How Bid-Protest Mechanisms Mitigate Opportunism in Government Contracting

Steven M. Maser [a], Vladimir Subbotin [a] & Fred Thompson [a]

[a] WILLAMETTE UNIVERSITY

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STEVEN M. MASER, VLADIMIR SUBBOTIN, AND
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WILLAMETTE UNIVERSITY

ABSTRACT: *This article proposes that government contracting, especially the source-selection process, gives rise to a particularly intractable set of transactional hazards:* governmental opportunism *and* third-party opportunism*. It shows how the first of these hazards can be addressed by* third-party intervention *and how third-party intervention leads to third-party opportunism. It argues that existing arrangements governing the source-selection process, primarily the GAO's bid-protest mechanism, mitigate the consequences of governmental opportunism and the direct harm resulting from third-party opportunism. More formally put, it concludes that the bid-protest mechanism works to minimize the maximum losses resulting from opportunistic behavior in the source-selection process. Therefore, existing governance arrangements are reasonably effective solutions to the idiosyncratic transactional hazards associated with source selection in government contracting.*

INTRODUCTION

Nobel Laureate Oliver E. Williamson's economics of governance (1967, 1985) holds that transactions are associated with various hazards. These hazards are largely a consequence of opportunistic behavior, the human propensity to seek and exploit situational opportunities, and the costs of running governance mechanisms designed to limit or avoid the adverse consequences of opportunistic behavior. Because of opportunism, there are very few if any perfect governance mechanisms (Gibbons 2003). Even so, they tend to evolve over time to mitigate the worst consequences of opportunistic behavior and/or to reduce the costs of running them (Melese et al. 2007).

Pablo Spiller (2009) argues that government contracting, especially the source-selection process, gives rise to a particularly intractable set of transactional hazards. These are *governmental opportunism* and *third-party opportunism*. Following Matt

McCubbins, Roger Noll, and Barry Weingast (McCubbins and Schwartz 1984; McCubbins, Noll, and Weingast 1987, 1989), Spiller acknowledges that governmental opportunism can be mitigated by *third-party intervention*, but insists that third-party intervention leads to third-party opportunism, which can be nearly as bad.

The governance arrangements applicable to public procurement in the United States encourage third-party intervention. Rejected bidders may contest the outcome of a source-selection decision before or after the award. When third parties exercise this right, we say they are making a "bid protest." For the past forty years, these governance arrangements have evolved so that the primary venue for protesting source-selection decisions is the Government Accountability Office (GAO), the audit, evaluation, and investigative arm of Congress. The GAO's processes have been standardized and routinized. Alternatively, interested third parties may petition the federal district courts or the Court of Federal Claims (COFC) for redress of their grievances. We refer to the rules for contesting and deciding bid protests as "bid-protest mechanisms." In this article we generalize about bid-protest mechanisms and test the implications of these generalizations statistically.

It is our contention that existing arrangements governing the source-selection process, especially the GAO's bid-protest mechanism, are truly extraordinary governance arrangements. Its design works to minimize the maximum losses resulting from opportunism in the source-selection process and, thereby, checks the idiosyncratic transactional hazards associated with government contracting: governmental and third-party opportunism.

In our examination of transactional hazards, we focus on the Department of Defense (DOD), the largest public procurement agency in the world, its acquisition officials, and their source-selection decisions. Source selection is central to contracting. It begins when a decision has been made to satisfy an operational need or functional requirement by procuring a product or service. It consists of a sequence of activities: procurement planning, solicitation planning, solicitation, source selection, contract administration, and contract closeout (Rendon 2008, 164). A stylized depiction of a source selection process appears in Figure 1. A major acquisition, like a major weapon system, involves more steps with more decision makers. A minor acquisition, like paving a road at a military base, involves fewer. In either case, similar types of decisions must be made.

GOVERNMENTAL OPPORTUNISM

Unusual transactional hazards give rise to unusual institutional arrangements. As C.J. Friedrich (1940, 20) observed, "no mere reliance on some traditional device can be counted upon to render the vast public services of a modern government responsible." In making this diagnosis, Friedrich focused explicitly on a series of principal–agent relationships peculiar to government and on their transactional hazards: citizens and elected officials, Congress and agencies, and presidents and cabinets and civil servants. In Friedrich's analysis these relationships are potentially more hazardous than are other sorts of principal–agent relationships, perhaps far more so. As is now commonplace, he noted the vast information asymmetries implied by the
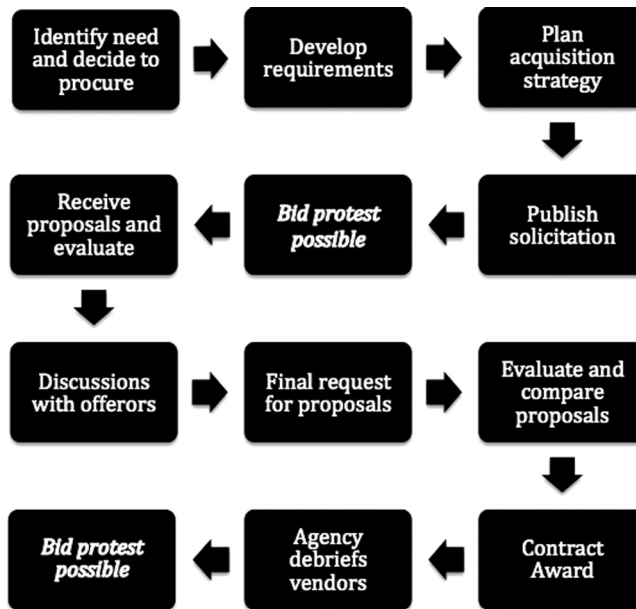
Figure 1. The Source Selection Process.

relative (rational) ignorance of the principals and the scope and complexity of the functions discharged by the agents. In addition, he stressed that in none of these relationships are the principals unitary actors with time-consistent preferences. Consequently, he concluded, "responsibility must remain fragmentary because of the indistinct voice of the principal whose agents the officials are supposed to be" (Friedrich 1940, 20).

