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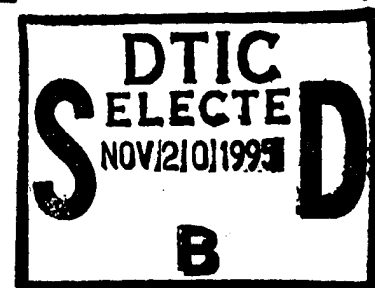
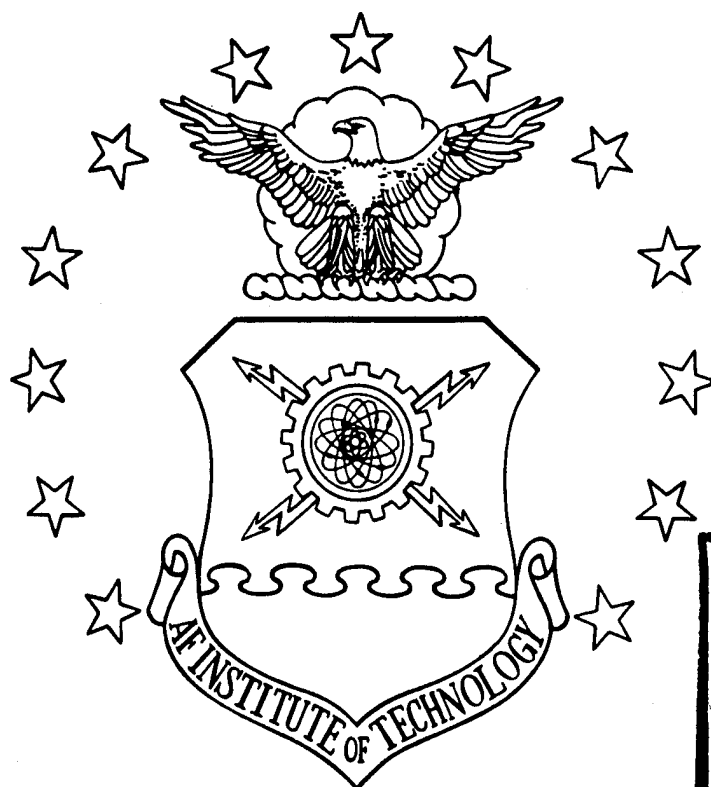
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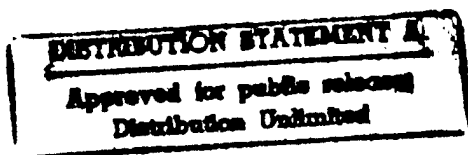


AN INVESTIGATION OF PROBLEMS  
IN ANALYZING PRICES  
OF STATE-OF-THE-ART COMMERCIAL ITEMS

THESIS

Vicki A. Fry, GS-12

AFTT/GCM/LAS/95S-5



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DEPARTMENT OF THE AIR FORCE  
AIR UNIVERSITY  
**AIR FORCE INSTITUTE OF TECHNOLOGY**

Wright-Patterson Air Force Base, Ohio

AFIT/GCM/LAS/95S-5

19951117 018

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AN INVESTIGATION OF PROBLEMS  
IN ANALYZING PRICES  
OF STATE-OF-THE-ART COMMERCIAL ITEMS

THESIS

Presented to the Faculty of the Graduate School of Logistics and Acquisition

Management of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the

Requirements for the Degree of

Master of Science in Contracting Management

Vicki A. Fry, B.S.

GS-12

September 1995

Approved for public release; distribution unlimited

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I cannot adequately thank my family, especially my husband, Ron, and my 3-year-old daughter, Leah. They remind me of what is truly important in this life and understand when I forget that simple fact. Finally, my unwaivering gratitude goes to my Lord and Savior: All to Him I owe.

Vicki A. Fry

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Abstract

This research explored whether techniques described in the Armed Services Pricing Manual are sufficient for evaluating prices of leading-edge and modified commercial items. The research was sparked by the Federal Acquisition Streamlining Act of 1994, which encourages contracting officers to rely on information other than certified cost or pricing data when buying commercial products. Pricing techniques used in five recent acquisitions were investigated through a case-study methodology. The research concludes that current guidance is sufficiently broad to enable the contracting officer to tailor the tools to an acquisition at hand. Research findings, however, indicate that the Department of Defense should consider expanding guidance and systems for use in secondary and auxiliary price comparisons. Findings indicate that contracting officers may not have the expertise or availability of data necessary to obtain pricing information from the preferred sources ranked in proposed regulations implementing the streamlining act. The research also uncovered evidence of the culture shock that contracting officers will experience as acquisition reforms are implemented. Contracting officers indicated that prices evaluated through price analysis techniques were the best obtainable given the circumstances. They believed that better prices could have been established through analysis of detailed cost or pricing data.

AN INVESTIGATION OF PROBLEMS  
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I. Introduction

Over the past several decades the federal government continually has spent more money than it has collected. Borrowing to cover each year's deficit has added to the federal debt, which is estimated to total nearly \$5 trillion. This ever-increasing debt became an especially hot issue in 1994, with those who called for a balanced budget seeing decisive election victories. The Department of Defense (DOD) budget, which is the largest category of discretionary spending in the federal budget, is a broad target for those congressional representatives who have pledged to reduce federal budget deficits in a march toward a balanced budget. The collapse of the Cold War is further motivating the call for DOD budget reductions as the executive and legislative branches search for the so-called peace dividend.

The DOD already has been forced to cope with declining budgets, both in nominal and real terms. The Fiscal Year 1993 budget authority for the DOD was \$281.1 billion, and President Clinton has proposed authority of just \$263.7 billion for Fiscal Year 1995 for the department (Collender, 1995:115). Defense procurement spending has dropped an inflation-adjusted 67 percent since 1987 (Pare, 1994:96).

The DOD is faced with finding ways to reduce costs and acquisition reform is a prime source of savings. As General Counsel Robert P. Murphy recently told Congress, the current acquisition system incorporates the well-intentioned but incremental and uncoordinated efforts of the government to correct wrongs or add initiatives.

[T]he acquisition system is an unbalanced mosaic of requirements that lead, simply, to too much money for too little product. It is particularly important in these times of declining budgets to continue the process of bringing the system into balance. (GAO, 1995b:1)

A cost-cutting area identified by acquisition reform proponents is to increase the use of commercial or modified-commercial products in lieu of initiating expensive and lengthy projects to develop items unique to the military. Expanding the use of commercial products "involves taking advantage of the far higher volume in which commercial products are produced, the associated lower cost, and the higher quality of these products whereby their performance and environmental capability satisfies the military need" (Gansler, 1989:334). Gansler says that the DOD could save in the neighborhood of \$15 billion a year by expanding the use of commercial products (1989:341).

Studies have found numerous benefits that could result from increased DOD use of commercial goods and services. Acquiring commercial items, for example, will reduce acquisition lead times, lower costs, and facilitate the use of advanced technology (See, for example, Report of Acquisition Law Advisory Panel, 1993; LaBerge, 1994; and Adams, Hevey, and Shaw, 1992). The DOD no longer would have to initiate lengthy research and development efforts to meet mission needs. Costs incurred by the contractor would be spread over a larger commercial base instead of allocated solely to DOD contracts. The

DOD also would benefit from technological advancements resulting from private research and development efforts necessitated by the contractor's desire to gain or maintain a competitive edge in the marketplace.

These and other views sparked passage of the Federal Acquisition Streamlining Act in October 1994. The act not only specifically encourages all federal government agencies to maximize use of commercial goods and services, it also expands the definition of commercial and non developmental items. This definition expansion may create a problem for the DOD contracting officer, who is charged by the Federal Acquisition Regulation (FAR) to ensure that goods and services are acquired at fair and reasonable prices. One team of reform experts, in fact, states that this "significant expansion of the definitions will create almost a new contracting system" (Lumer and Ireton, 1995:96-1).

The Pricing and Finance Division of the Air Force Material Command (AFMC) Directorate of Contracting sponsored this research of whether traditional price analysis techniques described in procurement guidance are sufficient help for government personnel purchasing in the commercial arena. The research focused on acquisitions of state-of-the-art commercial or modified-commercial items. This chapter discusses the background of this issue before summarizing the problem statement addressed by this research. A description of the general investigative questions concludes the chapter.

## **Background**

Contracting officers long have struggled to negotiate fair and reasonable prices for the goods and services they purchase for the DOD or other federal agencies. This



struggle intensifies as the dollar value of the contract increases and the level of competition among potential contractors decreases. The contracting officer has relied on the requirements of and protections afforded by the Truth in Negotiations Act (TINA) of 1962 (Title 10 USC Sec 2306a). The act mandates detailed cost or price analysis requirements for acquisitions valued at more than the specified threshold, now \$500,000. Figure 1 depicts a simplified, generalized overview of the current decisions that a DOD contracting officer faces when deciding what cost or price documentation is required.

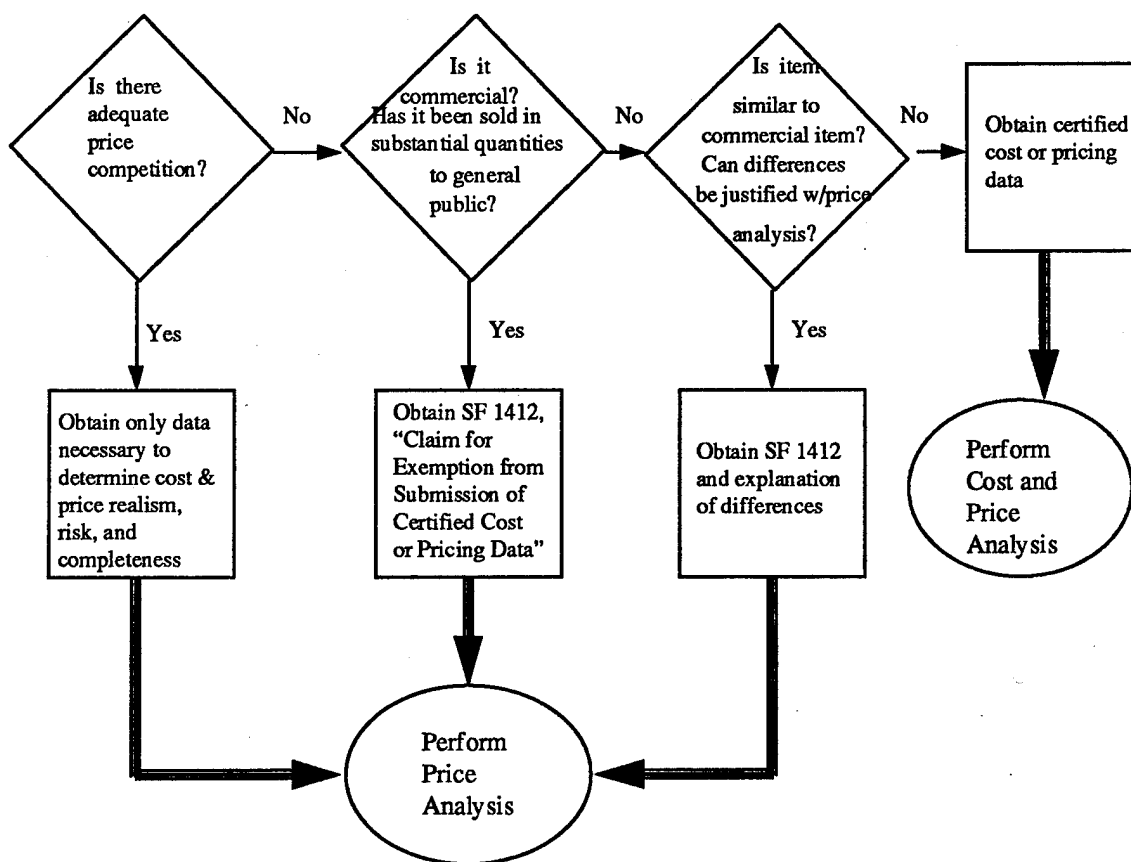


Figure 1: Cost and Price Analysis Decisions

Lovitky states that the purpose of TINA is "to give the government and the contractor equal footing in negotiating contracts" (1987:79). Congress passed TINA in response to the belief that the prices paid by the government will be reasonable only when the contracting officer possesses the same cost data as the contractor (Lovitky, 1987:79). As Figure 1 shows, a contractor that is not vying for award under competitive conditions or that cannot show that its product meets what has been called a restrictive test of commerciality must disclose to the contracting officer all cost or pricing data used in preparing the proposed price. Such cost or pricing data include all known facts at the time of negotiation that reasonably could be expected to have a material impact on cost or price negotiations (Feldman, 1988). Lovitky calls this requirement for submission of cost or pricing data "an intrusive tool through which the government may obtain a broad spectrum of information concerning a contractor's business activities" (1987:84). Examples of potentially sensitive cost or pricing data are historical and projected labor rates; engineering analyses; internal corporate studies, analyses and audits; material costs; sales forecasts; and competitive strategies (Lovitky, 1987).

