17] The result of opportunistic behavior may be adverse selection, ex ante choice of an inferior option (or production technology), or moral hazard, increasing risk that if a relationship specific investment is made, that the other party will exploit the terms of the contract to "hold them up." For example, changes in specifications are frequently used by contractors as an excuse to raise prices and profits under government contracts, especially when specific investments by the contractor create a barrier to the entry of other competitors.

[18] Costs associated with contracting, and the holdup risks remaining are major components of "transactions costs."

[19] The concept of unproductive bargaining and rent-seeking is usually attributed to Tullock (1971), Krueger (1974), and Bhagwati (1980). (also Tullock, 1993) A key insight of this literature is that costly bilateral bargaining by two parties for a bigger share of the surplus they jointly create can dissipate or even eliminate that surplus. (Tullock, 1971)

[20] There are other factors as well. For example, Wolff and Reed (2000) find significant evidence that, *inter alia*, the nature of, and access to, assets in a joint venture are important in predicting the balance of positive sum (productive) and zero sum (unproductive) outcomes for the participants.

[21] The concept of unproductive bargaining and rent-seeking is usually attributed to Tullock (1971), Krueger (1974), and Bhagwati (1980). (also see Tullock 1993) A key insight of this literature is that costly bilateral bargaining by two parties for a bigger share of the surplus they jointly create can dissipate or even eliminate that surplus. [Tullock 1971]

[22] For instance, consider a government customer (or principal) that actively revises rules and regulations to allow more economical or flexible procurement on the part of a private contractor (or agent). This productive effort could lower the agent's input costs, thereby contributing to joint savings or a surplus. Meanwhile, suppose the agent simultaneously engages in productive investments in human capital or new processes that further contribute to the surplus. "By exerting effort the [agent] can hold down its realized costs. For example, it can, at some cost to itself, search for lower-priced raw materials…or it can manage its…inventories so that it is not left holding excessive stocks." [McAfee & McMillan (1988) p.17] The challenge remains how any gains, savings or surpluses are shared between the principal and the agent.

[23] Relaxing the simplifying assumptions that the marginal benefit and costs of bargaining are the same for both players, the simulations reveal much the same results as those reported here for the complete analytical solution.

[24] The lower sigma (the marginal benefit of unproductive bargaining) and the higher gamma (the marginal cost of unproductive bargaining) for any particular activity, the lower the transaction costs of outsourcing.

[25] For purposes of illustration, consider two polar examples: A transaction that involves routine aircraft maintenance, and one that involves defense research & development (R&D) on a major weapon system. In the case of recurring purchases of routine maintenance, the service is relatively homogeneous, not especially complex, and therefore can be well specified. Assuming there are mild information asymmetries and many competing suppliers employing mostly non-specific assets, market governance can be prescribed to minimize both production and transaction costs. Anytime competition exists among suppliers of well-specified homogeneous products, spot market purchases or simple FP contracts generally offer adequate governance structures to induce cooperative adaptation, and minimize transaction costs. If government performs such functions, then public-private competitions are likely to reveal both production and transaction cost savings from outsourcing. In sharp contrast, a complex, nonrecurring defense R&D program involves challenges in specifying the product, service, or project as well as significant technical uncertainty over the results. Moreover, even if the R&D contract is let through ex-ante competitive bidding, "holdup" problems due to asset specificity may present significant cost control and ex-post bilateral dependency hazards. In this case, contracting offers an imperfect solution to opportunism. What is required, are additional governance mechanisms (rules and regulations, reputation mechanisms—ex-ante efforts to screen in terms of reliability and reputation, GOCO—government ownership of specific assets that contractors operate, etc.) to settle disputes, adapt to future conditions, and protect transaction-specific investments.

[26] Productive investment (effort in the model) can be thought of as involving two types of assets: general and specific. The greater the ratio of specific assets to total investment, the greater the risk of "hold-up." Moreover, as the threat of bilateral dependency increases, the more incomplete the contract (and the lower the penalty for reneging or renegotiation), the lower the marginal cost to each party of engaging in unproductive bargaining or influence activities (i.e. the lower γ). In the face of incomplete contracting, the hold-up problem poses a hazard Williamson calls "maladaptation." Maladaptation is captured here as an increase in the return to both parties in unproductive bargaining (i.e. an increase in σ). From Table 3, as σ increases and γ decreases, a greater amount of unproductive bargaining (b), and a lower productive effort or investment (e) can be expected which will lower the surplus (S) enjoyed by both parties to the transaction.

[27] According to Williamson & Masten (1999), the "central problem of economic organization is adaptation." (p.xi) The challenge of adaptation is especially acute when ex-ante competition leads to ex-post monopoly power. Whenever products, services or projects cannot be well specified in advance (due to complexity, uncertainty about future conditions, measurement difficulties, etc.), and they involve transaction-specific assets, then ex-ante competition (e.g. competitive bidding) can lead to ex-post monopoly/monopsony power. In turn, this leads to costly adaptation through bilateral bargaining and renegotiation.