In the discussion that follows, we concentrate on the second of Friedrich's relationships: Congress and agencies. This relationship is especially problematic under the separation of powers that exists in America (although, presumably, the rest of this section applies equally to the first of Friedrich's relationships, citizens and elected officials, and presidents and cabinets who can rely on direct monitoring and enforcement to deal with principal–agent problems). The relationship between Congress and the acquisition agencies is central to defense contracting in general and to source selection in particular. Congress must authorize every major acquisition project to be carried out by the defense agencies and appropriate the funds needed to carry it out. Not surprisingly, Congress wants its preferences reflected in the actions taken by the defense agencies and their acquisition officials.

Of course, this relationship is problematic only where the preferences of principal and agent differ. Were their aims congruent, acquisition officials would be perfectly responsive to the wills of their principals in Congress. Imperfectly aligned preferences point directly to the crux of the problem in this relationship: information asymmetry. Acquisition officials have a significant function to discharge. To perform this function, they necessarily possess information that their principals lack. It also means that, left to their own devices, they can exploit this asymmetry to

pursue their own aims at public expense or, using the language of transactions-cost economics, to behave opportunistically.

Monitoring and enforcing compliance is, of course, necessary in any principal–agent relationship. To avoid opportunistic behavior on the part of agency officials, Congress must monitor the actions taken by acquisition officials, detect deviations from its preferences (which are neither unitary nor time consistent), and provide sanctions that are activated when deviations are detected. But where Congress and the defense agencies are concerned, direct monitoring and compliance enforcement are often infeasible or unworkable. Consequently, this relationship can be said to give rise to a transactional hazard that is idiosyncratic to the relationship between Congress and agencies. It arises as a consequence of the infeasibility or unworkability of direct monitoring and compliance enforcement, information asymmetry, incoherent preferences on the part of principals, and opportunism on the part of agents: *governmental opportunism*.

Matt McCubbins, Roger Noll, and Barry Weingast (McCubbins and Schwartz 1984; McCubbins, Noll, and Weingast 1987; 1989) argue that, in the presence of governmental opportunism, "elected officials can gain leverage over bureaucrats through informal oversight mechanisms and carefully structured administrative procedures to guarantee that the relevant legislative constituents are well served." Frequently, the fix takes the form of what McCubbins, Noll, and Weingast call "fire-alarm" mechanisms. Under these mechanisms, responsibility for alerting politicians to agency decisions that stray from *preferred policy paths* is assigned to the parties who bear the consequences of the agency's failures, that is, interested *third-parties*. Their point is that elected officials rely heavily on third-party intervention to monitor bureaucratic agents' compliance with policy priorities in a large number of fields.

Bid protests belong to the general class of "fire alarm" mechanisms. Indeed, it almost passes for commonplace that policy control is the reason third parties are given standing to protest source-selection decisions, as does the claim that third-party protests hold contracting officials accountable for their source-selection decisions. Franck, Lewis, and Udis (2008) observe, for example, that Congress encourages third-party intervention because it does not trust executive-branch agencies to make "sensible" source-selection decisions.

THIRD-PARTY OPPORTUNISM

According to Pablo Spiller (2009, 56–57),

> A fundamental feature of interest groups as monitors, though, is that they are interested. In other words, they are biased. They provide information only when it is to their advantage. That is, the third party (or parties) may behave opportunistically. As it relates to public contracts, interested third parties may have incentives to challenge the 'probity' of a particular public agent when by such action they may benefit. . . . [T]he challenge may be exercised even if the action is ethical and/or legal.

Hence, he concludes that relying on third-party intervention to offset government opportunism gives rise to a second transactional hazard: *third-party opportunism*.

The evidence corroborates the existence of third-party opportunism and shows it to be widespread (Gansler 2011). Contractor executives and bid-protest attorneys report (Roemerman 1998) that they protest to:

- win and thereby be competitive in a successive solicitation or to recover costs;
- send the agency a message, be heard, seek justice, when they believe they have been wronged because government erred, even against advice of counsel that their protest is unlikely to be sustained given past precedents or that, if their protest is sustained, they are unlikely to become the eventual winner;
- obtain information to help them improve their future bids;
- obtain competitive intelligence;
- hurt the winner by delaying the award;
- retain a revenue stream for the duration of the protest at the GAO (in the case of an incumbent who loses);
- demonstrate resolve to board members or senior executives that everything that can be done to pursue a contract is being done;
- be granted work under the contract, either by the agency or by the winner (buyoff or fedmail);
- improve their chances of getting future contracts.

Consequently, we accept Spiller's claim that, once one embraces third-party inter-vention, the threat of third-party opportunism is inevitable. But he goes further, implying that its hazards cannot be mitigated. Moreover, he hypothesizes that "the more complex the public/private transaction, the higher the inherent informa-tional asymmetries . . . the higher the probability of third party opportunism" (Spiller 2009, 57), which he speculates leads to a vicious cycle: government increases the com-plexity, rigidity and specificity of its search, negotiation, and monitoring and enforcement procedures, leading to increased informational asymmetries and, eventually, to even greater exposure to the risks of third-part opportunism (Spiller 2009, 58; see also Bajari and Tadelis 2001). He concludes that, as a result, govern-ment contractual processes are necessarily more rigid than the procedures governing equivalent relationships between private parties. He asserts that this conclusion implies, for example, "that 'relational' contracting is less likely to evolve in the public sphere" (Spiller 2009, 58). Relational contracting is based upon trust between the parties; explicit contract terms provide an outline of the parties' expectations for per-formance while implicit understandings direct the parties' behavior.

OPPORTUNISM AND THE GAO'S TRULY UNUSUAL BID-PROTEST MECHANISM

We do not doubt that the threat of third-party opportunism is omnipresent under existing institutional arrangements. Moreover, we know that many bid protests are specious. Certainly, there is no question that bid protests are costly to agencies and

to contract winners (Kelman 1990; Greenstein 1993). When protests are filed, projects are delayed until the GAO issues a decision, which ties up resources that could have been allocated to other high-value projects (waivers to continue work are rarely requested or granted). If the protester prevails, these costs may increase. Agencies must also expend resources responding to protests.