The contractor also must certify that the furnished data is accurate, current, and complete. TINA gives the government the right to audit all contractor records to verify whether the cost or pricing data actually was accurate, current and complete. TINA further provides for a price reduction if defective data is discovered. The price reduction is to include profit and interest (for any overpayments) and can include penalties if the contractor knowingly submitted the defective data (Feldman, 1988).

Congress did recognize the assumed ability of the marketplace to establish fair and reasonable prices by exempting commercial items from the cost or pricing data requirement. A commercial item, however, was defined narrowly as a supply or service regularly used for other than government purposes and *sold or traded to the general public in substantial quantities* (emphasis added for this report) in the course of normal business operations [FAR 15.804-3(c)]. Contracting officers could grant an exemption from the requirement to provide and certify cost or pricing data only if the contractor could substantiate that the offered product met specific formulas addressing, for example, the proportion of government versus private sales. A significant part of the substantiation process occurs when the government, as allowed by TINA, actually examines contractor records to verify the claim of commerciality.

The definition of commercial item now incorporated in the FAR has been called a barrier that blocks access by commercial industries to the DOD (Adams and others, 1992; and Report of Acquisition Law Advisory Panel, 1993). Firms that could not meet the definitions were faced with submitting and certifying detailed, potentially business sensitive, cost or pricing data or with foregoing DOD business (Lamm, 1988). Many private contractors do not maintain accounting systems that meet DOD-specified Cost Accounting Standards and, therefore, cannot provide the data in the required, auditable format. Others are reluctant to mingle the costs of DOD accounting requirements with their commercial business, thereby increasing costs to their commercial customers. Current regulation also states that the TINA requirement for certified cost or pricing data can apply to modifications made to commercial items after award, even if such data was

not required for the initial award. A General Accounting Office report found that this regulation nearly discouraged a producer of commercial helicopters from participating in an Army acquisition (GAO, 1995a). Both government and contractor representatives have identified TINA requirements as among a host of government-unique requirements that impede acquisitions of commercial items (GAO, 1995a:6). Other government-unique requirements include military specifications and special test and evaluation programs.

The Federal Acquisition Streamlining Act expands the definition of commercial item in an attempt to remove this perceived barrier for some private firms. Upon implementation, scheduled for no later than 1 October 1995, a commercial item will no longer have to have been sold in substantial quantities to the general public. Sales to *nongovernmental entities* and *offers* for sale to the general public are among the new conditions that will qualify a product as a commercial item. A state-of-the-art product that has evolved from a commercial item through advances in technology also will be considered a commercial item as long as the upgraded product will be available in the commercial marketplace in time to satisfy the government's delivery schedule (P.L. 103-355, Section 8001). In addition, a product will retain its commercial designation if it has been subject to "minor modifications made to meet [f]ederal [g]overnment requirements" (P.L. 103-355, Section 8001).

The contracting officer, negotiating with a contractor proposing an item that meets the expanded definition of commercial, will be able to request only the price information that is necessary to evaluate, through price analysis alone, the reasonableness of the proposed prices (P.L. 103-355). Proposed implementing guidance states that the

contracting officer should obtain no further information if a price is based on adequate price competition. If such competition does not exist, the contracting officer may obtain, in order of preference, (1) information available within the government, (2) information obtained from sources other than the offeror, and (3) information obtained from the offeror. Requiring the prospective contractor to furnish certified cost or pricing data should be a last resort.

The contracting officer should use every means available to ascertain a fair and reasonable price prior to requesting cost or pricing data. Contracting officers shall not unnecessarily require the submission of cost or pricing data because it leads to increased proposal preparation costs, generally extends acquisition lead-time, and wastes both contractor and [g]overnment services. ["FAR Case 94-721," 1995:2284 (Proposed FAR 15.802(a)(3))]

Further acquisition reform may eliminate the option of obtaining certified cost or pricing data for all acquisitions of commercial items. General Counsel Murphy has suggested that Congress seriously consider exempting all commercial items from the certified data and audit requirements of TINA.

There have been arguments that market forces may not have sufficient impact on some items contained within the FASA definition--those items not yet in the commercial market, but that evolve out of existing commercial items--to ensure fair and reasonable prices without the assistance of certified data. The question for the Congress is whether the impact of the free market on the basic item will be sufficient. Clearly, the more the government is willing to bear the same risks as any other large customer, the more advantage it can take of the commercial market. (GAO, 1995b, 2, 3)

The proposed order of preference will force contracting officers to base their negotiations on analyses of price in lieu of analyses of detailed cost or pricing data furnished by the prospective contractor. Price analysis techniques, as cited in the FAR and in the Armed Services Pricing Manual (ASPM), largely have been used to analyze prices

on much smaller dollar contracts, those below the threshold for certified cost or pricing data. Whether these techniques and tools will be adequate to evaluate the prices of large-dollar commercial items is not known.

### **Problem Statement**

Forthcoming implementation of the Federal Acquisition Streamlining Act likely will increase the number of DOD acquisitions of high-dollar commercial items.

Acquisitions for commercial items with an established sales history probably will not be a problem as DOD contracting officers can continue to compare proposed prices to published and historical prices. DOD contracting officers, however, will experience more difficulty analyzing the prices of state-of-the-art or modified-commercial products, for which sales have been limited or non-existent.

DOD contracting officers traditionally have relied on the requirements of Truth in Negotiations Act of 1962 for the contractor to furnish certified cost or pricing data for such leading-edge or modified-commercial products. This safety net no longer will be readily available. The requirement to ensure that goods are acquired at fair and reasonable prices, however, remains. The contracting officer instead is being directed, whenever possible, to evaluate price only and not its detailed cost element breakdown. Price analysis techniques now available traditionally have been used to verify prices of low-dollar (up to \$500,000 but usually \$25,000 or less) items. How will the contracting officer ensure that prices of large-dollar commercial items that meet the expanded definition of commercial item are fair and reasonable? Will current price analysis

techniques be sufficient to enable the contracting officer to negotiate fair and reasonable prices for high-dollar leading-edge commercial or modified-commercial items?

This exploratory research focused on pricing cases accomplished in the last two years by AFMC contracting personnel. The contracting officer in each of the researched cases sought approval to waive the requirement for the contractor to submit certified cost or pricing data. Air Force regulations vest the authority to approve such a waiver with the Assistant Secretary (Acquisition) [Air Force Federal Acquisition Regulation Supplement: 5315.804-3(I)(1)]. It is anticipated that these pricing cases simulated conditions that will exist after implementation of the streamlining act. A review of AFMC records identified eight formal requests to waive cost or pricing data requirements in the last two years. The five cases that were completed were selected for the research.

The exploratory nature of this study responds to the emerging emphasis on applying price analysis tools to large-dollar purchases of state-of-the-art commercial items. No empirical research on the adequacy of existing DOD price-analysis tools has been accomplished to date, perhaps because the tools traditionally have been used on purchases that comprise only about 8 to 10 percent of DOD's annual budget (Peterson, 1987).

The research was conducted using a case-study methodology. There were two reasons for using this methodology. The first reason is the difficulty in objectively defining what constitutes a fair and reasonable price. By definition, the price negotiated, reviewed, and approved via the award of the contract is a fair and reasonable price. Other concepts of a fair and reasonable price are in the eye of the beholder. It is one that is acceptable to both the government and the seller. A fair and reasonable price may be the price

determined by market forces, the price that allows the seller a reasonable profit, or the price that is the lowest the buyer is willing to pay (ASPM, 1986 and 1987). A case study approach will enable analysis of the perception of prices and of the usefulness of the price analysis tools that led to those negotiated prices.

Use of a case study methodology also will compensate for a second problem. Contracting officers, charged with negotiating contract prices, are not likely to admit readily that they might have been able to obtain a better deal if better tools had been available.

But *immediately* after the purchase, everyone feels that they got a good deal. This, of course, is the definition of a market exchange: someone buys and someone sells, and both parties feel that the deal has made them better off. This doesn't, however, get at the question of whether they couldn't have done *better* (italics supplied by Murnighan). (Murnighan, 1991:2)

Such information can be obtained more easily through open-ended interviews conducted during the case study. A case-study approach also enables exploration of data gathered from historical documents such as contract files and through interviews with the many participants in the case. Data was cross-verified among sources.

Results of this exploratory research will provide insight to decision-makers concerning potential problems with price analysis techniques. More extensive and quantifiable data, of course, can be collected after implementation of the Federal Acquisition Streamlining Act. This issue, however, is too critical to wait resolution until quantifiable data has been generated through implementation of the Act. Results of this research will support any preliminary refinement or development of price analysis tools



necessary for acquisitions of commercial items. This study's results also will form the foundation for further research upon implementation of the streamlining act.

### **Investigative Questions**

Four investigative questions were the focus of this exploratory case study research. Each is described below:

1. "Would the contracting officer have to seek approval to waive submission of certified cost or pricing data if the pricing action occurred after implementation of the Federal Acquisition Streamlining Act?" The authority to approve such waivers now is vested at the assistant secretary level; after implementation of the act, it will be vested with the head of the procuring activity.

This first question was designed to confirm whether an assumption of this study's methodology is true. The analysis of cases with a negative answer to this question will be more easily generalizable to the post-implementation era. The key variable was whether the item being acquired meets the new definition of commercial item established by the streamlining act. If the item meets the new definition, the contractor would not be required to submit certified cost or pricing data for any new acquisition that occurred after the streamlining act is implemented.

Not all of the cases identified by AFMC involved acquisition of items that meet the new definition. Reasons for seeking a waiver of the TINA requirement are varied. An analysis of the pricing actions that occurred within all cases was helpful. Price analysis without the support of detailed and certified cost-element breakdowns was necessary in all

of the studied cases and may be even more critical upon implementation of the streamlining act. The act has moved the authority to waive submission of cost or pricing data to a lower level in the chain of command. Some experts believe that this change will result in more contractor requests for waivers. The process will be expedited. More contractors will recognize that waivers will be much easier to obtain quickly and, consequently, will seek more waivers (Lumer and Ireton, 1994).

2. "How did the contracting officer and other procurement personnel ensure that fair and reasonable prices were negotiated?" This research investigated whether the contracting officer found existing price analysis tools to be effective. Key variables were price analysis techniques used, negotiation strategies, and negotiation outcomes. It was anticipated that the contracting officer either found the existing tools to be adequate, adapted the tools to the circumstances of the pricing action, or designed a new method of price analysis. Also investigated was the relationship of several variables, identified in theories that will be discussed in Chapter II, on the acquisition. These theory-based variables included the degree of market competition faced by the contractor, the urgency of the procurement requirement, and the length of the contractual document.

3. "Did the contracting officer or contractor attempt any action, such as incorporation of special clauses, to protect the assurance of fair and reasonable prices in the instant acquisition and in any potential follow-on actions?" This question stemmed from the various theories, which will be discussed in Chapter II, that contribute to an understanding of how prices and contract structures are established. Did the contracting officer rely on market forces to assure that the negotiated price was fair and reasonable, as

classic microeconomics theory might propose? Did the contracting officer incorporate special and standard clauses to protect against the dangers that Transactional Cost Economics proponents say are caused by limited information and opportunistic behavior? Did the contracting officer attempt any action to prevent a "buy-in" by the contractor?

Key variables were the contracting officer's perception of market and other environmental conditions, the terms and conditions proposed by either party, and the terms and conditions included in the final contractual document. Analysis of this information will assist policy-makers charged by Section 8003 of the streamlining act with determining what clauses should be included in DOD contracts for commercial items.

4. "Did the contracting officer or contractor try to influence conditions affecting the theorized advantages of contestable markets?" The theory of contestable markets, which will be discussed in Chapter II, assumes that a firm will establish prices at fair and reasonable levels in order to discourage potential competitors from entering its market. Key variables were any identified barriers and any actions taken to affect those barriers.

## Summary

Analysis of the current U.S. political environment leads to the inevitable conclusion that the decline in DOD budgets likely will continue, perhaps at an even faster rate, in the foreseeable future. Increasing the use of commercial items in lieu of defense-unique items will help the DOD to cope with these budget decreases, according to acquisition reform proponents. Acquisition costs and lead times will be reduced. Use of high technology will be increased. The Federal Acquisition Streamlining Act does much

to facilitate the increased use of commercial and modified commercial items. It expands the definition of commercial items and eliminates many of the perceived barriers discouraging contractors in the commercial industrial base from selling to DOD.

These reform actions, however, have eliminated or significantly altered many of the traditional techniques used by the DOD contracting officer to negotiate a fair and reasonable price when buying leading-edge or modified commercial items. The contracting officer is being directed to conduct price analysis whenever possible. The act has curtailed significantly the amount of information the contractor is required to supply and directs that analysis of detailed cost elements be conducted only as a last resort. The contracting officer will have to rely on existing price analysis techniques, traditionally used on lower-dollar acquisitions, or new techniques will have to be developed.

The primary aim of this research is to address, on a preliminary basis, whether the existing price analysis techniques will be useful in negotiating larger-dollar acquisitions of state-of-the-art or modified commercial items. A study of cases that simulate the conditions that will occur upon implementation of the act will facilitate identification of any need for new or modified tools.

