RESEARCH REPORT

TOPIC:

2013 Characteristics and Contract Type Report

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NIGP
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NIGP
151 Spring Street
Herndon, Va 20152
703.836.8900

CUSTOMER CARE:
800.367.6447, Ext. 426

ONLINE:
nigp.org
nsite.nigp.org
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Introduction

Purpose: This report provides measures of product characteristics, namely the degree to which it is difficult to specify the product's attributes or requirements, and the degree to which specialized investments are required to produce the product. These measures are mapped to contracts for 29 different products procured at the federal level to identify sources of risks in the match between product characteristics and contract type, namely method of payment (i.e. fixed price versus cost reimbursement).

Conducted by: The Institute for Public Procurement and the Public Procurement Research Center at FAU

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Executive Summary

Products vary on two key dimensions, how easy or difficult it is to define the product's requirements and the degree to which specialized investments are required to produce the product. Simple products are easy to describe and easy to make, while complex products are difficult to describe and difficult to make. While contracts for complex products pose greater risks of cost overruns, delivery delays, and failed products, these risks are exacerbated when there is a mismatch between the type of contract used to acquire the product and the product's characteristics. Consistent with contracting best practice and regulatory guidance, fixed price contracts are best suited for simple products and cost reimbursement contracts are best suited for complex products.

This report provides measures of product characteristics that are sources of risks in contracting, namely the degree to which it is difficult to specify the product's attributes or requirements, and the degree to which specialized investments are required to produce the product. The measurement scheme is applied to 29 products purchased by the U.S. Department of Defense (DOD), the largest purchaser in the world, through a survey of federal procurement personnel conducted by NIGP: The Institute for Public Purchasing (NIGP) in 2012. The resulting product characteristic measures are paired with 2421 DOD contracts from 2004-2008 to identify instances where there is a match or a mismatch between the contract design, notably the method of payment, and each product's characteristics. The DOD contract data comes from the Federal Procurement Data System (FPDS), the largest catalogue of contract actions by U.S. federal government agencies. The results suggest that fixed-price contracts predominate when products are easy to specify and require few specialized investments and that cost reimbursement contracts are more common under the opposite conditions, but that there are notable exceptions.

The ratings of product characteristics provided by respondents to the NIGP survey can be used to identify mismatches between product characteristics and contract type. While not all mismatches result in higher risks of negative outcomes, the rating system (and the logic underlying it) can be used to identify potential risks that require an alternative contract design for future purchases and potentially enhanced contract management investments.

The findings suggest three recommendations for mitigating contracting's risks:

1. Match contract type to the product's characteristics.
2. Review existing contracts for mismatches.
3. Invest in contract management capacity to mitigate the risks of mismatches.

Section I: Overview & Background

On March 4, 2009, the Office of Management and Budget, under direction from President Barack Obama, issued a memorandum directing federal agencies to increase their use of fixed-priced contracts. The rationale for the guidance was simple: After years of growth in cost-reimbursement contracting, tighter contract standards would be needed to shield taxpayers from cost escalation (Office of the Press Secretary, 2009). The method of payment, a key contract design element, influences who bears the risks of cost overruns and other negative outcomes, like delivery delays and performance failures. The contract's design features also influence the ability of procurement personnel to manage these risks through monitoring, incentives, and renegotiation after the contract has been let. A primary source of risk in contracting is the characteristics of the product (Brown, Potoski and Van Slyke, 2006). Products that are difficult to specify and difficult to make increase the risks of cost overruns because neither the buyer nor the seller know at the outset what it takes to make the product and what it will cost. The contract plays a large role in determining outcomes for the purchasing agency and the vendor because it specifies who gets to make decisions about the product's attributes and who bears the costs (Tirole, 1999). One strategy for managing and mitigating these risks is to appropriately match contract design features, like payment method, with characteristics of the product.

This report provides measures of product characteristics that are sources of risks in contracting, namely the degree to which it is difficult to specify the product's attributes or requirements, and the degree to which specialized investments are required to produce the product. The measurement scheme is applied to 29 products purchased by the U.S. Department of Defense (DOD), the largest purchaser in the world, through a survey of federal procurement personnel conducted by NIGP: The Institute for Public Purchasing (NIGP) in 2012. The resulting product characteristics measures are paired with 2421 DOD contracts from 2004-2008 to identify instances where there is a match or a mismatch between the contract design, notably the method of payment, and each product's characteristics. The DOD contract data comes from the Federal Procurement Data System (FPDS), the largest catalogue of contract actions by U.S. federal government agencies. The results suggest that fixed-price contracts predominate when products are easy to specify and require few specialized investments and that cost reimbursement contracts are more common under the opposite conditions, but that there are notable exceptions.