Nevertheless, we are inclined to believe that Spiller's indictment of third-party intervention is exaggerated. Its hazards are not inevitable. They can be minimized and, where they are, the consequences remaining will be far less adverse than the hazards of government opportunism it was intended to check. Indeed, we would respectfully submit that many of the unusual design features of the GAO bid-protest mechanism have evolved to remedy the hazards associated with third-party opportunism.

Several things about the bid-protest mechanism are remarkable or surprising. First of all, it gives third parties *standing to protest* government's choice of a partner and, potentially, the power to overturn relationships sought by the contracting partners. While such a mechanism is not unusual where public–private partnerships are concerned—bid protests are allowed not only in the United States but elsewhere as well—they are idiosyncratic to government. They have no counterparts in the governance of non-governmental contractual relationships, at least not where those relationships involve parties external to the contracting enterprise.

Second, the design features of the GAO's bid-protest mechanism are unlike those of most other third-party interventions. Limited standing and narrowly framed grounds for complaint are among the unusual features, as are the complaint venue and the authority of the venue. Most third-party interveners complain directly to elected officials or to the courts. In contrast, the GAO, a quasi-independent agent of Congress, usually receives bid protests. Indeed, insofar as third-party intervention is concerned, prior to making the GAO the primary venue for protesting source-selection decisions, formal petitions for redress had to be addressed to the COFC. Unlike a court, decisions by the GAO are not binding. However, Congress requires the GAO to report to it when an agency fails to comply, which is rare. Finally, the specialized expertise of the GAO and its streamlined decision-making processes are noteworthy.

These carefully structured administrative procedures ensure that protests will be dealt with in a timely, transparent, and reasonably predictable manner, which would not be the case if protests went directly to Congress or the courts. Moreover, most spurious and immaterial protests are rejected. Indeed, most protests are summarily dismissed and, of those that go to hearing, only the minority succeeds. The upshot of this is that few source-selection decisions are protested. As a consequence, the direct costs bid protests impose on government and winners tend to be low (Gansler and Lucyshyn 2009).

These design features did not spring full-blown from the mind of Congress: like the common law, they evolved over an extended period as the GAO developed working rules. To the extent that the GAO is responsive to congressional policy priorities, it is reasonable, therefore, to say that the GAO bid-protest mechanism repairs the adverse effects of both governmental and third-party opportunism. We infer that it was, in some sense, designed to perform this function and that it persists because the GAO's principals in Congress attach importance to its performance.

HYPOTHESIS TESTING

That the GAO bid-protest mechanism works to mitigate the hazards of governmental and third-party opportunism implies two kinds of hypotheses: those which have to do with the GAO's disposition of protests and those which have to do with the decision to protest. Were the GAO bid-protest mechanism designed, in some sense, to repair the adverse effects of governmental opportunism and acute information asymmetry, it follows that the GAO ought to be responsive to congressional policy priorities. The problem with this claim is that it is hard to know what Congress wants. Fortunately, to test our claims we don't have to take Congress as a whole, but can focus on congressional leaders (Cohen, Coval, and Malloy 2011). Moreover, while members of Congress have a variety of policy priorities, there is one dimension upon which they are all presumed to be alike: responsiveness to constituent interests. Constituency politics are often pork-barrel politics. Thomas McNaugher (1989), for example, asserts that the pork barrel dominates congressional acquisition policy concerns, almost to the exclusion of everything else. This is because the local interests best positioned to play the constituency card are large-scale businesses and their employees, who are exclusively concerned with sales, profits, share prices, and jobs and wages (Mathur et al. 2012).

To cite a specific example, Shane Harris (2010) explains the Air Force's decade-long struggle to replace its 400 aged KC-135 tankers in terms of this dynamic. In this case, a protest was likely regardless which source was selected. The bidders on this contract were Boeing, the Democrats' choice, and the European Aeronautic Defense and Space Company (EADS), the Republican favorite. In both cases, party preferences reflected the location of the jobs the contract would create and the political affiliations of the officials representing those locations. According to Harris, the Air Force's struggle was ultimately due to bad timing. Every time it reached the culminating step in its protracted source-selection process, the party controlling Congress changed. First the Air Force selected Boeing, just before the Republicans took control of Congress; then, it selected EADS, shortly after the landslide that returned the Democrats to power. Because Congress was divided when he wrote, Harris predicted, regardless of the source selected by the Air Force, that its selection would be sustained. In fact, when the Air Force selected Boeing's KC-46 bid in February 2011, EADS declined to protest the award.

To the extent that congressional leaders are more concerned with who gets public moneys and where they go than with what they buy for the public at-large, pork-barrel politics are doubly relevant to our story. First, although Congress assigned the GAO primary responsibility for hearing and adjudicating bid protests, rejected suitors are free to take their protests to the COFC or to the district courts. Both are relatively independent of Congress. Consequently, we can rely on this difference to test the GAO's responsiveness to congressional leaders: to the extent that the GAO is responsive, the outcomes of protests heard by the GAO will be more likely to reflect the constituency interests of congressional leaders than the outcomes of protests heard by the COFC or the district courts. This logic implies hypothesis 1 (H1).

H1: Large businesses headquartered in districts represented by powerful congressional leaders are more likely to prevail before the GAO than before the COFC.

Second, agency officials are less likely to be concerned with constituency interests than Congress, probably much less likely. This implies that, if rejected bidders believe their interests are better aligned with those of the congressional leadership than winners and if they believe the GAO is responsive to the preference of congressional leaders in a way agency officials are not, they will be more likely protest than their less well-connected rivals. This implies two additional hypotheses (H2 and H3):

H2: Large domestically headquartered businesses are more likely to protest when they lose a source-selection competition to a business headquartered abroad than when they lose to a domestic business.