## II. Literature Review

What is a commercial item? A company modifies a commercial airliner wheel assembly for use on a military aircraft. Another company builds an electronics line around a technological breakthrough. Both are examples of products that could be considered commercial after the Federal Acquisition Streamlining Act of 1994 is implemented. The act includes modified commercial products and state-of-the-art products designed for sale in the commercial marketplace in its definition of commercial items. An example of the potential magnitude that such commercial buys can assume is the forthcoming contract for the Joint Primary Aircraft Training System (JPATS) system. The pilot training system will be based on a commercial airframe and at least one competitor proposed an entirely off-the-shelf plane. The winning contractor can anticipate more than \$5 billion in new sales in Department of Defense (DOD) orders alone (Brown, 1993).

The act amends 10 USC 140 to require that the DOD purchase commercial items to the maximum extent practicable. The act not only expands the definition of commercial items, it also establishes new statutory guidance designed to simplify acquisitions of these items. Support for the policy of increased use of commercial items is grounded on several theoretical foundations that share the common idea that such items can be purchased efficiently at economical prices.

### **Organization of Discussion**

This literature review begins with a brief discussion of why there has been such a push for a policy encouraging acquisition of commercial items. The review then

distinguishes between the current and new definitions of commercial items. Four theories that contribute to an understanding of how prices and contract structures are established then are discussed. The review then addresses the applicability of these theories to three levels of DOD acquisitions, to include the expanding category of buys of commercial items. Concluding this chapter is a review of the battery of price analysis tools now established by DOD guidance, such as the Armed Services Pricing Manual (ASPM).

### **Reasons to Increase Commercial Acquisitions**

Expanding the use of commercial products is one of seven changes that respected economist and former Deputy Assistant Secretary of Defense Jacques S. Gansler advocates for DOD acquisitions. He states that increased use of commercial equipment at the component level, the subsystem level, and even the system level has the potential to save about \$15 billion each year. Individual items, he says, would be at least 50 percent cheaper. In buying commercial items, the DOD would realize an added advantage of buying equipment that already has met the market test for quality and price (Gansler, 1989).

This plea to increase the number of DOD acquisitions of commercial items was championed most recently by the Acquisition Law Advisory Panel to the United States Congress. This group is better known as the Section 800 panel as its study was directed by Section 800 of the National Defense Authorization Act for 1991. The panel analyzed more than 600 statutes before issuing its final report in January 1993.

The Section 800 report cites three reasons for increasing acquisitions of commercial items. First, commercial items tend to be much less expensive than their defense-unique counterparts. Items developed by the commercial market could be less expensive for a variety of reasons. DOD would pay a reduced percentage of research and development costs as the contractor could amortize its expenses over all sales. The DOD, in contrast, would pay the entire amount of such costs for those items developed for the unique use of the DOD. Transaction Cost Economics theory, as discussed below, also holds that administrative savings would result because it would be less expensive to negotiate and administer contracts for commercial items.

Secretary of Defense William J. Perry cites the purchase of commercially available Global Positioning Receivers during Desert Storm as a success story. Military-unique, MILSPEC-compliant receivers, which tell soldiers exactly where they are, would have cost \$34,000 each, would have weighed 17 pounds each, and would have taken 18 months to produce. Receivers instead were purchased in the commercial marketplace at a cost of \$1,300 each. The same receiver today sells for about \$800 and weighs three pounds ("Blueprint for Change," 1994).

A second, closely-related reason is that the purchase of these less-expensive commercial items will lessen the effects of declines in DOD spending and in the defense technical and industrial base (Report of Acquisition Law Advisory Panel, 1993:Ch 8, 11, and 12). Clark Fiester, the late Assistant Secretary of the Air Force for Acquisition, was quoted as saying that increased use of commercial items will move us away from a separate military industrial base and toward a single industrial base:

[W]e created a separate military industrial base, one we can't afford anymore. When the Cold War ended, the world changed drastically, almost overnight. Declining budgets, a changed threat and a shrinking military force compel us to change the way we do business--by reducing costs and development time--while producing superior weapons. (Graham, 1995: 17)

The third reason cited by the Section 800 panel is that such items increasingly are more technically advanced than defense-unique counterparts (Report of Acquisition Law Advisory Panel, 1993:Ch 8, 12). LaBerge echoes this final reason:

What we really should focus on is buying into the commercial competitive process where continuous aggressive competition drives down initial product sale prices and provides stimulus for continued product improvement and cost performance benefit. (1994:24)

It is this environment, LaBerge says, that brought the price of cellular phones, camcorders, and personal computers down while increasing the performance of the items (1994).

Recognition of this commercial technological leadership led Secretary Perry in June 1994 to direct the military services to use performance and commercial standards in lieu of lengthy, detailed military-unique specifications.

[T]echnical leadership in the fields of technology most important to the Defense Department today--semiconductors, computers, software, telecommunications--is in industry. If we do not accept their standards, we pay extra and we also have a generation or two delay in getting the equipment. ("Blueprint for Change," 1994:9-10)

Two other commonly cited benefits that would result from increasing DOD's use of commercial items are quick response to operational needs and reduction of technology, cost, and schedule risks (Adams, Hevey and Shaw, 1992). The DOD needs much more time to bring a new system from conception to deployment than a commercial business needs to bring a new product to market (Gansler, 1989). Buying commercial technology



also cuts much of the time and money that DOD needs to spend on research and development of a new system. Using proven commercial technology also can mitigate much of the risks associated with untried DOD systems.

Acquisition reform proponents advocate increasing use of commercial buying-practices, not just of commercial items. The government takes much more time, paperwork, and money to complete an acquisition than do counterparts in private enterprise. General Counsel Murphy said that the government on average pays an additional 18 to 19 percent for what it buys solely due to the requirements it imposes on its contractors (GAO, 1995b:1). Such requirements include the need to comply with detailed specifications, the need to generate data, and the need to comply with numerous mandatory clauses such as those imposed by the Truth in Negotiations Act.

The DOD has attempted to adopt more commercial-buying practices in recent pilot acquisition programs. The Army, for example, recently purchased commercial helicopters using many commercial-buying practices. The acquisition still used considerably more time, involved considerably more personnel, and required considerably more data and paperwork than similar acquisitions by commercial enterprises. The General Accounting Office attributed these differences (1) to the requirements for the Army to comply with numerous laws and regulations; (2) to the more intensive and less flexible system requirements imposed by the Army; and (3) to the Army's need for documentation throughout the proposal and award process, partly to guard against contingencies such as bid protests (GAO, 1995a).

## **New Emphasis on Buying Commercial Items**

The Federal Acquisition Streamlining Act not only explicitly encourages the increased acquisition of commercial or modified commercial items; it also expands the definitions of those terms. These changes respond to criticisms that the former definitions, found in law and in regulation, were creating barriers to acquisition of commercially developed items. The discussion in this section first focuses on the former definitions before describing the changes created by the act.

**Current Definition of Commercial Item.** Much of the Section 800 panel's concerns were directed at the current definition of commercial item. The Federal Acquisition Regulation (FAR) addresses the definition in the context of whether an offeror is exempt from the certification requirement of the Truth in Negotiations Act. The contractor generally is required to submit detailed, certified data for negotiated prices above a specified threshold, now \$500,000, unless the proposed prices meet one of three exemptions. FAR 15.804-3 states a proposal is exempt from the certification requirement if the proposal was submitted under adequate price competition or if prices were set by law or regulation.

Of greater importance to this research is a third exemption, which is allowed when prices are, or are based on, established catalog or established market prices of commercial items sold in substantial quantities to the general public [FAR 15.804-3(c)]. Commercial items are "supplies or services regularly used for other than [g]overnment purposes and sold or traded to the general public in the course of normal business operations" [FAR 15.804-3(c)(3)]. These concepts incorporate explicit terms, which are defined in Table 1.

TABLE 1

DOD CONTRACTING DEFINITIONS

TERM	DEFINITION
Adequate price competition [FAR 15.804-3(b)]	Such a condition generally exists when (1) offers are solicited; (2) two or more responsible offerors that can satisfy the government's requirements submit priced offers responsive to the solicitation's expressed requirements; and (3) these offers compete independently for a contract to be awarded to the responsible offeror submitting the lowest evaluated price.
Based on catalog or market price [FAR 15.804-3(c)(6)]	A price is based on a catalog or market price only if the item is sufficiently similar to the catalog-or-market-priced commercial item to ensure that any difference in prices can be identified and justified without resort to cost analysis.
Cost or pricing data (FAR 15.801)	Such data is composed of all facts, as of the date of price agreement, that prudent buyers and sellers would reasonably expect to affect price negotiations significantly.
Established catalog price [FAR 15.804-3(c)(1)]	Such a price must be recorded in a form regularly maintained by the manufacturer or vendor. The catalog, price list, schedule, or other verifiable and established record must be available for customer inspection.
Established market price [FAR 15.804-3(c)(2)]	Current prices established in course of ordinary and usual trade between buyers and sellers free to bargain. Such prices can be substantiated by sources independent of the vendor.
General public [FAR 15.804-3(c)(5)]	A significant number of buyers other than the government or affiliates of the offeror comprise general public. The item in question must not be for government end use, which would include items acquired for foreign military sales.
Sold in substantial quantities [FAR 15.804-3(c)(4)]	To meet this term, items must be sold regularly in sufficient quantities to constitute a real commercial market.

It is in this explicit language that the differences between the FAR definition and the definition established in the streamlining act are found.

The Section 800 panel found that these FAR definitions prevent the government "from buying 'cutting edge' technology simply because it is an early, major buyer of that

technology” (Report of Acquisition Law Advisory Panel, 1993:Ch 8, 21). This is especially true given that models, samples, prototypes, experimental units, and other categories *sold in nominal quantities* are excluded from the types of commercial items exempt from the requirement for certified cost or pricing data (FAR 15.804-3(c)(4)).

Numerous studies have confirmed that this FAR definition of commercial items has blocked access by commercial industries to the DOD. Satisfying the requirements of this exemption for “state-of-the-art commercial items or services is close to impossible and even the basic exemption often is applied differently by each contracting officer” (Adams, Hevey, and Shaw, 1992:V). Some industries, Templin and Heberling state, rarely qualify for the exemptions. The space launch and aircraft industries, for example, sell commercial products through large contracts. Aerospace products rarely meet the established market price test and, therefore, cannot qualify for an exemption from the requirement to submit certified cost or pricing data (Templin and Heberling, 1994).

**New Definition of Commercial Item.** The streamlining act alleviates some of the above concerns by extending the definition of commercial item in several key areas. Upon implementation of the act, the commercial item definition will include any item, other than real property, that is of a type customarily used by the general public or by *nongovernmental entities for purposes other than governmental purposes* and that has been sold, leased, or licensed to the general public or has been *offered* for such sale, lease, or license to the general public. Items that would be commercial items except for

modifications customarily available in the commercial marketplace or for minor modifications to meet federal government requirements also will be considered commercial items (P.L. 103-355, Section 8001).

Perhaps the greatest departure from the current FAR definition is the act's inclusion of items that have evolved from commercial items through advances in technology or performance. Such state-of-the-art items will be considered to be commercial in nature as long as they will be available in the commercial marketplace in time to satisfy the delivery schedule. Gone is the current FAR requirement that such items must have been sold in substantial quantities in the marketplace in order to be considered commercial items.

The streamlining act also alters the requirement that historical sales must have been made to the general public. The act adds a category of nondevelopmental item (NDI) to include any items that have been developed previously and are in use by any federal, state or local government, or by any foreign government with which the United States has a mutual defense cooperation agreement. Also included in this definition of NDI are any items of supply currently being produced that do not meet the definition of NDI solely because the items are not yet in use (P.L. 103-355, Section 8001). One critic faults the act for not clearly distinguishing whether an NDI is a commercial item or whether a commercial item is an NDI (Hiestand, 1994). The streamlining act includes commercial items both as a subcategory of NDI and as its own separate category. This ambiguity will have to be resolved by those establishing implementing guidance.

## Pricing Theories

Stimulating the push for increased use of commercial products is the belief that the free market will set prices of commercial items and that those prices will be same regardless of whether the DOD or a private entity is the buyer. A review of four groups of theories will examine whether this assumption is true. The four theories--classic microeconomics, transactional cost economics, game theory, and contestable market theory--all contribute to an understanding of how the prices that DOD pays for its requirements are established.

**Classic Microeconomics Theory.** Classic microeconomics theory, also known as modern price or market theory, examines the effectiveness of market forces in establishing prices. The theory classifies markets on a continuum by degrees of competition among buyers and sellers. As Figure 2 shows, the perfect and effective competition levels at the center of the "bow-tie" diagram are characterized by many buyers and many sellers. Neither the buyer nor the seller can control price. The control that either the buyer or the seller can exert over setting price increases as we move away from the center toward imperfect competition conditions at either extreme. The number of sellers declines as we move to the left toward monopoly; sellers in each category increasingly are able to control prices. The number of buyers decreases as we move to the right toward monopsony, in which there is only one buyer who theoretically can control the prices ultimately set by the seller. Each of the types of competition is defined in Table 2.