The report is divided into three sections beyond this introduction. Section II lays out the basic argument about matching contract design features, notably the payment method, to the product's characteristics. Section III describes the data used in this report, notably the details of the NIGP survey. Section IV reports the findings, offers recommendations, and concludes the report.

Section II: Product Characteristics and Contract Design

Product Characteristics

One of the primary sources of risk in contracting is the type of product to be acquired (Brown, Potoski and Van Slyke, 2006). Some products, whether they be goods or services, are easy to describe and easy to make. That is, it is easy for the buyer to define the product's requirements. This might mean specifying the inputs required to make the product, what tasks and functions the product will perform, the outputs the product will generate, or the outcomes that will result from the product. It is also easy for suppliers to develop the production process to create the product. That doesn't always mean that these products are cheap to produce. Some easy-to-make products – like airplane hangars – require expensive up-front fixed investments. Instead, it means that it is easy to figure out how to make the product, and it means that the investments required to make it can be relatively easily transferred to some other activity if the purchasing government stops buying the product. For example, if the U.S. Air Force stops buying airplane hangars, suppliers can retool their production process to make giant warehouses or garages for semi-trucks. These products are "simple".

"Complex" products, on the other hand, are difficult to describe and difficult to make. When government agencies buy a complex product, like an information technology system, it is difficult to describe everything the purchasing agency wants the product to do and how it should be made. This makes it difficult for the vendor to figure out how to make the product and consequently how much it will cost. Complex products often require investments in research and development to figure out how to design the production process to make the product. These investments are "specialized" to the extent that if the agency stops buying the product, the supplier has limited alternatives to shop the product (and the accompanying production process) to another buyer. On the flip side, if the purchasing agency is dissatisfied with the chosen vendor, few if any other suppliers likely have made the required specialized investments to produce the product (Tirole 1999; Williamson, 1981, 1985).

In comparison to simple products, the attributes and features of complex products create risks. Faced with uncertainty about what is required to make the product and how much it will cost, the risk of cost overruns, delivery delays, or an unsatisfactory product is high. These risks are lower, although still present, when purchasing simple products in part because buyers can turn to the market to replace poor performing sellers with relative ease. If a seller provides a simple product that costs more than the government agency anticipated, or delivers it late or in shoddy condition, the agency is not forced to keep buying the product from the same vendor. It can find a vendor that better meets its need in the next round of purchasing. Exit is far more challenging for complex products. Once a buyer and a seller enter into an exchange for a complex product, it is very difficult for them to exit the exchange because there are few alternative partners.

Contract Design

One of the primary tools available to contract personnel to mitigate and manage the risks of different product types is the design of the contract used to govern the exchange. In an ideal world, all contracts would be complete: the purchaser would specify what he wanted from the vendor in exacting detail, and the vendor would then provide accurate cost estimates. With such a complete contract there would be no surprises or substantial risk of harm to buyer or seller. Unfortunately, such complete contracts are impossible in large part because buyers and sellers cannot know with exact certainty what future conditions will be like (Coase, 1937). Factors like the price of key inputs (e.g. steel) or how the product will be used in the future will have important implications for whether the buyer and the seller each receive value from the exchange, yet the ability of the two parties to forecast these types of changes is limited. As a result, contracts often cannot be fully specified in advance, and the buyer and the seller will be exposed to risk. For the vendor, there is a chance that production costs will exceed what she expected. For the buyer, there is concern that the vendor will behave opportunistically by lowering service quality or running up charges to increase profits (Williamson, 1981, 1985). The costs of writing a contract to cover all these contingencies are too high to warrant moving forward with the exchange. Instead, buyers and sellers have to rely on incomplete contracts that specify as much as reasonably possible about the product, but leave some aspects of the exchange unspecified.