H3: Businesses headquartered abroad are less likely to protest successfully than businesses headquartered in the United States (which also implies that they will be less likely to protest than their American counterparts).

These hypotheses go to the logic of third-party protests as a solution to the hazards of governmental opportunism. We are, of course, mindful of their irony, as they rely on congressional preferences not codified in the FAR/DFARS. To the extent that these preferences are reflected in the outcomes of source selections or in the GAO's handling of bid protests, they may be welfare reducing and, in that sense, opportunistic.

Our second set of hypotheses goes to the logic of the GAO mechanism as a solution to the hazards of third-party opportunism. Here, we remind the reader that despite the low cost and prompt resolution of petitions for redress under the GAO bid-protest mechanism, very few source selections are protested, most protests are summarily dismissed, and of the remainder, only a minority prevails. The most obvious explanation for this pattern of behavior and results is that the GAO does a pretty good job of distinguishing opportunistic protests from those with merit. If this explanation is correct, experience with the process should lead to fewer protests (Kahneman, Knetsch, and Thaler 1986), especially fewer opportunistic protests. This, in turn, implies that, because small businesses with fewer defense contracts tend to be less experienced than large businesses, they ought to protest more often than big businesses and, because, their protests are more often without merit, are less likely to succeed before the GAO. This implies hypotheses 4 and 5 (H4, H5).

H4: Small businesses are more likely to protest source selections than large businesses.

H5: Bid protests from small businesses are less likely to be sustained than are protests from large businesses.

Spiller argues that project and procedural complexity increases both meritorious and opportunistic protests. Aspects of complexity include the inventiveness of the work required, the amount of systems integration called for, the need for investment

in project-specific assets, the duration of the project, and the anticipated difficulty of assessing performance at project completion. Complex projects necessitate complicated RFPs and procedures, which increase the likelihood that the agency will trip up (Snider and Walkner 2001). Complexity also increases uncertainty and informational asymmetries, which invites opportunistic protests. This implies hypotheses 6 and 7 (H6, H7).

> H6: The more complex the contract, the greater the number of bid protests.
> H7: The more complex the contract, the greater the sustain rate.

In the analysis that follows we use a variety of proxies for complexity: contract pricing, contract duration, project stage (R&D has more uncertainty than production), and object of contract—service vs. product (service quality is more difficult to assess than product quality), weapon vs. other, etc.

DATA

Studying the outcomes of bid protests and the decision to protest proved to be a nontrivial exercise. First, bid-protest records generally provide a lot of useful information but they do not always include the item we need to test our hypotheses: the source solicitation number for the contract being protested. The source-selection number is the key to unlocking other information from public databases—the name of the contracting agency, which might allow us to determine whether some agencies tend to be involved in more protests than others, and, where remedial actions on the part of the agency are recommended, the actions taken. This missing information is a significant problem. We would encourage the GAO to include source solicitation numbers on all if its future decisions.

Information on bid-protest results involving the DOD, including the identities of contract winners and protesters, was taken from the GAO's Web site (651 cases) and from the Lexis/Nexis database for cases before the COFC (293 cases). With the help of three students from Willamette University's College of Law, we coded all digested decisions issued in calendar years 2001 through 2009 in terms of whether the GAO sustained or denied them or in terms of whether the COFC supported the protester or the government. We recorded characteristics of the protest (the nature and number of claims made, the number of protestors, the contract winner, etc.), the protesters (size, location, and extent of their government contracting), and the basis for the GAO's decision.

Information about the characteristics of contract winners and protesters came from FEDMINE.US, an advanced database-driven web application that aggregates data from various authoritative federal-government sources, as did information about the political jurisdictions in which bidders are headquartered. Additional and confirming information about the contract solicitation numbers, values, types and contracting commands came from databases such as FedBizOpps (fbo.gov), the Federal Procurement Data System (fpds.gov), and fedspending.org, a project

of the nonprofit organization OMB Watch. This information was then hand matched to bid-protest results.

For each bid protest, we could identify the senator or member of Congress representing the jurisdictions in which the winning and losing bidders had their headquarters. We could then record whether these officials sat on one of the four congressional committees or subcommittees with direct oversight responsibility for the DOD. The range was 0 to 3, meaning some bidders effectively had no elected representatives on any of these committees; others had representatives on as many as three.

To make sense of the decision to protest, we required information about the universe of protestable contracts in each calendar period, which is not readily available. We report analyses based on two approaches. First, we obtained information about DOD contracts with source solicitation numbers listed in FedBizOpps for fiscal years 2004–2009, which approximates the universe of protestable contracts. We hand matched these to bid-protest decisions issued between October 2003 and September 2009. This provided us with an accurate description of all protestable source selections (about 65,000) and allowed us to accurately distinguish those that were protested from those that were not, but provided us with data on only a portion of the variables with which we were concerned (for example, there was no data on losers, except for protesting bidders).

Second, we used information about the total number of contract actions per fiscal year from FEDMINE, which varies from zero to hundreds per contract, as a proxy. After reviewing samples of all contract actions in selected military services, we estimated an average 2.5 contract actions per contract and applied this ratio to data about the lengths of contracts to estimate the number of protestable contracts in a calendar period. This allowed us to look at all the variables we were interested in, but produced an inferior set of observations (108 months for the dependent variable, ~140,000 contract actions).

In other words, we analyzed data from two different sources: one, which is known to be representative but comprehends a truncated set of variables, and another, which comprehends many of the variables we are concerned with but features a sample of convenience.