The market that works best at price-setting is the one at the center of the diagram, where, again, neither the buyer nor the seller can control price. The theory of perfect

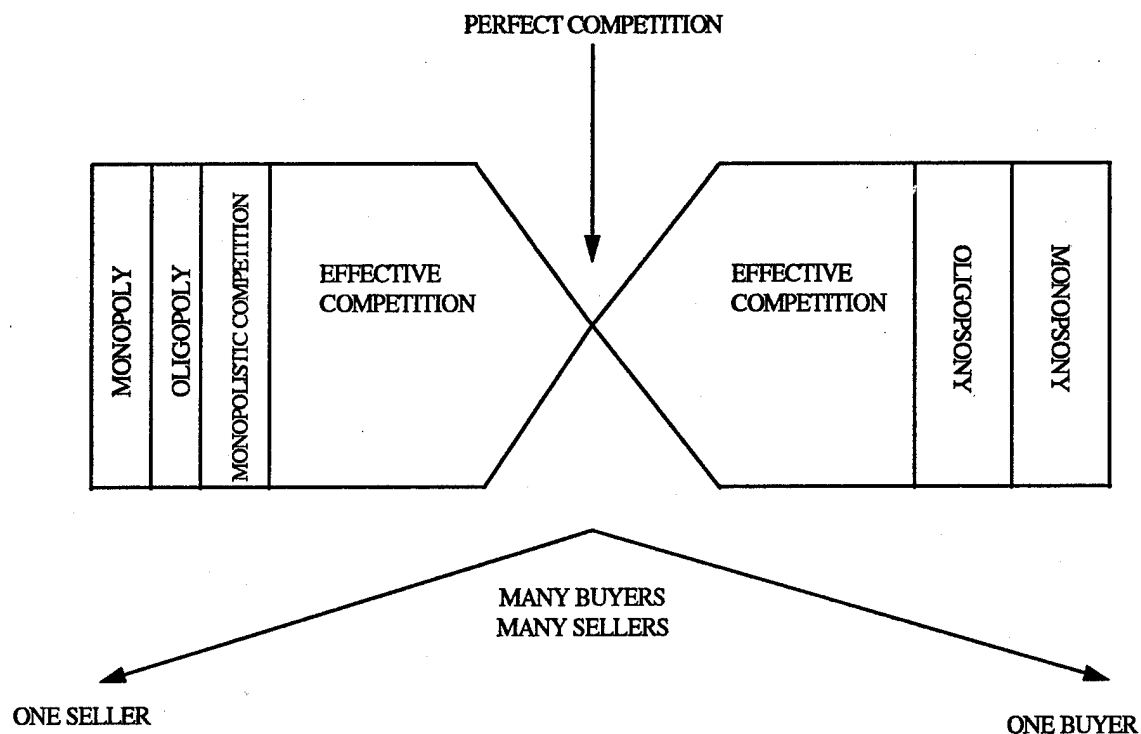


Figure 2: Market Advantage

competition holds that the market will establish a long-run equilibrium price based solely on supply and demand. That price presumably would be equitable and satisfactory to both the buyer and the seller and would represent a fair return to the seller and a fair value to the purchaser (Heinritz, Farrell, Giunipero, and Kolchin, 1991). Perfect competition also assumes that all buyers and sellers are rational, which is defined as “fully informed,” an ideal, but unattainable condition (Watson and Getz, 1981:252).

Closely related is the concept of effective competition. In this case, the numbers of sellers are limited but there are enough so that no one seller controls the market price. Support for the market price rests on the idea that competitive forces determine what

TABLE 2  
TYPES OF MARKETS

CONCEPT	DEFINITION
<b>Perfect competition</b>	Such a market is characterized by many fully-informed sellers and buyers such that no buyer or seller can control price. Products would be homogeneous and interchangeable. There would not be barriers preventing sellers and buyers from entering or leaving the market at will. Neither the seller nor the buyer can control the price (Watson and Getz, 1981:252; and Burt, 1990).
<b>Monopoly</b>	One seller controls the entire supply of a commodity and "thus is free to maximize its profits by regulating output and forcing a supply-demand relationship that is most favorable to the seller" (Dobler, Burt and Lee, 1990).
<b>Oligopoly</b>	Such a condition would occur in a market in which there are few sellers and many buyers of goods that have degrees of differentiation. The seller, due to advertising and quality differentiation, is able to control price to some extent. Each firm knows that its actions will affect the entire industry (Watson and Getz, 1981:252; Burt, 1990; and Heberling and Graham, 1993).
<b>Monopolistic competition</b>	This type of imperfect competition is characterized by many sellers and many buyers free to enter and leave the market at will. There, however, is differentiation among similar products that are close substitutes for each other. The seller is better able to control price than a seller in a perfectly competitive market (Watson and Getz, 1981:252; and Burt, 1990).
<b>Effective Competition</b>	There are fewer sellers than there are in perfect competition. There are, however, enough sellers so that no one seller can dominate the market. Sellers are active rivals (Burt, 1990).
<b>Oligopsony</b>	This condition is similar to that of oligopoly except that there are many sellers and only a few buyers. Seller's control over price is limited (Burt, 1990)
<b>Monopsony</b>	Such a market condition occurs where there are several sellers and one buyer, the DOD. Sellers tend to have little control over price (Burt, 1990).

quantities will be bought and sold at what prices, under specific market conditions, at a moment in time. This view evolves from the concept of perfect competition and the



understanding that there is competition among potential buyers for the available supply and competition among potential sellers for the available demand (ASPM, 1986:Ch 2, 3).

Lowry combines this classic concept of an economic market with a legal market. The market, he says, defines the arena in which bargains, sales, or transactions occur. The market also generates agreement on current prices and governs how legal title to goods and services will be transferred during a sale:

In the market relation built by the legal and customary framework, all that is needed is the simple sale. The average view, the average rationality, and the average anticipation of the future, all function to provide the social statement of aggregate intellectual judgment, and the ordinary buyer and seller can rely on the general safeguards of average price in this structure relation. (Lowry, 1976:10)

Classic microeconomics theory addresses the diminishing effectiveness of the marketplace to establish price. The market becomes less effective at establishing fair and reasonable prices as it moves away from perfect and effective competition toward imperfect competition. A seller in a monopolistically-competitive market can control prices to a degree because buyers have been convinced, through advertising or other means, that the seller's product is better than or different from that of its competitor. As the number of sellers decreases, the amount of control over price exerted by an individual seller increases (ASPM, 1986:Ch 2, 3).

Acquisitions for DOD weapon systems generally occur in a market characterized by oligopoly, monopoly, or monopsony, three conditions at the extremes of imperfect competition on the market continuum. The seller increasingly becomes a price-maker as the number of competitors decreases. For example, the DOD frequently faces a oligopolistic market, in which a limited number of contractors are able to meet the DOD's

requirement. Oligopolists periodically exercise monopolistic price-setting control but “any buyer who has purchased in oligopolistic markets knows that price competition can be intense” (Dobler, 1990:243). A monopoly environment certainly would characterize the negotiation of needed changes after contract award. Prices in such a one-on-one situation are established via negotiation, generally with the contractor benefiting as a result of its powerful position as a sole-source supplier.

**Contestable Markets.** Perfect competition among many fully-informed buyers and sellers is considered an unattainable ideal. Proponents of the relatively new theory of contestable markets, however, believe that a market composed of oligopoly or even monopoly firms can still provide the perceived benefits of perfect competition. In a perfectly contestable market, “market forces are almost as powerful, and firms almost as powerless, as those under perfect competition” (Baumol, 1991:513).

Baumol, Panzar, and Willig define a perfectly contestable market as one “into which entry is completely free, from which exit is costless, in which entrants and incumbents compete on complete symmetric terms, and entry is not impeded by fear of retaliatory price alterations” (1982:349). An entry barrier is defined as an action or condition that prevents others firms from entering a market. Such a barrier allows the incumbent firm to obtain above normal profits or exhibit other forms of unacceptable performance (Bailey, 1984:118). Entry barriers can result from government regulatory action or can result from other natural forces of the market. Increasing research attention has been devoted to sunk costs--outlays that the firm cannot recoup without substantial

delay (Bailey, 1984:114). Sunk costs constitute an entry and exit barrier. The incumbent in the market that has a large amount of sunk costs invested will be more likely to attempt retaliatory action against entrants into the market. Potential entrants facing the need to invest sunk costs and the potential of such retaliatory pricing will be less attracted to the market (Kessides, 1990:614).

An oligopolistic or monopolistic firm operating in a perfectly contestable market will base its pricing and supply decisions on the perceived threat of future competition.

Monopolists and oligopolists who populate such markets are sheep in wolves' clothing, for under this arrangement potential rivals can be as effective as actual competitors in forcing pro social behavior upon incumbents, whether or not such behavior is attractive to them. (Baumol and others, 1982:350)

The monopolist or oligopolist operating in a perfectly contestable market will resist the urge to set prices high enough to earn excessive profits in recognition that such high profits would attract competitors to the market. Expanding the number of sellers in turn would soon drive down prices and profits (Bailey, 1984:117).

Freedom to enter and exit the market is just one feature of a contestable market. A pool of potential entrants able to respond quickly to a market opportunity also characterizes a contestable market. A third condition is that an incumbent's pricing response to entry by competitors be slow. This third condition is not absolutely necessary but does help to prevent the incumbent from making retaliatory price changes to combat competitors (Bailey, 1984:120-121).

Proponents of the theory of contestable markets recognize that this threat of potential competition works best in a perfectly contestable market, a condition that, like the utopia of perfect competition, may not exist in reality (Baumol, 1991:508).

It is only the presence of impediments to entry that permits firms to conspire to form coalitions in order to profit at the expense of rivals or consumers, that makes a producer dependent on the performance of circumscribed numbers of input suppliers and that renders interdependent economic agents vulnerable to poor performance by those upon whom they must depend. This, in turn, leads to the adoption of costly mechanisms that can be used to monitor and control the behaviour of those other parties. (Baumol, 1991:509)

A study by Morrison and Winston, however, illustrates that contestability is not an "all-or-nothing proposition" (1987:65). They theorize that potential competitors may have an important effect on market welfare even in an *imperfectly* contestable market. The authors cite recent studies that have focused on the airline industry after deregulation. "In all likelihood, perfect contestability is not present in the airline industry because carriers require time and must absorb sunk costs to obtain gate space and establish patronage" (Morrison and Winston, 1987:59). The authors conclude that market welfare may benefit even from an *imperfectly* contestable market. The authors found in their own study of the airline industry that three potential competitors had about the same effect on market welfare as did one actual competitor (1987:61).

**Transactional Cost Economics.** Transactional Cost Economics (TCE), championed by Oliver Williamson, examines pricing and contracting structures from another angle. TCE is an interdisciplinary theory joining economic and organizational theory with aspects of contract law (Williamson, 1981).

First, a description of the basic tenets of TCE is required. Williamson defines a transaction as the transfer of a good or service across a technologically separate interface (Williamson, 1981). The transfer of title of a mainframe computer from IBM to the Air Force would constitute a transaction as would the transfer of the computer from one separate IBM subsidiary to another. Williamson defines the cost of the transaction as the friction that occurs between the parties to the exchange (Williamson, 1981).

Templin finds there are transaction costs associated with pre-award actions of drafting and negotiating contracts and with post-award actions such incorporating changes and resolving disputes (1994). Costs associated with proposal preparation and negotiation, for example, can be significant and generally increase as the number of unique or contended requirements increases. The significant numbers of acquisition laws and regulations unique to the federal government increase transaction costs for parties to DOD contracts. In fact, one comparison of commercial and military acquisitions procedures found that it is five times more expensive to bid on defense contracts than commercial solicitations. The study also found that it cost a commercial supplier three times more to administer a defense contract than a commercial effort (Center for Strategies and International Studies, 1993). These transactions costs have been found by numerous studies to be barriers preventing commercial industries from entering the defense market (See, for example, Humerick and Minnich, 1992; and Templin and Heberling, 1994).

Two of TCE theory's basic concepts--bounded rationality and opportunism--distinguish TCE from classic microeconomics theory. Williamson's concept of TCE proposes that individuals operate within bounded rationality. The microeconomics

concept of rationality requires complete knowledge of, for example, the market conditions and the positions of competitors. Williamson's "organization man" does not possess this complete knowledge.

Unlike "economic man," to whom hyperrationality is often attributed, "organization man" is endowed with less powerful and analytical and data-processing irrationality. . . . As a consequence incomplete contracting is the best that can be achieved. (Williamson, 1981:553)

Templin finds that this concept of bounded rationality is an appropriate assumption for the defense sector, given its complexity and uncertainty. Neither the DOD contracting officer nor the contractor can envision all risks associated with meeting technical, schedule, and cost requirements. Changing political or world environments, such as congressional budget cuts, program redirections, or even the end of the Cold War, compound this uncertainty (Templin, 1994).