Incomplete contracts create a zone of discretion where the decisions and actions of the buyer and the seller determine whether both receive value from the exchange. Here the best that can be done is to design a contract that guides the buyer and the seller towards actions that minimize the risks that one or both parties receive losing outcomes. A key contract design element that influences these outcomes is the method of payment. Broadly speaking, contracts come in two types. Fixed-price contracts specify a final price for the good or service being purchased. This structure helps to shield the buyer from risk: because the purchase price has been set at the time the contract is written, the vendor must bear any additional costs incurred over the course of production. Fixed-price contracts create an incentive for the vendor to determine product characteristics and costs at the outset. The other principal type of contract is the cost-reimbursement contract. Under this arrangement, allowable charges are specified at the outset but a final price is not determined until the product is delivered. This payment method shifts the risk of cost overruns onto the buyer because the vendor can pass on unexpected costs. The buyer faces an incentive to be as clear as possible about what he wants from the supplier and the means by which it should be produced.

Driven by the insight that fixed-price contracts place the risk of cost overruns on the vendor, the Federal Acquisition Regulations (FAR) – the primary regulations governing contracting at the federal level in the United States – promote the use of fixed-price contracts whenever possible. While federal regulations do allow for the use of cost reimbursement contracts, this guidance was reinforced in 2009 under an Office of

Management and Budget memo encouraging agencies to increase their use of fixed-price contracts relative to cost reimbursement contracts (Office of the Press Secretary, 2009).

Contracting personnel and the managers that govern the procurement function would be wise not to heed the guidance to increase the use of fixed price contracts as an iron-clad directive. One of the principal ways to manage risk in acquisition is to match the payment method to specific product characteristics. Fixed-price contracts are preferable for simple products, like commodities, because so much is known about the product *ex ante* and the risk of becoming locked-in to a single supplier is low. Fixed-price contracts are not always appropriate for complex products due to uncertainty about what it will take to produce the product. Because the development process for complex products is often iterative, it is challenging to identify performance measures for the purchasing agency to monitor over time. In the face of such heightened uncertainty we might expect the buyer to insist on a fixed-price contract to defend against cost escalation. However, setting a payment cap might impose counterproductive constraints on production. The buyer could end up with an inadequate product because the vendor is forced to cut corners under the fixed ceiling on costs. Alternatively, the vendor faces the risk of financial loss. She might not even be willing to enter into the exchange under a fixed-price regime. In these cases a cost reimbursement contract is preferable. There is clearly still risk under this arrangement, but the buyer is now incented to work hard to specify as much as possible about what they want from the product – to define the product's requirements – and to invest in contract management capacity to coordinate and oversee the relationship with the vendor. While relying on a fixed-price contract for a complex product might seem advisable at the outset, it can also result in a dysfunctional relationship in which excessive risk is placed on the vendor, almost encouraging opportunistic behavior. The astute acquisition professional matches the type of contract and the characteristics of the product to be acquired. Mismatches between the type of contract and product characteristics are noteworthy in that they signal *potential* mistakes which enhance risks for one or both parties. A primary purpose of this report is to present a measurement scheme that can be used to identify matches and potential mismatches between product characteristics and contract payment methods.

Section II: Data

To identify matches and mismatches between product characteristics and contract types the data for this report come from two sources – an NIGP survey of federal contract personnel and a database of federal contracts for 29 products purchased by the U.S. Department of Defense (DOD). DOD is the largest purchaser in the federal government, buying large volumes of simple products, like landscaping and laundry services, and complex products, like program management services and guided missiles. This allows a focus on a range of products with varying levels of complexity. This section describes the two data sources and the operationalization of product characteristics and contract type.

A. Product Characteristics

To measure product characteristics, 29 products commonly purchased by the DOD were identified. Federal agencies buy products under two industry standard product categorization schemes – the North American Industry Classification System (NAICS) and the Product Services Code (PSC) system. Products were selected that had uniform NAICS and PSC categorizations. Appendix 1 reports the NAICS and PSC categorizations for the 29 products in the sample. NIGP then conducted an original survey of federal procurement personnel which asked respondents to rate each of the 29 products on the two characteristics identified earlier – the ease or difficulty of specification and the degree to which specialized investments are required to make the product. NIGP administered the survey by emailing the questionnaire to the 960 federal contacts in its database.[1] Thirty-eight active federal procurement personnel provided ratings.