ANALYSIS

The first thing we found is that the GAO appears to be more responsive to congressional interests than the COFC (H1). Figure 2 shows the GAO sustain rate for bid protests by type of protester (large, small) and by the protester representation on House and Senate defense authorizing and appropriations committees. The same analysis of COFC sustain rates (by type of protester and protester representation on House and Senate Defense authorizing and appropriations committees) shows no evidence of a relationship between protesting-companies' representation on military-related committees and sustain rates. Of course, one would expect bid-protest decisions in the COFC to be largely immune from political influence,
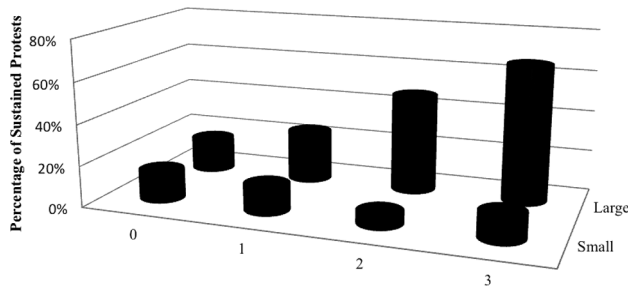
Figure 2. Sustain Rate of the GAO Protests Distributed by Protestor Business Size and Number of Defense Committees Where Protestor Has Members from Its Congressional District.

because of the relative independence of the judiciary. This finding does not mean that the COFC has no political biases, merely that there is no evidence that it is responsive to congressional influence. We would also note that its sustain rate is nearly twice as high as the GAO's. Moreover, despite its much more formal procedures, its outcomes are much less predictable than the GAO's using the variables we have access to.

Using a χ^2 test, we cannot reject the null hypothesis that there is no difference between the sustain rate for small firms in the two venues. That is not the case with respect to large firms. Representation on a greater number of defense-related committees is associated with a higher sustain rate at the GAO, but not at the COFC. The χ^2 value is 8.98, which is greater than the critical value of 7.82 (with degrees of freedom equal to 4 and alpha level of significance equal to 99%). This was further confirmed by analysis of the standard error of the difference in skewness. H1 is supported.

Figure 2 also shows that bid protests from small businesses are less likely to be *sustained* by the GAO than are protests from large businesses, as predicted by H5. Further, Appendix A describes an analysis of the results of a least-angle logistic regression on 651 GAO protests between 2004 and 2009, where the dependent variable is 1 if sustained and 0 if denied. H1, H5, and H7 are upheld: large losers from politically influential districts are more likely to prevail before the GAO than losers from less politically influential districts or foreign firms; there is a strong and highly significant relationship between the size of the protester and the sustain rate; there is a strong correlation between contract stage and the number of source-selection criteria (proxies for level of complexity of the contract) and the sustain rate. In sum, the evidence suggests that, notwithstanding the GAO's efforts to maintain its independence from Congress, its bid-protest process appears to act as a check on agency actions that deviate too far from congressional constituency interests, and it corrects agencies in circumstances where information costs are high.

However, there is no difference between the sustain rate of domestic businesses protesting contracts won by foreign businesses and the sustain rate of domestic businesses protesting contracts won by domestic businesses. An interesting fact, which we had not earlier noted, is that foreign-headquartered firms rarely (never?) protest

source-selection decisions. None of the protests in this sample were made by businesses headquartered abroad, which unexpectedly confirmed H3 ("Businesses headquartered abroad are less likely to protest successfully than businesses head-quartered in the United States").

While four variables (business size, political influence, and the two proxies for project complexity) explain 77% of the variance in GAO case dispositions, which is a remarkable result, it should be stressed that political influence is not the only thing that matters or even the variable that matters most. On its own, political influ-ence explains less than 25% of the variance in GAO outcomes. We cannot discount the possibility that Congress assigned responsibility for hearing bid protests to its agent, the GAO, at least in part as a means of deflecting/reducing constituent demands aimed at influencing source-selection decisions. Consequently, we conclude that McNaugher's position, that congressional priorities are dominated by pork, is somewhat overstated. Pork matters, but it seems that other things matter more (see Bawn 1995).

To understand the decision to protest, we used information on protestable contracts from FEDMINE's database on 65,000 contracts with solicitation numbers, identified as listed in FedBizOpps, matched to the protested contracts in our data-base of GAO decisions. That allowed us to conduct a logistic regression where the dependent variable is dichotomous: 1, if protested; 0, otherwise. Unfortunately, the data from FedBizOpps included information *only* on the type of contract, the contracting agency, and the contract winner. This means we can test only H2 ("Busi-nesses are more likely to protest when they lose a source-selection competition to a business headquartered abroad"), H6 ("The more complex the contract, the greater the number of bid protests"), and whether some defense agencies' source-selection decisions are more likely to be protested.

The results of this exercise are shown in Table 1, which supports H2 and H6 ("Awards to foreign businesses are more likely to be protested; more complex products and services generate more protests"). Table 1 also suggests that Navy and DLA contracts are less likely to be protested than Army, DOD, or Air Force contracts.

TABLE 1
Protests in FY2004–2009

Logistic Regression Table					
Predictor	Regression Coefficient	Standard Error	Z Score	p Value	Odds Ratio
Foreign winner	1.48	0.21	0.00	0.009	0.00
Size of contract winner	0.35	0.28	1.25	0.003	1.42
Contract pricing	1.51	0.33	4.51	0.000	4.53
Service vs. product	0.28	0.21	1.32	0.009	1.32
Navy	−0.67	0.20	3.37	0.001	1.96
DLA	−1.31	0.15	8.98	0.000	3.71

Note: Degrees of freedom = 11; $N = 65,000$.

TABLE 2
The determinants of bid protests FY2004–2009

Step	1	2	3
Constant	0.000357	0.000337	0.000316
N of bidders	0.005	0.005	0.006
t value	−5.67	−13.6	4.74
p value	0.005	0.001	0.042
Foreign winner		0.004	0.006
t value		4.25	23.82
p value		0.024	0.002
Business size			−0.005
t value			−17.76
p value			0.003
R^2	78.94	88.42	89.99

Note: Degrees of freedom = 15; $N = 108$.

We also found that awards to large businesses are more likely to be protested than awards to small businesses. We did not predict that result and have no explanation for it.