The second major distinction between classic microeconomics theory and TCE is the latter's concept of opportunism. Microeconomics theory holds that players are seeking to protect or enhance their self-interests. TCE holds that individuals act opportunistically by extending "simple self-interest seeking to include self-interest seeking with guile" (Williamson, 1979:234). Again, Templin finds that "actual, perceived, or feared" opportunistic behavior characterizes DOD contracting (Templin, 1994:122). Taxpayers frequently read of procurement scandals in which a contractor has committed fraudulent or other unethical acts in an attempt to win unfair compensation. The DOD contracting officer continuously is cautioned, even directed, to guard against the potential for such opportunistic behavior.

A final TCE central tenet to be discussed is the theory's reliance on governance structures to define the institutional framework within which the integrity of the transaction is decided (Williamson, 1979). A governance structure defines the appropriate control measures for a contract. "The best governance structure is one that can adapt to changes arising from bounded rationality while protecting the parties against the risks of opportunistic behavior," says Templin (1994:120). It is reasonable, for example, to include in the governance structure the types of protection that a buyer, such as the DOD, should obtain from the seller, such as a defense contractor, to ensure a fair and reasonable price. Thus, the DOD may rely on adequate price competition for standard commercial items and may rely on contractor certifications to detailed cost element breakdowns for more complex procurements.

Williamson finds that selection of an appropriate governance structure is a critical choice in any organization's attempt to minimize transaction costs. "Use of a complex structure to govern a simple relation is apt to incur unneeded costs, and use of a simple structure for a complex transaction invites strain" (1979:239). Three critical dimensions affect the selection of an appropriate governance structure for a transaction. The dimensions are asset-specificity, uncertainty, and frequency (Williamson, 1979). Asset-specificity refers to the degree to which special purpose investments in capital or human assets are required for the transaction (Templin, 1994:119). Uncertainty refers to "unanticipated problems or those arising from opportunistic behavior, such as one party

taking advantage of events that require contractual changes to improve its position at the expense of the other party" (Templin, 1994:119). The third dimension refers to the frequency with which the transaction recurs.

**Game or Bargaining Theory.** Game theory, called the bargaining relationship by Gansler, examines how prices are set in individual contractual actions. Game theory assumes that offerors will set prices so as to beat the prices they anticipate their competitors will set (Heberling and Graham, 1993). Firm A, in deciding how to price a proposal, will anticipate the pricing strategy its competitors will use. Firm A may assume that Firm B desperately needs the contract in order to stay in business. Firm A then would assume that Firm B will propose a below-cost price in an effort to win the contract. Firm A then may reduce its price even lower than what it assumes Firm B will propose. Firm B, of course, simultaneously bases its pricing strategy on what it believes its competitors, including Firm A, will propose. Heberling and Graham theorize that in such a game, the question becomes how low each contractor will go below cost in order to win (1993).

Potential outcomes of the bargaining relationship also change as the balance of power shifts. The government is at the center of power when running a competition to select a source. The power balance shifts to the contractor after award when the government becomes dependent on the contractor, its sole source, to accomplish the inevitable changes required in DOD contracts (Gansler, 1989). Gansler, as well as Heberling and Graham, recommend that the DOD contracting officer at least recognize the game being played if not participate in it by influencing anticipated pricing strategies.



Lamm and Vose adopt a similar approach. They describe eight pricing strategies and theorize that a seller will select the appropriate strategy based on several external and internal variables (1988). DOD contracting officers can better negotiate prices if they can recognize the clues to the pricing strategies. One of the significant seller internal characteristics identified by Lamm and Vose is whether the seller is operating near capacity. The buyer can anticipate increased likelihood of a buy-in strategy when the seller is operating at low capacity (1988). Heinritz and others state that excess capacity and supply are characteristic of a buyer's market, in which prices are apt to be lower than they would be in a seller's market. Other characteristics would be the existence of reduced lead times, softness in published prices, and willingness on the part of seller to negotiate. Reverse conditions would characterize a seller's market (Heinritz and others, 1991).

Lamm and Vose also examine external variables, which include (1) the nature and life-cycle stage of the product; (2) the extent that competition exists in the market; and (3) the extent to which the buyer exerts control over the seller (1988).

### **Levels of DOD Acquisition**

The top line of Figure 3 shows a continuum of DOD acquisitions bounded at one end by the low-dollar, high-volume acquisition of mostly standard commercial items and at the other end by the high-dollar, low volume acquisition of weapons systems and items unique to DOD. The first category, generally the bread and butter of operational contracting shops, represents the largest number of actions. In fact, 98 percent of contract

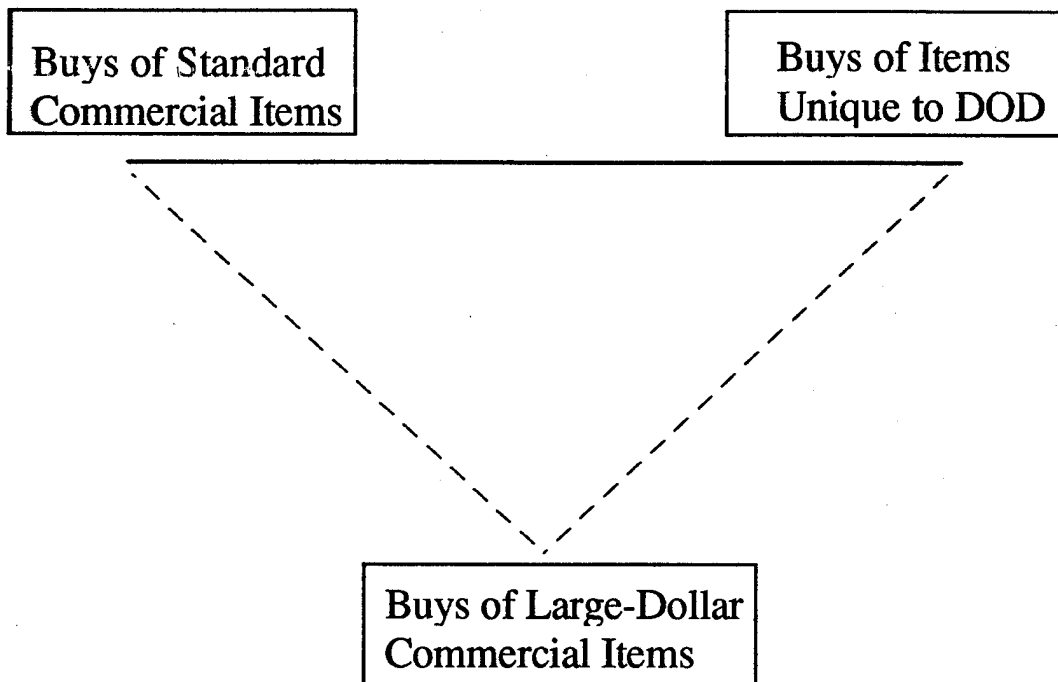


Figure 3: DOD Acquisition Continuum

actions (each \$10,000 or less) in 1976 spent about 11 percent of total defense dollars.

The remaining 2 percent of the actions (over \$10,000 each) spent 89 percent of the dollars in 1976 (Gansler, 1989:143). A similar situation existed in Fiscal Year 1994 in Air Force Material Command, according to information gathered from the Air Force Contracting Management Reporting System. About 94 percent of AFMC actions (each \$25,000 or less) spent about 2 percent of the total dollars spent. About 5 percent of AFMC actions (\$25,000 or more) accounted for more than 96 percent of the dollars spent.

Successful implementation of the Federal Acquisition Streamlining Act will expand, if not create, a third category (Figure 3) of DOD acquisitions. The number of large-dollar buys of established commercial items, leading-edge commercial items, and

modified commercial items will increase. The act, in fact, specifically names as pilot programs several multi-billion dollar initiatives for purchasing JPATS (as discussed above) and commercial-derivative aircraft or engines (P.L. 103-355, Section 5064).

This section examines the implication that the pricing theories discussed above will have on the two traditional levels of DOD acquisitions. The section concludes with a discussion of the theories and the emerging category of large-dollar acquisitions.

**Purchases of Standard Commercial Items.** Classic microeconomics and TCE theories agree that the competitive marketplace is the appropriate governance structure for exchanges of standard commercially available items between private parties. The prices of standard off-the-shelf items (such as supplies common to all business and industry) result from the collective activities of buyers and sellers. These theories also hold true for DOD purchases of commercial items, as long as the DOD does not become a significant source of demand.

Williamson agrees with classic microeconomics theory that a non-transaction specific structure, such as the marketplace with Lowry's concept of a legal market added, is the appropriate governance for simple contractual relations. "Items that are unspecialized among users pose few hazards, since buyers in these circumstances can easily turn to alternative sources, and suppliers can sell output intended for one order to other buyers without difficulty" (Williamson, 1979:239). Competition involving large numbers continuously self-polices the market (Williamson, 1979). Competition controls opportunistic behavior. Parties are free to re-enter the market if they are unsatisfied with the behavior of their current supplier. Parties can compensate for unbounded rationality--

and the dangers created by resulting incomplete contracts--by agreeing to short-term contracts for standard items. Any information discovered would be used to alter later transactions for the same standard items.

It is questionable whether DOD can rely on market forces for purchases of all but the most standard, commercially available items (Templin, 1994). Gansler finds that the "invisible hand" of market control may not work effectively for buys of even standard items because DOD's acquisition practices traditionally have not mirrored those found in the private sector. Private sector buyers may choose the item they believe represents the best value to their company. The DOD buyer can select a source based on best value only if the solicitation thoroughly defines best value, usually through detailed specifications and inspection standards. DOD contracts for commercial items nevertheless generally are awarded to the bidder proposing the lowest price. The supplier adapts to these expense-generating, detailed requirements and foregoes private business either because the company no longer can effectively compete in the private market or because the defense market is so lucrative. Other competitors are reluctant to enter the competition for DOD business because they do not want to bother with the red tape inherent in the process. There also is no incentive for the DOD supplier to provide superior goods, because the supplier will not be rewarded necessarily with follow-on business and poor performers generally will not be penalized. The new acquisition will begin with a "level playing field" in which more emphasis is placed on the proposed prices than on the competitors' performance records (Gansler, 1989).

DOD also has been unable to take advantage of the benefits of a contestable market when purchasing standard commercial items and services. Federal acquisition regulations specify numerous clauses and provisions that must be included in all contracts with DOD. Such clauses usually are not found in contracts in the commercial arena and are considered an entry barrier for commercial contractors. This entry barrier is being torn down as the Federal Acquisition Streamlining Act of 1994 has mandated that only those clauses required by law should be incorporated in contracts for commercial items.

Proposed implementing guidance of the streamlining act adopts the concept of contestable markets. The FAR Council has proposed that adequate price competition will be considered to exist, even if only one offer is received, as long as the contracting officer believed that two or more offers would be received. The contracting officer would have to be able to determine that the firm that did submit an offer believed that at least one other competitor was capable of submitting a meaningful, responsive offer ("FAR Case 94-721," 1995:2285). In the words of contestable market theory, the firm would have to believe that there were no barriers prohibiting potential competitors from entering the market.

**Acquisitions of DOD-Unique Items.** At the opposite end of the acquisition spectrum from the large-volume, low-dollar purchases of commercial items are acquisitions for development and production of DOD-unique systems. Suppliers of these requirements comprise the defense industrial base. Contracts for the research and development leading to such systems are awarded either after a competitive source selection process or are the result of a negotiation with one or a limited number of

potential contractors. Follow-on development and production contracts generally are negotiated on a sole source basis with the company that performed the research and development. Related changes to an awarded contract always are negotiated with the contractor as the sole source. Classic microeconomics theory, TCE, contestable market, and game theory will be examined below for theoretical support for the complex web of laws and regulations governing such acquisitions.

Experts agree that the military industrial base does not operate in a free market. Gansler, in fact, cites 30 important assumptions of free market economic theory that are absent from the defense market (1989:158-160). These missing characteristics include free entry and exit from the market, conditions necessary for contestable markets. Gansler also states that the rising prices of defense equipment result from the failure of market mechanisms for DOD acquisitions. One generation of military equipment costs three to five times as much as a prior generation, even after adjusting for the effects of inflation and of increasing unit costs due to decreasing quantities. In contrast, the cost of commercial equipment is going down in constant dollar price while the performance levels are increasing (Gansler, 1980:83).

Federal purchasing statutes have attempted to force-fit the DOD acquisition environment into the classic free-market theory in which market forces set fair and reasonable prices, including profit (Heberling and Graham, 1993; Peterson, 1987; and Gansler, 1989). Gansler says that it is this interrelated web of public accountability and regulation substituting for the free market that distinguishes the defense-industry market

(Gansler, 1980 and 1989). The Competition in Contracting Act (CICA), for example, encourages the DOD and other executive agencies to acquire its goods and services via “full and open” competition.

The lofty goal of increasing competition fails to recognize that acquisitions for DOD-unique systems generally occur in a market characterized by oligopoly, monopoly, or monopsony. Extensive competition is not possible when there are few or even only one potential supplier. The defense industry is indeed characterized by a limited number of sellers, and the numbers are declining further. Peterson finds that, from 1960 to 1985, five defense industry companies received about 20 percent of total defense budget; 25 companies received about 50 percent of the budget; and 100 companies received about 70 percent of the budget (1987). What Norman Augustine, president of the new Lockheed-Martin, has termed a collapsing defense market has spurred 22 defense mergers or major acquisitions since the end of 1992 (Pare, 1994:96).