To assess the ease or difficulty of specifying the product's attributes and requirements, survey respondents were asked to rate each product on a scale of 1 to 5, with 1 indicating that "measurement" was easy and 5 indicating that it was "difficult." To assess the degree of specialized investments required to produce the product, survey respondents were asked to rate each product on a scale of 1 to 5, with 1 indicating a low level of specialized investments and 5 indicating a high level.[2] In an effort to address instrumentation bias, respondents first rated ease of measurement for all 29 products and then performed a separate rating of the degree of specialized investments for each product. Table 1 on the next page reports the wording of the survey prompt for each of the two measures.

[1] NIGP conducted the survey with a protocol approved through a university Institutional Review Board.
[2] Respondents were also given the option "not sure" if they were unable to gauge a product along one of the dimensions. As the results in the next section report, all of the measures have N-sizes less than our sample of 38 because each respondent only felt confident assessing the products with which they were familiar.

Table 1 – Ease of Measurement and Specialized Investment Survey Prompts

Ease of Measurement

Ease of measurement refers to how difficult it is for government officials to measure the outcomes of the service and/or to monitor the activities required to deliver the service.

At one end of the scale, a service is easy to measure if it is relatively straightforward to identify performance measures that accurately represent the quantity and quality of the service. For easy to measure services, government officials can easily write a contract that clearly specifies outcomes for the vendor to achieve. Alternatively, if it is not easy to identify outcomes for the vendor to achieve, a service can be easy to measure if it is relatively straightforward to monitor the activities required to deliver the service.

At the other end of the scale, a service is difficult to measure if it is relatively hard to monitor the activities required to deliver the service and to identify performance measures that accurately represent the quantity and quality of the service. For difficult to measure services, government officials cannot easily write a contract that clearly specifies the outcomes for the vendor to achieve or the activities for the vendor to perform.

Degree of Specialized Investment

Degree of specialized investments refers to whether specialized investments are required to produce the service. By special investments, we mean investments that apply to the production of one service but are very difficult to adapt for the production of other services. These specialized investments include:

- the use of a specific a location that is only movable at a great cost;
- the use of highly specialized human skills that cannot be put to work for other purposes;
- the use of specialized tools or a complex system designed for a single purpose; or
- the requirement that the service reach the user within a relatively limited period of time or the quality of the service greatly diminishes.

At one end of the scale, a service has a low degree of specialized investments if no specialized investments are generally required to produce the service.

At the other end of the scale, a service has a high degree of specialized investments if many specialized investments are generally required to produce a service. Such specific investments often mean that if a government decides to contract for such a service, it is more likely that only the selected vendor will be available in future rounds of contracting.

Table 2 reports the mean ratings, standard deviations, and the number of valid responses for each product. The first column reports the product category. The second and third columns report the ease of measurement and specialized investment ratings, respectively. The fourth column reports the combined mean ease of measurement and specialized investments ratings.

Table 2 – Ease of Measurement and Specialized Investment Ratings

Product Category	Ease of Measurement			Specialized Investment			Combined
	Mean	*SD*	*N*	*Mean*	*SD*	*N*	*Mean*
Landscaping/Grounds Services	1.72	0.96	32	1.47	0.72	17	3.19
Custodial Janitorial Services	1.69	0.93	32	1.61	1.09	18	3.30
Laundry and Dry Cleaning Services	1.60	0.86	30	1.81	1.22	16	3.41
Trash/Garbage Collection Services	1.56	0.72	32	1.88	1.11	17	3.44
Guard Services	1.97	0.93	30	1.69	0.79	16	3.65
Court Reporting Services	2.21	1.32	24	1.50	0.76	14	3.71
Maintenance and Equipment Repair	2.19	1.00	32	2.17	1.04	18	4.35
Warehousing and Storage Services	2.00	1.03	31	2.39	1.24	18	4.39
Auditing Services	2.32	0.98	31	2.12	1.36	17	4.44
Advertising Services	2.77	1.22	30	2.18	1.47	17	4.94
Logistics Support Services	2.48	1.02	29	2.56	1.09	16	5.05
Training/Curriculum Development	2.45	1.12	33	2.61	1.29	18	5.07
Program Review/Development Service	3.29	1.15	28	2.13	0.89	16	5.41
Program Management/Support Services	3.21	1.15	29	2.29	1.10	17	5.50
Legal Services	3.21	0.77	29	2.47	1.18	17	5.68
Engineering and Technical Services	2.94	1.19	32	2.94	1.16	18	5.88
Systems Development Services	3.23	1.28	31	3.24	0.90	17	6.46
Guns (30MM and less)	3.06	1.25	17	3.80	1.03	10	6.86
Aircraft, Fixed Wing	3.63	1.26	16	4.18	0.87	11	7.81
Weapons – Basic Research	4.19	1.11	16	4.00	1.18	11	8.19
Defense Aircraft – Basic Research	4.22	1.11	18	4.00	1.18	11	8.22
Submarines	3.80	1.32	15	4.50	0.71	10	8.30
Bombs	4.00	1.30	14	4.33	0.87	9	8.33
Weapons – Applied R&D	4.41	0.80	17	4.27	0.90	11	8.68
Guided Missiles	4.14	1.29	14	4.56	0.88	9	8.70
Defense Aircraft – Applied R&D	4.41	0.80	17	4.36	0.92	11	8.78
Defense Aircraft – Engineering Dev.	4.53	0.80	17	4.27	1.01	11	8.80
Weapons – Advanced Dev.	4.47	0.87	17	4.36	0.92	11	8.83
Defense Aircraft – Advanced Dev.	4.53	0.87	17	4.36	0.92	11	8.89