To test H4 ("Small businesses are more likely to protest source selections than large businesses"), we ran an ordinary least-squares regression where the dependent variable was the protest rate in each month during our time period (108 periods). The independent variables were the mean and mode of business size (number of employees and gross revenues); of contract pricing (1, cost plus; 0, fixed price,); total number of bidders; of winner's nationality (1, foreign; 0, otherwise); of stage of project (1, R&D; 0, production); of object of project (1, weapon; 0, non weapon; and 1, service; 0, product); of contract duration; of a set of dummy variables for contracting agencies; and multiplicative interactions terms for all the possible combinations and permutations of independent variables.

We then used data-mining software (Clementine and MiniTab produced identical results) to construct a series of stepwise models, starting with the strongest explanatory variable and continuing until all significant variables ($p < .05$) had been exhausted. The results are shown in Table 2.

The most powerful of these models comprehended the following three variables: number of bidders, foreign winner, size of winner. The results shown in Table 2 are highly consistent with H4. They are also consistent with H2 ("Businesses are more likely to protest when they lose a source-selection competition to a business headquartered abroad").

CONCLUSIONS AND IMPLICATIONS

The hazards of governmental opportunism and third-party opportunism are real threats. Their effects, where realized, come at the expense of the general public,

but they are not the usual ones. The issue is what to do about them, if anything. The traditional prescriptions—run government like a business, quarantine administration from politics, marketization—seem to us to be not only naïve but often profoundly misconceived. Mitigating these unusual hazards requires the elaboration of governance mechanisms that are equally unusual.

> The simple fact is that we have not developed governance mechanisms . . . to match contemporary government's tactics and responsibilities . . . [T]his task should be central to our enterprise. . . . [H]owever, much of our knowledge remains equivocal. (Thompson 1993, 314)

The process of getting the knowledge we need should start with the mechanisms we have. We should take a hard look at the features of the mechanisms that have evolved to address the hazards characteristic to government, especially those mechanisms that are idiosyncratic to government, such as the GAO's bid-protest process. Until we understand how they work, it is unlikely that we will be able to design something better. That is, of course, the purpose of this article (see also Marshall, Meurer, and Richard 1991; Ysa 2007; Franck, Lewis, and Udis 2008).

Third-party protests through the GAO's bid-protest mechanism appear to mitigate government and third-party opportunism. While protesting is cheap and easy, protests are rare and successful protests even rarer. Only 2% of all protestable source-selection decisions are protested and, where the GAO hears protests, only 5% succeed. This implies an agency error rate of about one in a thousand, which is pretty good by almost any standard.

Clearly, how the bid-protest mechanism works to mitigate third-party opportunism deserves further attention. There is much that we don't know about this mechanism, how it works and how it might be made to work better.

1. The GAO's decision-making process often seems like a black box to the individuals making source-selection decisions and potential protesters. This condition may make it harder to avoid the hazards in the process and the process seem more distant and punitive than necessary.
2. Despite the GAO's efforts to assure consistency and the acquisition community's belief that the process is fundamentally effective and fair, the GAO's dual role as dispute resolver and educator of the community can create problems. For example, in the interest of educating the community it can reach decisions on merit rather than dismiss a protest or find certain facts material in some protests but not others that can make the process appear somewhat arbitrary. Then again, the GAO provides an alternative dispute resolution mechanism, not a court.

Perhaps, the GAO should engage in more thoroughgoing efforts to define quality, configure, and monitor the behavior and performance of the process (see Maser and Thompson 2010).

More generally, the DOD and Congress could improve upon the data they are collecting to monitor performance of the acquisition process from specification of need through contract award, taking into account bid protests or COFC lawsuits, as well

as the time required for an agency to amend or reissue a request for proposal and complete the selection. The number and dollar volume of protestable contract actions can be tracked, as can corrective actions and protester reasons for withdrawing protests. This expands a recommendation offered by the Congressional Research Service to require the GAO to include in its annual report to Congress the most common grounds for sustaining protests (Schwartz and Manuel 2009). Tracking this information will allow decision makers to understand the dynamics of the system and to try to improve it. It also will induce decision makers to manage to the measures being monitored.

The question of relational contracts in government also deserves more attention. We know that some public–private partnerships are governed by relational contracts (Ysa 2007) and that this is the case even where bid-protest mechanisms exist (Kapstein and Oudot 2009). However, we acknowledge that relational contracting appears to be relatively rare where government contracting is concerned. Is this perception accurate? If so, why? These are interesting and important questions. We don't have answers to them.

ACKNOWLEDGEMENTS

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ABOUT THE AUTHORS

Steven M. Maser is Professor of Public Management and Public Policy, Atkinson Graduate School of Management, Willamette University. He is a member of the editorial board of *Rationality and Society* and co-recipient of the 1988 IHS Lon L. Fuller Prize in Jurisprudence.

Vladimir Subbotin is a financial analyst with a commercial real estate investment company. His main focus is quantitative modeling and data analysis. He graduated from Willamette University in 2010 with an MBA degree, specializing in Operations, Systems Analysis, and Finance.

Fred Thompson (fthompso@willamette.edu) is the Grace and Elmer Goudy Professor of Public Management and Policy Analysis and Director, Center for Governance and Public Policy Research, Atkinson Graduate School of Management, Willamette University, and a Fellow of the National Academy of Public Administration (US).

APPENDIX A: LEAST-ANGLE REGRESSION ANALYSIS OF PROTEST OUTCOMES

Appendix A describes an analysis of the results of a least-angle logistic regression on 651 GAO protests between 2004 and 2009.

Matrix of Predictors

- Weapon vs. Non-weapon (1 = weapon; 0 = non-weapon)
- Product vs. Service (1 = service; 0 = product)
- Contract Duration (continuous)
- Business Size (continuous)
- Number of Bidders (continuous)
- Stage of Development (0 = low uncertainty; 1 = high uncertainty)
- Number of Source-Selection Criteria (continuous)
- Contract Pricing (0 = fixed price; 1 = cost plus)
- Political Interest (number of protester's representatives sitting on defense acqui-
  sition subcommittees, continuous: 0–4)
- Foreign Winner (0 = domestic winner; 1 = foreign winner)
- Foreign Loser (0 = domestic protester; 1 = foreign protester)

Response Matrix

- GAO decision (1 = protest was sustained, 0 = denied).