The DOD contracting officer must rely on other than competitive forces to ensure that agreements are fair and reasonable. Methods to facilitate these simultaneous goals are dictated by statute and regulation, such as the FAR and its supplements. In fact, the web of regulations that is now the target of simplification efforts emerged, at least in part, to guarantee that the DOD satisfies its needs at fair and reasonable prices. Proponents of TCE would say that such complex governance structures are necessary to protect both parties from unfettered opportunistic behavior and unbounded rationality.

More complex governance structures are required for the large-dollar, DOD-unique acquisitions under discussion. Such acquisitions can involve significant uncertainty

and generally are recurrent or long-term in nature. Such acquisitions usually require the contractor to invest in transaction-specific assets. A contractor, for example, may have to design special tooling and test equipment or may even have to construct special facilities in the course of performing one specific contract. Williamson finds that a bilateral monopoly links a buyer and seller in such a contract. He recommends a higher-level governance structure to guard against opportunistic behavior in such a contract, which by definition is incomplete as all unknowns could not be addressed prior to contract formation (Williamson, 1979 and 1981).

[B]oth buyer and seller are strategically situated to bargain over the disposition of any incremental gain whenever a proposal to adapt is made by the other party. Although both have a long-term interest in effecting adaptations of a joint profit-maximizing kind, each also has an interest in appropriating as much of the gain as he can on each occasion to adapt. (Williamson, 1979:242)

An example of terms that would be included in a complex governance structure is the requirement of the Truth in Negotiations Act of 1962 that a contractor furnish (unless exempted for limited reasons) the detailed cost or pricing data used to determine a proposed price. The contractor, furthermore, is required to certify that the provided data are accurate, current, and complete. DOD auditors are given the right to examine the contractor's records. The government also has the right to reimbursement, to include interest and, in some cases, penalty should the certified data later be found to be less than accurate, current, and complete (FAR 15.804).

The concepts of game or bargaining theory, according to Heberling and Graham and to Gansler, are applicable to these large-dollar weapon system acquisitions. Heberling and Graham find that the market addressing DOD-unique items is a monopsony, with



demand dictated by Congress, through the DOD, as the only buyer of the public good of national defense. Continuing to acquire DOD-unique systems under the assumption that the forces of competition will establish fair and reasonable prices results in buy-ins and cost overruns (1993).

Game theory holds that competitors will propose unrealistic, below-cost prices in an attempt to win a contract. FAR states that a "buy-in" occurs when a contractor submits an offer below anticipated costs with the intent to (1) increase the contract amount after award through unnecessary or over-priced change orders or (2) receive follow-on contracts at artificially high prices to recoup the losses experienced in the initial contract (FAR 3.501-1). Gansler finds that contracting officers can play the "oligopoly game," in which they play the contractors against one another in an attempt to win promises of high performance, low cost, and early delivery (1989). Such a strategy further encourages the contractor to buy-in, with the intent of later recouping losses. Contractors may find no difficulty in recovering from such buy-ins because the center of power lies with them in follow-on negotiations with the government (Gansler, 1989).

Heberling and Graham recommend that the contracting officer play the game by anticipating and countering contractor pricing strategies in an attempt to prevent or mitigate buy-ins. Government players, for example, could limit the use of noncompetitive, follow-on contracts by pricing the primary contract and all of its follow-on vehicles at the award of the initial contract (1993). This action would force contractors to fairly distribute their proposed prices over the *initial* contract and its follow-on actions.

Prevention of a buy-in or what Lamm and Vose call a "penetration pricing strategy" supports attempts to increase the control that the government has over the contractor. A penetration pricing strategy specifically is one in which the seller sets a low price initially until the market is penetrated; prices then are increased to generate profit. Such a strategy is unlikely when the buyer can exert control over the seller. This control, accomplished through regulations, inspections, and audits, is unique to the government-commercial contracting relationship (Lamm and Vose, 1988).

**High-Dollar Acquisitions of Commercial Items.** Proponents of the acquisition reforms would have us believe that the free market will establish prices of commercial items and that those prices will be the same regardless of whether the DOD or a private entity is the buyer. A review of microeconomics pricing, TCE, contestable market, and game theories calls this assumption into question. The DOD contracting officer may find that the difficulty of ensuring reasonableness of price increases as the dollar value, uniqueness, and technological complexity of the commercial item increase. This increasing difficulty especially will be true as regulations governing the acquisition of leading-edge and modified commercial items are implemented.

Concepts from the theory of contestable markets support the streamlining act's designation of items emerging from commercial technology as commercial items usually exempt from the submission of cost or pricing data. The contracting officer may attain some assurance that the item has been priced at a reasonable price if the contractor believes that prices resulting in excessive profits will attract competitors to the market.

The forces of potential market competition may be dampened, however, if the contractor can erect sufficient barriers to protect itself from market entry by other firms. Such barriers could include patents owned by the contractor; the necessity for large sunk costs for market entry; or contractual arrangements that will lock the contractor into long-term, sole-source relationships with the government. Much of the interest in contestable market theory has stemmed from the deregulation of the airline and other industries. Bailey and Baumol state that regulators should seek policies that promote contestability. "Moreover, regulators should keep their eyes open for entry barriers erected by firms and should take steps to discourage the maintenance of those barriers" (Bailey and Baumol, 1984:123). Are there steps that a DOD contracting officer who is buying high-technology commercial items can try to prevent contractors from erecting market entry barriers?

Classic microeconomics theory would lead us to believe that the market will ensure that the prices of these now-considered commercial items will be fair and reasonable. TCE also would recommend a market governance structure. But these general theories do not address the impact of the DOD as buyer, regulator, adjudicator, and governing sovereign power. Templin finds that economic market relationships fall short when dealing with the federal government, which can never divorce itself entirely from its powers as a sovereign (1994). This sovereign power gives the federal government rights not accorded to private parties who go to the commercial marketplace to satisfy their needs. Potential benefits of even contestable markets are eroded if these government rights are considered barriers to market entry by potential suppliers. A standard clause required in all government contracts, for example, gives the government the right to

terminate the contract for its own convenience. Such a clause rarely would be found in a private-sector contract based on the commercial market but is necessary to protect the federal government in its sovereign capacity. The sovereign power needs the flexibility to terminate a contract to address changes in government requirements, funding, or policy priorities. Whether this right to terminate affects a contractor's "commercial" pricing strategy for sales to the government is not readily ascertainable.

Other aspects of the public acquisition process also serve to discourage "best" prices. Sheth, Williams, and Hill point to the statutory requirements that the contracting officer release proposed and awarded prices to disappointed offerors or, upon request, to the general public.

There are good reasons why the management of a firm might be willing to sell specific commodities under a government contract at lower prices than those prevailing in the marketplace at a particular time. There are also good reasons why management would not want this fact revealed either to its customers or competitors. If such businesses bid on government contracts at all, it is likely to be at prices higher than would be quoted if there were no price disclosure. (1983: 10)

Ritenburg identifies another potential problem preventing the DOD from obtaining the benefits of true commercial-purchasing practices. Government contracting officers face the threat of protest by an unhappy party and such protests effectively halt the procurement process. Agents for private entities, on the other hand, can conduct what Ritenburg terms "discretionary competitions" without fear of protest to an outside agency. The streamlining act, Ritenburg says, will further motivate contracting officers to make acquisitions "protest-proof." The act, in fact, provides additional threats of protest.

For example, in view of FASA's explicit statutory preference for commercial items, a decision to embark on anything *other* (italics furnished by original

author) than a commercial item procurement could itself become the basis of future protests. ... Also, one can envision an offeror asserting that its not-quite-commercial item should be considered for award .... (1995:7)

Applicability of Lamm and Vose's ideas would indicate that the number of actions in which the DOD becomes the victim of a buy-in or penetration-pricing strategy may increase as a result of the reduction of control that the government will be able to exert over the supplier. The streamlining act instructs policy-makers to determine what clauses, now standard, should be deleted from DOD contracts for commercial items. Likely to be targets of this elimination process are those clauses that give the DOD rights not ordinarily afforded to private contracting parties when those clauses are not necessary strictly to protect the interests of the sovereign power. For commercial-item acquisitions, for example, the right to terminate a contract likely will remain; the right to audit contractor records to verify proposed prices, however, will be curtailed.

Buy-in strategies are especially dangerous when the awarded contract requires the government to reimburse all contractor costs. The streamlining act, however, recommends use of firm-fixed contracts, in which the contractor is paid no more than the negotiated total price, when buying commercial or modified commercial items. But fixed-price contracts also pose a danger. Cibinic and Nash find that such contracts pose the risk of poor contract performance as the contractor seeks to reduce costs (1986). The contractor also still may try to negotiate excessively-priced contract modifications or follow-on contracts.

The gamesmanship envisioned by Heberling and Graham also has implications for the acquisition of high-dollar commercial items. The pair centered their discussion on games played by the contractors and the DOD contracting officer in competitive buys. Could games also be played in a sole-source buy, for example, of a state-of-the-art product? Could the offeror propose a low price in an effort to lock-in its product to a long-term program?

### **Current Price Analysis Guidance and Tools**

The effectiveness of a marketplace pricing or governance structure may be diminished by DOD's role as a sovereign power. And DOD may not pay the fair and reasonable price unless the contracting officer understands and participates in the games that competitors play. But DOD contracting officers have not been left entirely in the cold in their efforts to verify the reasonableness of the prices of expensive, commercial items. This section will summarize existing federal government procurement price analysis guidance and tools. The case studies to be performed during this research will investigate whether this guidance and these tools are sufficient to help the contracting officer negotiate the price of high-dollar commercial items.

FAR 15.802(b)(1) charges contracting officers with purchasing supplies and services at "fair and reasonable prices." The ASPM defines a fair and reasonable price as one that is acceptable to both the government and the seller. Both the seller and the buyer may accept that the price determined by market forces is fair and reasonable. Leenders, Fearon, and England define a fair price as "the lowest price that ensures a continuous

supply of the proper quality where and when needed” (1985:280). The seller may find a price reasonable only if the price covers its costs and allows for a reasonable profit. The buyer, on the other hand, may find a price to be reasonable if it is the lowest that must be paid to acquire the needed product (ASPM, 1986 and 1987).

Tools used to verify that prices are indeed fair and reasonable are grouped into two broad categories, price analysis and cost analysis.

(1) Price analysis requires “examining and evaluating a proposed price without evaluating its separate cost elements and proposed profit”(FAR 15.801).

(2) Cost analysis is the much more detailed review and evaluation of all of the separate cost elements and profit that comprise a proposed and negotiated price.

Included is an in-depth analysis of the offeror’s cost or pricing data and the judgmental factors applied to project the estimated costs to decide whether the proposed costs represent what the cost of the contract should be, assuming reasonable economy and efficiency (FAR 15.801).

Cibinic and Nash state that price analysis generally is based on pricing data obtained from sources other than the contractor; cost analysis, in contrast, is based on a review of the estimated costs proposed by the offeror (1986:61).

Price analysis, according to the ASPM, generally is favored over cost analysis. “However, it is rather like a daydream that starts ‘Life would be good if only . . . . ‘ Price analysis is an objective, something to strive for” (ASPM, 1986:Ch 2, 8). Price analysis alone traditionally has been used to evaluate prices on low dollar contracts or on contracts awarded based on adequate price competition. Procurement guidance recommends that a

contracting officer apply more stringent levels of analysis as a procurement situation moves away from effective competition, especially as the dollar value of the procurement increases (Crumbie and Willis, 1990). Cost-element analysis, combined with price analysis to ensure that the bottom-line price also is fair and reasonable, traditionally has been used for the large-dollar acquisitions of weapon-systems.

DOD and other executive agencies have relied on information provided by a contractor to determine whether a proposed item is indeed a commercial item with a price based on established catalog or market prices. Contractors seeking to claim an exemption from the requirement to submit certified cost or pricing data for their commercial goods generally are required to submit a Standard Form 1412, "Claim for Exemption from Submission of Certified Cost or Pricing Data." Submission of this form is required for items priced above thresholds specified at FAR 15.804-3(e). A completed form, together with an audit or other verification, provides sufficient information to enable the contracting officer to determine that sales of the commercial item indeed have been in substantial quantities to the general public. Formulas used in evaluating government versus private sales ratios are specific. The contracting officer also can verify the prices of those sales.

The need for these verification steps is based on the premise that companies frequently sell below published catalog prices. "Published prices save sellers from negotiating each particular order, but for most purchasers they represent asking prices"



(Heinritz and others, 1991:208). The intent of the DOD contracting officer is to pay a fair and reasonable price that is no more than the price paid by the contractor's most favored customer.

Current FAR regulations allow, in exceptional cases, the requirement for submission of certified cost or pricing data to be waived [FAR 18.804-3(I)]. Approval by the head of the agency is required. This high approval level is designed to discourage this remedy (ASPM, 1987). The need for a waiver should arise only when (1) the supplier is adamant in refusing to supply cost or pricing data; (2) the product or service is needed urgently; and (3) the supplier is the only feasible source (ASPM, 1987:Ch 13, 9).