B. Contract Type

Data from the Federal Procurement Data System (FPDS) was used to measure contract type. The FPDS is the most comprehensive catalog of federal contracting actions available. Contract managers from across the federal government are required to input data on a standardized form about the contract actions they engage in with each contract they oversee. This provides a remarkable window into the contract type decisions of agencies. The FPDS catalogs all contract actions reported by 66 federal agencies (e.g. 3,337,335 contract actions were reported in the FPDS in Fiscal Year 2011). A stratified random sample was drawn from the FPDS of DOD contracts for the 29 product types. There are six different contract payment types – fixed-price, cost reimbursement, time and materials, labor hours, combination, and "other". Both "time and materials" and "labor hours" contracts are variations on traditional cost reimbursement contracts because labor hours can be adjusted later if requirements and funding are uncertain. Like cost reimbursement contracts, these two contract types provide no positive profit incentive to the vendor for cost control or efficiency (GAO 2007, 2009a, 2009b). In addition, the GAO classifies both "combination" and "other" contracts as partial cost reimbursement contracts, because they each lack clarity about the extent of cost reimbursement obligations (GAO 2009c). For these reasons these five categories were combined into a single category of cost reimbursement contracts. In the sample, 74.3% of contracts are fixed price and 25.7% are cost reimbursement. Table 3 reports the percentage of fixed price and cost reimbursement contracts each of the four years in our sample.

Table 3 – Percentage of Fixed Price and Cost Reimbursement Contracts

Year Signed	Fixed Price	Cost Reimbursement	Total	Missing Values
FY 2004	350 (70.7%)	145 (29.3%)	495 (100%)	56
FY 2005	273 (80.3%)	67 (19.7%)	340 (100%)	35
FY 2006	297 (76.3%)	92 (23.7%)	389 (100%)	10
FY 2007	469 (72.0%)	182 (28.0%)	651 (100%)	-
FY 2008	410 (75.1%)	136 (24.9%)	546 (100%)	-
Total	1799 (74.3%)	622 (25.7%)	2421 (100%)	101

Section III: Findings, Recommendations and Conclusions

A. Findings

This section reports the findings of the analysis. Table 4 shows how the use of different contract types varies by product complexity, which is simply the sum of the measurement and specialization scores reported in Table 2 from the previous section. In general, fixed price contracts are used almost exclusively for simple products (those with low complexity scores), while the percentage of other contract types increase as products become more complex.