[28] In the first interpretation of the model—an out-sourcing or external bilateral monopoly bargaining setting—we considered ex-post adaptation (bilateral negotiation) between parties to a transaction (based on various assumptions regarding the complexity, uncertainty, and degree of asset specificity involved in the transaction). In a second interpretation of the model—an in-sourcing or internal bureaucratic (or hierarchical) setting—productive and unproductive activities (monitoring and measurement; shirking, and rent-seeking, etc.) engaged in by a principal (the boss or internal customer) and agent (the worker or internal supplier) can be studied using the stylized game model developed earlier.

[29] If such agreements turn out to be too costly to implement and enforce—or "maladaptation hazards" are too great—then out-sourcing can give way to in-sourcing (or vertical integration). [see Williamson 1999] An important result of TCE is that internalizing transactions can reduce customer and provider incentives to engage in opportunistic behavior, and promotes the sharing of specialized information. Internalizing some activities under the direct control of a manager can economize on transaction costs and (together with production cost considerations) these cost savings provide an efficiency basis for defining the boundaries of an organization. The main value of ownership integration is that it reduces buyer and seller incentives to engage in opportunistic behavior and promotes the sharing of specialized information. The choice of governance structure for any transaction—either in-sourcing (or vertical integration), or out-sourcing (or spot market purchases)—depends upon both *production* and *transaction* costs.

[30] Wintrobe (1977) offers a good review of the literature that analyzes the strategic behavior of a public monopolistic, budget-maximizing bureau—or internal agent (Niskanen 1971), that can make take-it-or-leave-it budget proposals, and its sponsor—or internal principal. Mueller (1989) later replaces the assumption the bureau is allowed to make take-it-or-leave-it budget proposals with a model in which the sponsor chooses a desired level of output based on the bureau's announced price per unit of output. Claar (1998) expands the role of the sponsor to regulate the bureau by allowing it to select both the level of output and the allowed price per unit, based on the bureau's reported marginal cost. Adapting Baron & Myerson's (1982) incentive compatibility framework for regulating a monopolist with unknown costs to the sponsor's problem of monitoring a bureau with unknown costs, the welfare-maximizing pricing policy deviates from the standard efficient pricing policy, P=MC. The deviation of the optimal pricing policy from the usual P=MC pricing rule arises due to asymmetric information—or the informational advantage the bureau has concerning its own costs. Internal transaction costs must therefore include a subsidy paid by the sponsor in addition to MC to induce the bureau to report its costs truthfully. Baron & Besanko (1984) modify the Baron-Myerson model to permit the regulator to conduct random audits of costs. This introduces an additional transaction cost—monitoring costs. These examples point to the internal transaction costs (a subsidy to induce truthful reporting or monitoring costs to establish correct costs) that must be weighed against any production cost advantages that might exist from in-sourcing or internalizing transactions in government's *make* or *buy* decisions.

[31] An example of the latter is Performance Based Logistics (PBL). DoD defines PBL as: "an integrated acquisition and sustainment strategy for enhancing weapon system capability and readiness, where the contractual mechanisms…include long-term relationships and appropriately structured incentives with service providers, both organic and non-organic [to] support the end user's (warfighter's) objectives." [31] Any future investments in PBL could benefit from the multiple insights generated by TCE. The decision to outsource weapon system support or to bundle that support with an acquisition and to outsource the resulting bundle should weigh production cost savings against the costs and risks associated with a critical source of supply being outside DoD's control. Those costs and risks are part of the transaction costs of outsourcing. TCE indicates outsourcing should only occur if there are positive net savings from the external supply relationship

[32] For purposes of illustration, consider two polar examples: A transaction that involves routine aircraft maintenance, and one that involves defense research & development (R&D) on a major weapon system. In the case of recurring purchases of routine maintenance, the service is relatively homogeneous, not especially complex, and therefore can be well specified. Assuming there are mild information asymmetries and many competing suppliers employing mostly non-specific assets, market governance can be prescribed to minimize both production and transaction costs. Anytime competition exists among suppliers of well-specified homogeneous products, spot market purchases or simple FP contracts generally offer adequate governance structures to induce cooperative adaptation, and minimize transaction costs. If government performs such functions, then public-private competitions are likely to reveal both production and transaction cost savings from outsourcing. In sharp contrast, a complex, nonrecurring defense R&D program involves challenges in specifying the product, service, or project as well as significant technical uncertainty over the results. Moreover, even if the R&D contract is let through ex-ante competitive bidding, "holdup" problems due to asset specificity may present significant cost control and ex-post bilateral dependency hazards. In this case, contracting offers an imperfect solution to opportunism. What is required,

are additional governance mechanisms (rules and regulations, reputation mechanisms—ex-ante efforts to screen in terms of reliability and reputation, GOCO—government ownership of specific assets that contractors operate, etc.) to settle disputes, adapt to future conditions, and protect transaction-specific investments.

[33] These characteristics include: the extent of any relation-specific (site, human or physical) assets that might be required for the transaction; complexity (the degree of uncertainty about demand, quality, cost, etc.); frequency of the transaction; information (asymmetries); market structure; etc.

[34] The implications of this paper suggest that in the case of out-sourcing a transaction where complexity, uncertainty and asset specificity can lead to renegotiation, the choice of governance structure will drive productive effort and unproductive bargaining.