The streamlining act converts the waiver process from an exception to the rule. Under the streamlining act, certified cost or pricing may not be requested for any procurements of commercial items awarded through adequate price competition. This general prohibition also applies to any contract modifications accomplished after award. (Current regulation generally allows the contracting officer to obtain certified cost or pricing data for after-award modifications.) Commercial items no longer will have to meet the test of whether the items have been sold in substantial quantities to the general public (excluding governmental bodies). For any item not acquired through adequate price competition, the contracting officer is to exempt the contractor from the data submission and certification requirement if the contractor provides the price information that is adequate for evaluating, through price analysis, the reasonableness of the proposed prices.

The exemption also applies if the contracting officer is able to gather the required information from sources independent of the contractor (P.L. 103-355, Sections 1202, 1203 and 1204).

The FAR and ASPM recommend many general price analysis tools when buying commercial items. Table 3 summarizes these techniques. Purchasing agents for commercial companies rely on similar analyses (Heinritz and others, 1991; Dobler and others, 1990; and Burt and others, 1990).

Dobler and others, for example, recommend the following tools: (1) analysis of competitive price proposals; (2) comparison of proposed prices with regulated, catalog, or market prices of same or similar items; (3) comparison of proposed prices with historical prices; and (4) comparison of proposed prices with an Independent Cost Estimate (ICE) prepared by the purchasing office (1990). Any historical prices used for comparisons should be analyzed to determine how conditions, including inflation, have changed; whether the historical prices included one-time engineering, set-up, or tooling charges; and whether the new acquisition will create a situation where the supplier will realize reduced costs as a result of operation of the learning curve (Dobler and others, 1990).

Similarly, Burt and others recommend that any ICE used in price analysis also be analyzed to determine whether it is fair and reasonable. The buyer should consider the sources and reliability of the information and the techniques that were used to prepare the ICE. An ICE, for example, can be developed through a roundtable approach, in which

TABLE 3  
PRICE ANALYSIS TECHNIQUES

TECHNIQUE	SOURCE
<p><b>PRIMARY COMPARISONS:</b> These techniques require comparisons of contemporaneous prices of same or similar items. The ASPM says that primary comparisons are the most conclusive. They may be supplemented with lower tier comparisons if necessary.</p>	ASPM, 14-2
<ol style="list-style-type: none"> <li>1. Comparison of proposed prices responding to the solicitation.</li> <li>2. Comparison with competitive published price lists, published market prices of commodities, similar indexes, and discount or rebate arrangements: This primary comparison would be effective when prices are available in the marketplace, when there are priced catalogs, or when prices are set by law or regulation.</li> </ol>	<p>FAR 15.805-2(a) ASPM, 11-6 FAR 15.805-2(d) and ASPM, 11-6</p>
<p><b>SECONDARY COMPARISONS:</b> These techniques involve comparisons of proposed prices with prices for past purchases or for prices for different, but similar items. A combination of secondary comparisons may be used to validate the reasonableness of a price if no primary comparison is available.</p>	ASPM, 14-2, 3
<ol style="list-style-type: none"> <li>1. Comparison of proposed prices to historical prices of same or similar items: Any such comparison would be valid only if the contracting officer is able to determine that the historical prices also were reasonable. Historical prices should be adjusted for time, quantity, and seasonal differences.</li> <li>2. Comparison of proposed prices to market pricing data of same or similar items.</li> <li>3. Comparison with market data and producer price indices</li> <li>4. Application of cost estimating relationships and other rough yardstick estimates, such as dollars per pound or per horsepower</li> <li>5. Comparison of proposed prices with government cost estimates.</li> </ol>	<p>FAR 15.805-2(b) and ASPM  ASPM, 14-2 ASPM, 14-5 FAR 15.805-2(c) and ASPM, 14-5 FAR 15.805-2(e)</p>
<p><b>AUXILIARY COMPARISONS:</b> These techniques cannot be used on their own as their results are subjective. They are used to supplement conclusions reached through primary or secondary price analysis techniques or through cost analysis.</p>	ASPM, 14-2
<ol style="list-style-type: none"> <li>1. Value analysis requires the buyer to isolate the reasons for differences in prices quoted for similar products.</li> <li>2. Visual analysis involves inspection of the item or drawings in an attempt to estimate its value.</li> </ol>	<p>ASPM, 11-6 and 14-6,7 ASPM, 11-6 and 14-6,7</p>

experts develop cost estimates based on their knowledge of market conditions and the production process. The roundtable approach is quick and inexpensive to accomplish but provides subjective results. The ICE also may be developed by adjusting or projecting historical costs for future production. A bottoms-up approach would focus on detailed reviews and cost estimates of all components, processes and assemblies (Burt and others, 1990:136-137).

Leenders and others identify a most-favored customer clause as a price protection commonly used in private enterprise. Such a clause could state: "the vendor, over the duration of the contract, will not offer a lower price to other buyers, or if a lower price is offered to others, it will apply to this contract also" (Leenders and others, 1985:310).

There has been no empirical analysis of whether the price analysis tools recommended by the ASPM are adequate or whether they should be revised or expanded. This lack of interest perhaps is due to the fact that price analysis generally is associated with the high volume of contracts that together represent a relatively insignificant portion of the total DOD budget. Small purchases, those with a contract price of \$25,000 or less, on average comprise only 8 to 10 percent of the annual DOD budget (Peterson, 1987). It is anticipated that these tools will be used for purchases that carry higher prices after the streamlining act is implemented.

## **Conclusion**

There is no doubt that DOD is being asked to rely more on acquisitions of commercial items rather than substantially on special development items to satisfy its

requirements. There is little doubt that the Federal Acquisition Streamlining Act, together with its forthcoming implementing guidance, will remove many of the barriers barring commercial firms from DOD contracts. Where the doubt remains is on how the DOD contracting officer will ensure that commercial items under the new definitions are purchased at fair and reasonable prices.

Classic microeconomics, contestable market, and Transactional Cost Economics theories provide a theoretical foundation for the claim that it is appropriate to rely on the competitive market to establish fair and reasonable prices for commercial items. What is left unanswered is whether these market forces and governance structures will be strong enough to overcome the effects of DOD's sovereign role as the sole buyer of the public good of national defense. Also left unresolved is whether the DOD contracting officer can rely on anticipated market forces to set fair and reasonable prices of cutting-edge products that meet the new definition of commercial item.

Some of the general price analysis tools and strategies recommended by regulation, guidance, and academic and practitioner literature have been discussed briefly. The discussion also has examined whether the DOD contracting officer can protect against unfair pricing by participating in the pricing games being played by prospective contractors. The next step will be to accomplish studies of several recent procurement cases in which the Air Force contracting officer performed price analysis. Of special interest will be cases in which the contracting officer sought a waiver for the requirement for submission of cost or pricing data. These cases likely will resemble closely the commercial item acquisitions envisioned by the streamlining act.

This exploratory study will not provide the complete answer of whether price analysis tools need to be revised or developed to be usable in acquisitions of high-dollar commercial items. Sufficient data to answer that question will not be available until some time after the streamlining act has been implemented. This study, however, will provide a preliminary basis to begin any needed revisions to pricing guidance. Results of the study also will provide a foundation for further research. In addition, the report may serve as an interim "lessons-learned" document for a contracting officer faced with negotiating a large-dollar contract for a commercial item.

### III. Methodology

This research investigated whether the traditional price analysis tools described in procurement guidance are sufficient to ensure government personnel the capability of successfully negotiating in the commercial arena. The research is spurred by the recent passage of the Federal Acquisition Streamlining Act of 1994, which directs the Department of Defense (DOD) to purchase commercial items to the maximum extent practicable. The act facilitates this direction by significantly expanding the definition of "commercial item." Whether the price analysis techniques are sufficient for evaluating the prices of modified commercial and state-of-the-art commercial items is the focus of this research.

#### **Organization of Chapter**

This chapter discusses the research design. Why the case study methodology was selected and is appropriate for this exploratory research is discussed first. The research design then is defined, using Yin's components of a case study design: (1) research or investigative questions and their related propositions; (2) unit of analysis; (3) logic linking the data to the propositions; and (4) criteria for interpreting the findings (1994:20). The chapter also describes the measures taken to ensure the quality of the research. The chapter concludes with a discussion of the case study protocol that was used.

## Case-Study Design

This research attempted to learn how the DOD contracting officer and other procurement personnel can ensure that a contract for a leading-edge commercial or modified-commercial item is awarded at a fair and reasonable price. The research attempted to determine what price analysis tools and guidance have been used and how effective they have been when used for acquisitions of large-dollar commercial items. Conclusions support a preliminary decision of whether tools and guidance need to be revised and whether new tools need to be developed. Case study methodology has a distinctive advantage when “a ‘how’ or ‘why’ question is being asked about a contemporary set of events over which the investigator has little or no control” (Yin, 1994:9). A case study design also is appropriate for asking an exploratory “what” question (Yin, 1994:5).

Case studies secure data from multiple sources, allowing verification between sources and reducing the probability of missing significant data. Detail is emphasized, providing insight for problem solving, evaluation, and strategy (Cooper and Emory, 1995). Yin recommends a case study methodology when the researcher deliberately wants “to cover contextual conditions--believing that they might be highly pertinent to [the] phenomenon of study” (1994:13). Detail and environmental context were crucial elements of this study. The success of a price analysis tool in facilitating negotiation of a fair and reasonable price can be analyzed only within the context of the actual negotiation.

The approach for this research was a modified case-study design. Case studies can address a full variety of evidence, to include documents, interviews, and current



observations (Yin, 1994). This study combined the elements of a historical research approach with the interviews of a case-study design. The study focused on documents, such as those included in the contract files, and on interviews with government contracting personnel involved in the acquisitions. There was no opportunity for direct observation, although interview questions addressed any ongoing, post-award actions related to the acquisitions. The lack of direct, detailed observation does not jeopardize the success of research (Yin, 1994:14).

This effort is exploratory by necessity. As stated in Chapter II, there has been no empirical research of the usefulness of existing price analysis techniques, perhaps because such tools traditionally have been used on the large-volume, small dollar actions that comprise a relatively small portion of defense dollars spent each year. Objective measures of success or usefulness of the tools and techniques have not been defined. It also is doubtful that any such objective measures would be applicable when those tools are used to analyze prices of large-dollar acquisitions.

Cooper and Emory state that exploratory studies are appropriate when an immediate purpose is to develop hypotheses or questions for further research (1995:115). That was one intent of this research. There has not been sufficient empirical evidence to facilitate formation of a hypothesis, for example, that the existing tools will not be sufficient under specified circumstances. Nor was there sufficient data to investigate any such hypothesis as the existing population of large dollar buys of commercial items (especially those that meet the new definition of commerciality) is small. DOD traditionally has not purchased commercial items to satisfy military applications. All that

could be investigated now is how the contracting officer has conducted price analysis on large-dollar items in recent years. Future research will be necessary to investigate quantitatively the success of price analysis techniques.

A survey approach to this research was not appropriate as the population of contracting officers experienced in price analysis of large-dollar commercial items is small. The existing price analysis tools have been used extensively in operational (base-level) contracting for small-dollar (under \$25,000) procurements. The average contracting officer working in a non-operational environment does not have much experience with price analysis tools as the sole determinant of whether prices are fair and reasonable. Contracting personnel involved with the acquisitions reviewed during this research confirmed in interviews that their experiences concentrated on analyzing detailed cost or pricing data for acquisitions of products or systems unique to the DOD.

The case-study approach was used to attempt to learn the true opinions that the procurement personnel have of price analysis techniques. Discovery of such information through a sterile survey would be difficult. For a contracting officer to admit that the price analysis that was conducted was inadequate is tantamount to admitting that the awarded price may not have been fair and reasonable. Contracting officers are charged by Federal Acquisition Regulation (FAR) with ensuring that supplies and services are purchased at fair and reasonable prices (FAR 15.802). Procurement personnel, given the opportunity to explain, identified criticisms and successes during the open-ended interviews conducted during this research. Several problems experienced during the price analyses also were identified through reviews of contract files.

## **Research Design**

Cooper and Emory define research design as a plan for selecting the sources and types of information used to answer the research question. The design also is a framework for specifying the relationships among the study's variables. It, in addition, outlines each procedure from the research question to the analysis of data (1995:114). This section addresses the research design components that Yin finds to be especially important for case-study methodologies. These components are (1) a study's questions and their related propositions; (2) its unit(s) of analysis; (3) the logic linking the data to the propositions; and (4) the criteria for interpreting the findings.

**Investigative Question 1.** "Would the contracting officer have to seek approval to waive submission of certified cost or pricing data if the pricing action occurred after implementation of the Federal Acquisition Streamlining Act?" Analysis of cases with a negative answer to this question will be more easily generalizable to the post-implementation era.