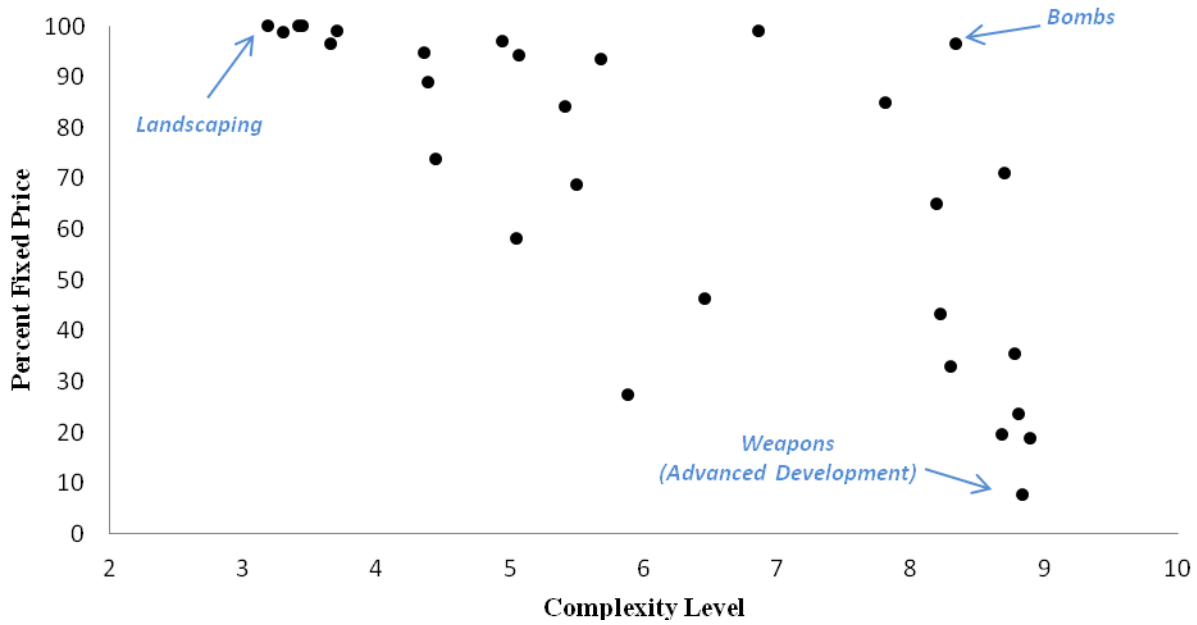
Table 4 – Contract Type by Product Complexity

		Contract Type (Percent)			
Service	**Complexity**	*Fixed Price*	*Cost Reimbursement*	*Time & Materials*	*Combination*
Landscaping/Grounds Services	3.19	100.0	0.0	0.0	0.0
Custodial Janitorial Services	3.30	98.9	0.0	0.0	1.1
Laundry and Dry Cleaning Services	3.41	100.0	0.0	0.0	0.0
Trash/Garbage Collection Services	3.44	100.0	0.0	0.0	0.0
Guard Services	3.65	96.6	1.1	2.3	0.0
Court Reporting Services	3.71	99.0	1.0	0.0	0.0
Maintenance and Equipment Repair	4.35	94.8	0.0	5.2	0.0
Warehousing and Storage Services	4.39	89.0	0.0	9.0	2.0
Auditing Services	4.44	73.9	0.0	13.0	13.0
Advertising Services	4.94	97.0	3.0	0.0	0.0
Logistics Support Services	5.05	58.2	5.1	27.8	8.9
Training/Curriculum Development	5.07	94.4	1.1	2.2	2.2
Program Review/Development Service	5.41	84.2	7.9	7.9	0.0
Program Management/Support Services	5.50	68.9	3.3	15.6	12.2
Legal Services	5.68	93.6	0.0	6.4	0.0
Engineering and Technical Services	5.88	27.5	45.1	20.9	6.6
Systems Development Services	6.46	46.4	33.3	17.9	2.4
Guns (30MM and less)	6.86	99.0	0.0	0.0	1.0
Aircraft, Fixed Wing	7.81	85.0	12.0	3.0	0.0
Weapons – Basic Research	8.19	64.9	35.1	0.0	0.0
Defense Aircraft – Basic Research	8.22	43.4	55.6	0.0	1.0
Submarines	8.30	33.0	55.0	1.0	11.0
Bombs	8.33	96.5	2.4	0.0	1.2
Weapons – Applied R&D	8.68	19.6	78.4	2.1	0.0
Guided Missiles	8.70	71.1	18.6	8.2	2.1
Defense Aircraft – Applied R&D	8.78	35.4	63.5	0.0	1.0
Defense Aircraft – Engineering Dev.	8.80	23.7	63.2	13.2	0.0

Weapons – Advanced Dev.	8.83	7.7	69.2	23.1	0.0
Defense Aircraft – Advanced Dev.	8.89	18.8	68.8	12.5	0.0

Figure 1 plots each of the 29 products by its complexity level and fixed-price contract percentage. The figure highlights three products – landscaping, advanced weapons development, and bomb production. Landscaping is representative of other simple products – it is easy to measure and easy to make. The DOD relies exclusively on fixed-price contracts for the landscaping services included in the sample. Likewise, variable-cost contracts are rare for the other simple products. As product complexity increases, the use of fixed-price contracting generally declines – all the way down to 7.7 of contracts for advanced weapons development (bottom right corner of Figure 1). Cost reimbursement type contracts are prevalent because it's difficult to define requirements for advanced weapons systems and their production typically requires significant specialized investments. This suggests a match between product characteristics and contract type. By and large the scatterplot suggests matches between product characteristics and contract type. There is a strong negative correlation (r = -.72) between product complexity and use of fixed-price arrangements.