  Least-angle regression algorithm:

- Start with all coefficients b_j equal to zero.
- Find the predictor x_j most correlated with y.
- Increase the coefficient b_j in the direction of the sign of its correlation with y. Take
  residuals $r = y - \hat{y}$ along the way. Stop when some other predictor x_k has as much
  correlation with r as x_j has.
- Increase (b_j, b_k) in their joint least squares direction, until some other predictor x_m
  has as much correlation with the residual r.
- Continue until: all predictors are in the model.

Least-Angle vs. Stepwise Regression

Least-angle regression (LARS) relates to the classic model-selection method
known as forward selection, or "forward stepwise regression": given a collection
of possible predictors, we select the one having largest absolute correlation with
the response y, say x_{j1}, and perform simple linear regression of y on x_{j1}. Classic
Forward Selection is an aggressive fitting technique that can be overly greedy, per-
haps eliminating at the second step useful predictors that happen to be correlated
with x_{j1}. LARS algorithm is a much more cautious version of forward selection,
which may take thousands of tiny steps as it moves toward a final model. That
allows the LARS algorithm to greatly reduce the computational burden.

LARS is potentially revolutionary, offering interpretable models, stability, accu-
rate predictions, graphical output that shows the key tradeoff in model complexity,
and a simple, data-based rule for determining the optimal level of complexity that
nearly avoids the bias in hypothesis tests.

The Model Sequence

Step 1: added Variable *Business Size*
Step 2: added Variable *All Subcommittees*
Step 3: added Variable *Stage*
Step 4: added Variable *Number of Criteria*
Step 5: added Variable *Number of Bidders*
Step 6: added Variable *Contract Duration*
Step 7: added Variable *Weapon vs. Non-weapon*
Step 8: added Variable *Product vs. Service*
Step 9: added Variable *Contract Pricing*
Step 10: added Variable *Foreign Winner*
Step 11: added Variable *Foreign Loser*

In other words, the model finds the optimal combination of variables and ranks them by the level of correlation of the variable with the dependent variable. Because the LAR method does not eliminate the variables (as does stepwise) from the model, there are a series of tests that allow us to identify the statistical significance of each variable.

Model Test: *k*-Fold Cross-Validated Mean-Squared Prediction Error

Cross-validation is a method for estimating generalization error based on "re-sampling." In *k*-fold cross-validation, one divides the data into *k* subsets of (approximately) equal size, training the net *k* times, each time leaving out one of the subsets, but using only the omitted subset to compute whatever error criterion is of interest, as shown in Figure A.1.
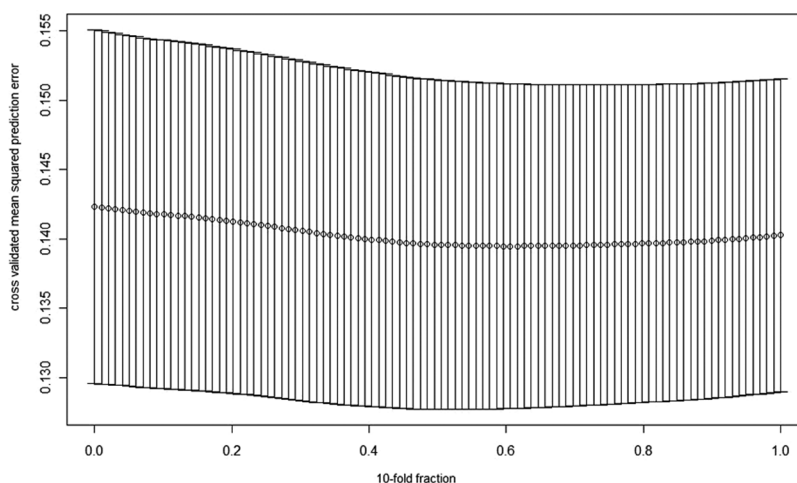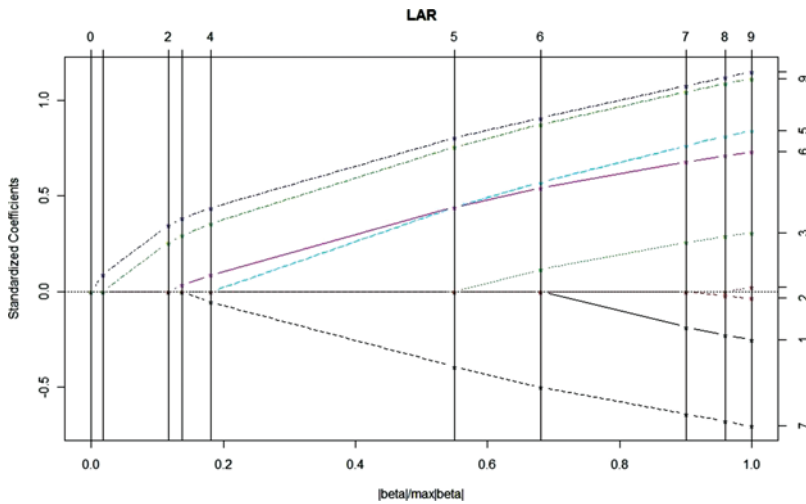

Figure A.1. Ten-Fold Cross-Validated Mean-Squared Prediction Error.

Figure A.2.   Standardized Model Coefficients.

In this model, we use 10-fold cross-validated mean-squared prediction error. The results from Figure A.1 show that we obtain the optimal variation of the model on the fifth fold; all subsequent attempts are slightly worse.

Figure A.2 shows the estimation of regression coefficients β_j, j = 1, 2, ..., 11, for the protest outcomes study using LARS estimates, as a function of $t = \Sigma_j |\beta_j|$. The covariates enter the regression equation sequentially as t increases, in order $j = 4$, 9, 6, 7, ..., 11.