Figure 1. Use of Fixed-Price Contracts by Complexity Level



There are a number of exceptions to this pattern. There are a handful of products which suggest a mismatch between product characteristics and contract type. There are no instances of high levels of fixed price contracts for complex products, but there are a number of instances where fixed price contracts are used at high levels for complex products. For example, 96.5 percent of bomb production contracts are fixed-price contracts. These mismatches suggest potential risks for cost overruns, delivery delays, and other negative outcomes. If fixed-price contracts are being used when performance is

difficult to measure and specialization is required, it suggests the DOD may be using its market power to shift risk onto vendors. This could ultimately increase the chance of contract failures and poor outcomes for both the DOD and its suppliers. There is an alternative explanation for the use of fixed-price contracts for some complex products. It may be that cost-reimbursement contracts were used during the research and development phase of the product's production and now, in subsequent rounds of contracting, fixed-price contracts are used to acquire the product once the requirements have been defined and the seller has recouped her specialized investments.

B. Recommendations

The findings of the analysis suggest three basic recommendations to increase the chances of win-win contracting outcomes. These three recommendations are consistent with contracting best practice and core regulatory guidance in governance documents like the Federal Acquisition Regulation.

1. Match contract type to the product's characteristics
   Fixed price contracts are best suited for simple products where requirements are well defined and few, if any, specialized investments are required to produce the product. Cost reimbursement contracts are best suited for complex products where requirements are ill defined and specialized investments are significant. Mismatches enhance the chances that negative outcomes will result.

2. Review existing contracts for mismatches
   Following the spirit of the guidance from the Office of Management and Budget to review existing contracts and contract practices and increase the use of fixed price contracts, purchasing agencies would be wise to target their review efforts to mismatches between product characteristics and contract type. Instances where fixed price contracts are used to acquire complex products or cost reimbursement contracts are used to acquire simple products should be the primary targets for review. If a true mismatch is discovered – say a fixed price contract is being used for the R&D phase of a complex product – good contracting practice suggests switching to a cost reimbursement contract for subsequent purchases of the same product until requirements are sufficiently defined.

3. Invest in contract management capacity to mitigate the risks of mismatches
   Given the risks associated with purchasing complex products, it is always wise to dedicate additional contract management capacity for the acquisition of complex products relative to simple product purchases. This need for increased contract management capacity increases if there is a mismatch between the product and the contract type.

Conclusions

Products vary on two key dimensions, ease of measurement and specialized investments. Simple products are easy to describe and easy to make, while complex products are difficult to describe and difficult to make. While contracts for complex products pose greater risks of cost overruns, delivery delays, and products that fail to meet the needs of the purchasing government, these risks are exacerbated when there is a mismatch between the type of contract used to acquire the product and the product's characteristics. Fixed price contracts are best suited for simple products and cost reimbursement contracts are best suited for complex products. The ratings of product characteristics provided by respondents to the NIGP survey can be used to identify mismatches between product characteristics and contract type. While not all mismatches result in higher risks of negative outcomes, the rating system, and the logic underlying it, can be used to identify potential risks that require an alternative contract design for future purchases and potentially enhanced contract management investments.

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Researchers

- Dr. Trevor Brown, John Glenn School of Public Affairs, the Ohio State University
- Mr. Alex Roberts, John Glenn School of Public Affairs, the Ohio State University
- Dr. Yong Woon Kim, John Glenn School of Public Affairs, the Ohio State University

Appendix: Method

Survey Method:	SurveyMonkey.com on-line survey
Invitation Method:	E-mails through SurveyMonkey.com
Target Group:	Federal procurement professionals in the NIGP database
Email Invitations Sent:	November 14, 2012
Reminder Sent:	November 28, 2012
Final Reminder Sent:	December 28, 2012
Survey Closed:	January 7, 2013
Number of Responses:	39 (25 complete)