APPENDIX B: C_P STATISTICS

Using the Mallows' C_p statistic, we can see from Table B.1 that the most significant variables are:

a. Business Size
b. Number of Subcommittees
c. Staging
d. Number of Criteria

Then entering those four variables stepwise into a standard regression model, we obtained the following coefficients of determination (R^2):

25.3	48.2	67.8	77.3

Omitted Variable Bias (OVB)

Omitted-variable bias occurs when a model is created which incorrectly leaves out one or more important causal factors. Bias is created when the model compensates for the missing factor by over- or underestimating one of the other factors. More

TABLE B.1
Model Summary

Variable	Residual Sum of Squares	Mallow's C_p Statistic	Regression Coefficient
Business Size	87.706	24.5925	0.1356
All Subcommittees	86.742	19.5359	0.0612
Stage	86.567	20.2577	0.1087
Number of Criteria	86.238	19.8514	−0.1044
Number of Bidders	84.247	7.2863	0.0703
Contract Duration	83.876	6.5717	0.0252
Weapon vs. Non-weapon	83.556	6.2332	−0.0430
Product vs. Service	83.529	8.0361	−0.0030
Contract Pricing	83.524	10.0000	0.0020
Foreign Winner	82.746	2.0143	0.0010
Foreign Loser	80.217	0.0000	0.0000

Note: Degree of freedom $= 10$.

specifically, OVB appears in biased parameter estimates in a regression analysis, when the assumed specification is incorrect, in that it omits an independent variable (possibly non-delineated) that should be in the model.

Two conditions must hold true for omitted-variable bias to exist in linear regression:

• The omitted variable must be correlated with one or more of the included independent variables.

AND

• The omitted variable must be a determinant of the dependent variable (i.e., its true regression coefficient is not zero).

We will start by checking if the first condition is true.

As can be seen in Table B.2, the included variables are not significantly correlated with any not-included independent variables. This result alone allows us to make a conclusion that our model is free of omitted-variable bias.

Interpreting the Coefficients

Since interpreting the regression coefficients only by reference to sign and statistical significance says nothing about materiality of relationships, we examined the alternative transformations of the canonical parameters that define a model, using a method proposed by Scott Long (1997).

The most direct approach for interpretation is to examine the predicted probabilities of an event for different values of the independent variable. To check the interpretation of the included variables we examine the predicted probabilities of the controlled variables (the one included in the model).

TABLE B.2
Chi-Square Table

	Political Interest	Stage	Business Size	Number of Criteria	Weapon vs. Non-weapon	Product vs. Service	Contract Duration	Number of Bidders	Contract Pricing	Foreign Winner
Stage	2.3480									
Business Size	2.2350	2.2790								
Number of Criteria	1.9875	3.5570	1.2430							
Weapon vs. Non-weapon	2.2350	0.0100	3.1590	0.0100						
Product vs. Service	1.1195	1.2080	3.0510	2.0340	7.7270					
Contract Duration	1.5874	0.8060	0.8380	1.4410	3.4740	6.6430				
Number of Bidders	1.1140	1.9680	0.8160	0.0230	2.1900	0.3170	0.6030			
Contract Pricing	1.7856	3.1280	3.5200	3.4420	0.2960	4.4260	5.6950	2.3780		
Foreign Winner	1.3325	2.0030	1.9965	2.1054	1.5687	2.6668	2.3354	2.1140	1.4789	
Foreign Loser	2.8560	2.0145	1.8870	1.9955	1.3250	2.1145	2.0045	2.0077	0.0200	5.2100

Note: Degree of freedom = 1; p value = 0.05; critical value = 3.84.

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The way to interpret the predicted probabilities is to examine the range of probabilities. If the range of probabilities is between 0.2 and 0.8 (more conservatively, between 0.3 and 0.7), the relationship between the x's and the predicted probability is nearly linear, and simple measures can be used to summarize the results. As we can see in Figure B.1, all our included variables have the probability range between 0.3 and 0.7, which means that we can use simple measures to summarize the results (such as interepreting the coefficients by their sign and statistical significance).

We can take a further step, calculating the factor change in the odds, which means that for a unit change in x_k, the odds are expected to change by a factor of $\exp(\beta_k)$, holding all other variables constant.

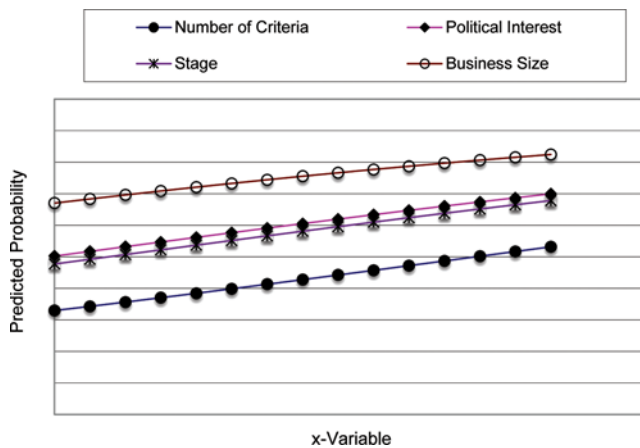As can be seen in Table B.3, the variables included in our model have the greatest factor-change values.

Figure B.1. Predicted Probability.

TABLE B.3
Factor Change

Variable	Logit		Factor Change	Std. Factor Change
	Coef.	Z Score		
Weapon vs. Non-weapon	−0.25	−0.50	0.78	0.942
Product vs. Service	−0.00	−0.01	1.00	0.999
Contract Duration	0.17	0.75	1.19	1.089
Business Size	0.84	2.99	2.31	1.330
Number of Bidders	0.47	2.11	1.60	1.252
Stage	0.72	2.08	2.05	1.214
Contract Pricing	0.02	0.09	1.02	1.010
Number of Criteria	0.70	2.78	2.01	1.208
Political	0.80	2.15	2.23	1.794