Proposition 1. The first investigative question also is Proposition 1. It was assumed that the question could be answered with a "yes" or "no" response. The key variable was whether the item(s) being acquired would comply with the definition of commercial item established by the streamlining act. Cases that involved acquisition of an item that will be considered commercial simulated the conditions that will exist after the streamlining act is implemented. Analysis of non-commercial cases also was appropriate. Reasons for seeking a waiver of the TINA requirement are varied. Approval of the waiver, however, always means that the contracting officer will not have access to the

certified data necessary for a detailed analysis of the cost elements of a price. Price analysis without the support of detailed and certified cost-element breakdowns was necessary in all of the studied cases.

**Investigative Question 2.** “How did the contracting officer and other procurement personnel ensure that fair and reasonable prices were negotiated?” This research area investigated whether the contracting officer found the price analysis tools listed in Table 3 to be effective. The price analysis tools are designed to take advantage of the price-setting mechanism of the marketplace. The DOD contracting officer should be able to rely on the tools if market mechanisms operate effectively for large-dollar buys of leading-edge or modified commercial items. This question asked whether the contracting officer found the existing tools to be adequate, adapted the tools to the pricing action, or designed a new method of price analysis. The five propositions associated with this question are discussed below. Variables of interest are included in Table 4. It was not possible, given the exploratory nature of this research, to hypothesize any relationships among the variables and the propositions.

Proposition 2A. “The contracting officer was not able to use the primary price comparison techniques, with or without modification.” It was anticipated that the primary techniques could not be used for two reasons. First, an acquisition for leading-edge or modified commercial items likely would not occur in a competitive environment. This sole-source environment would eliminate the technique of comparison among prices proposed in a price competition. Second, companies proposing cutting-edge or modified

**TABLE 4**  
**RESEARCH VARIABLES**

<b>VARIABLE</b>	<b>PROPOSITION</b>	<b>DEFINITION</b>
<b>Asset-specificity</b>	3A, 3B, 4A, 4B, 4C	The degree to which special purpose investments are required for the transaction
<b>Barriers</b>	4A, 4B, 4C	Actions taken by any party to effect barriers preventing potential competitors from entering the market.
<b>Control</b>	2E, 3A, 3B, 3C, 4A, 4B, 4C	Did the contractor or the government maintain the most control of the acquisition
<b>Dollar Value</b>	2E, 3A, 3B	The dollar value of the contract price subject to the waiver of the requirement to submit certified cost or pricing data
<b>Experience</b>	2A, 2B, 2C, 2D, 2E, 3A, 3B, 3C, 4A, 4B, 4C	The number of years the AFMC contracting representative has served contracting and on similar projects
<b>Frequency</b>	2E, 3A, 3B, 4A, 4B, 4C	How often has the transaction occurred? How often will it occur in the future?
<b>Length</b>	2E, 3A, 3B, 3C, 4A, 4B, 4C	The number of months or years in the performance period of the contractual action
<b>Market Conditions</b>	3A, 3B, 3C, 4A, 4B, 4C	The conditions of the market environment affecting contractor operations
<b>Pressure</b>	2E	The urgency and criticality of need for the item
<b>Relationship</b>	2E, 3A, 3B, 3C	Description of the relationship that characterized the acquisition: Was the negotiation characterized by trust or cooperation?
<b>Requirement</b>	1	The item(s) being acquired are commercial, non-developmental, or developmental
<b>Terms and Conditions</b>	2D, 3A, 3B, 3C, 4A, 4B, 4C	The clauses and provisions proposed or incorporated into the final contractual document
<b>Tool</b>	2A, 2B, 2C, 2D, 2E	The price analysis technique used or proposed for use
<b>Type of Contract</b>	2E, 3A, 3B, 3C, 4A, 4B, 4C	The type of contract as defined in FAR Part 16. Examples are firm fixed price or cost plus fixed fee.
<b>Uncertainty</b>	2E, 3A, 3B	The extent to which the acquisition was characterized by risk or fear of opportunistic behavior

commercial items may not have the commercial sales necessary to warrant a price analysis based on comparisons to published catalog or price lists.

Proposition 2B. "The contracting officer was able to use the secondary comparison techniques, with or without modification." The five secondary techniques are listed in Table 3. The alternate to this proposition was that the contracting officer would find that these techniques were not helpful in analyzing the prices of leading-edge or modified commercial items.

Proposition 2C. "The contracting officer was able to use the two auxiliary comparison techniques, with or without modification, to supplement the more conclusive primary and secondary comparisons." The alternate to this proposition also would be that the contracting officer would find that these techniques to be unusable.

Proposition 2D. "The contracting officer or contractor developed new price analysis techniques." This proposition was based on an assumption that the techniques listed in Table 3 were not sufficient for these acquisitions of leading-edge and modified commercial products.

Proposition 2E. "The contracting officer was comfortable that the price analysis techniques and negotiation strategies that were used provided sufficient assurance that negotiated prices were fair and reasonable." Contracting officers are charged by FAR to award contracts only at prices determined to be fair and reasonable. This proposition was based on the assumption that the contracting officer would not proceed with award until all significant doubts were eliminated.

**Investigative Question 3.** “Did the contracting officer or the contractor attempt any action, such as incorporation of special clauses, to protect the assurance of fair and reasonable prices in the instant acquisition and in any potential follow-on actions?” This question was derived from three economic theories discussed in Chapter II. These theories are classic microeconomics, transactional cost economics (TCE), and game theory. Discussed in this subsection are the three propositions associated with this investigative question. Variables of interest are included in Table 4.

Proposition 3A. “Either the contracting officer or the contractor was able to rely on market forces to establish the governance structure of the contract.” This proposition was based on a tenet of classic microeconomics and TCE theories that a market governance structure is appropriate when buying commercial items. Producing firms are free to compete for business. The three TCE variables also would indicate that a market governance is appropriate. First, the degree to which the dangers of uncertainty must be controlled is minimal. Second, transactions for commercial items can be repeated frequently. Third, a company supplying a commercial product does not have to acquire assets specific to the DOD transaction. This proposition also assumed that the circumstance in which the DOD is a party to the contract does not jeopardize the effectiveness of the marketplace in setting fair and reasonable prices.

Proposition 3B. “Either the contracting officer or the contractor attempted to incorporate special clauses designed to protect against the dangers that proponents of TCE say are caused by limited information and opportunistic behavior.” This proposition was the alternative to Proposition 3A.

Proposition 3C. “The contracting officer attempted to prevent a buy-in by the contractor.” This proposition was based on game or bargaining theory as discussed in Chapter II. Such a buy-in would occur if a contractor proposed unreasonably low prices with the intent of “getting-well” through price increases in follow-on acquisitions. This proposition assumed that a contractor proposing leading-edge technology would attempt to buy-in to programs to ensure a long-term sole-source relationship. This proposition also adopts the theory proposed by Lamm and Vose that the risk of buy-ins, which they term penetration-pricing strategies, will increase as the amount of control that the government can exert over a contractor decreases.

**Investigative Question 4.** “Did the contracting officer or contractor try to influence conditions affecting the theorized advantages of contestable markets?” This question examined whether contracting officers tried to encourage offerors to propose prices in recognition that potential, if not real, competition existed. It also investigated whether the contractor erected barriers to discourage potential competitors from entering the market. This research stream was derived from contestable market theory as discussed in Chapter II. The three propositions linked to this investigative question are described below. Variables of interest are included in Table 4.

Proposition 4A. “The contractors attempted to erect market entry barriers or to emphasize those that already existed.” Increasing entry barriers would help to solidify a company’s market position and sole-source relationship with the DOD.

Proposition 4B. “The contracting officers attempted to remove existing entry barriers or to prevent development of new barriers.” This proposition is based on



findings of research into contestable market theory. Bailey and Baumol recommend that anti-trust regulators should seek policies that promote contestability (1984:123). Should DOD contracting officers also direct their actions toward eliminating market-entry barriers in order to facilitate proposed prices that are fair and reasonable?

Proposition 4C. "The actions taken by the contracting officer to remove market entry barriers affected the negotiated price." Each of the contractors was locked-into a sole-source acquisition. Each was a monopolist for at least the acquisition at hand. Such a monopolist is a price-maker that will set price so as to maximize profit. The desire to set prices to maximize profit would be reduced if the contracting officer were able to encourage the contractor to act as if it operated in a contestable market. According to the contestable market theory, the contractor should set prices at a level sufficient to earn a reasonable profit. Potential competitors would be attracted to the market if they realized that the incumbent was earning excessive profits.

**Units of Analysis.** Data related to the investigative questions was collected from five recent pricing cases that have been negotiated by Air Force Materiel Command (AFMC) personnel. Each case was one in which the contracting officer sought approval to waive the requirement for the contractor to submit certified cost or pricing data. Included in the population were cases in which such approval was not granted, leaving the contracting officer with the dilemma of whether and how to proceed with acquiring the goods or services. The focus was on the case from the time the procurement request was submitted to the contracting organization to the present. This time frame captured data concerning the acquisition strategy that led to structuring the request for proposal. The

case generally ended with the award of the contractual document, but procurement personnel were asked to describe any relevant post-award actions during interviews.

The population of cases was limited to AFMC for several reasons. AFMC is the largest acquisition command in the Air Force. AFMC was responsible for 77.5 percent of the total Air Force contracting dollars in Fiscal Year 93 (Air Force Materiel Command FY93 Contracting Summary, 1994:12). It also was convenient to select AFMC as the target population. Copies of the waiver packages that were the preliminary focus of the research are located at AFMC headquarters located at Wright-Patterson Air Force Base, the home base for this research. No travel funds were available to support this research.

The study was limited to actions that occurred between 1 July 1992 and 1 February 1995 for two reasons. The first reason recognizes that Air Force Logistics Command (AFLC) and Air Force Systems Command (AFSC) merged 1 July 1992 to form AFMC. Any cases prior to this date would have to be resurrected from the separately maintained databases and files of the former commands. A second reason for the time frame limit recognizes that human memories cloud as time passes. The case design was based on the assumption that participants in cases processed since 1 July 92 would be able to recall crucial information and details about the acquisitions.

Potential cases were identified through a search of records in the Pricing and Finance Division of AFMC's Directorate of Contracting. The division reviews all waiver requests for the command. The review identified eight cases that occurred during the

research time frame. The five cases that had been completed through contract award were selected for the research. Contract awards or decisions on whether to grant the request for waiver had not finalized in the other three cases.

The researcher studied the waiver packages filed at AFMC headquarters and contract files. Interviews were conducted in-person with local contracting personnel. Interviews were conducted by telephone with personnel located off-site.

**Links of Data to Propositions.** The data was collected over a six-week period. Pattern matching, as recommended by Yin (1994) and Miles and Huberman (1984), was used both to link the data to the propositions and to facilitate subsequent analysis. Miles and Huberman define pattern codes as “explanatory or inferential codes, ones that identify an emergent theme, pattern, or explanation that the site suggests to the analyst” (1984:67). Yin calls pattern-matching one of the most desirable strategies for case study analysis. Such a strategy “compares an empirically based pattern with a predicted one (or with several alternative predictions)” (Yin, 1994:106).

Pattern coding was used throughout the data collection and analysis to facilitate the final analysis. The codes were efficient data-labeling and data-retrieval devices (Miles and Huberman, 1984:64). A preliminary list of codes was developed prior to data collection, as recommended by Miles and Huberman. The codes were based on the investigative questions, propositions, and variables. Preliminary codes were assigned to the data collected during each interview or review of documentation. Any new themes that emerged from an interview or review were incorporated into the list of pattern codes

prior to the next data-collection effort. Assigning and revising codes served as a form of continuing analysis throughout the research effort (Miles and Huberman, 1984:63).

Final pattern codes were assigned during the final data analysis. The analysis effort focused on three efforts. Identifying a theme or pattern involves “isolating something (a) that happens a number of times and (b) that consistently happens in a specific way” (Miles and Huberman, 1984:215). The analysis first finalized the recognition of patterns or themes that pervaded the data. The number of occurrences of several of the codes, such as price analysis tool used, was counted. Finally, themes were clustered into categories after comparing similarities and differences in the data. The three techniques are descriptive in nature (Miles and Huberman, 1984:215) and thus are appropriate for use in an exploratory study designed to answer, in part, how the prices of cutting-edge or modified commercial items can be analyzed.

The pattern codes that were used throughout this research are identified in Appendix A. Also included are the corresponding operational definitions and the links of the codes to the investigative questions.

**Criteria for Interpreting Findings.** The researcher attempted to generalize the findings to the environment that will surround acquisitions for commercial items after the Federal Acquisition Streamlining Act is implemented. Findings were interpreted using a framework derived from the four groups of theories discussed in Chapter II.

First, proponents of acquisition reform believe that the DOD will benefit from the free marketplace when purchasing commercial items. The ability of the market to establish fair and reasonable prices is the foundation of classic microeconomics theory.

Proponents of contestable market theory state that perfect competition is not required for the market to effectively set prices, as long as market entry and exit barriers, for example, are not present. TCE proponents also find the marketplace to be an appropriate governance structure for readily available items. Existing tools were developed for use as a primary method of analyzing prices of small-dollar, readily-available commercial items. Support for the theories held by the acquisition reform proponents would be a finding that existing pricing tools and techniques are adequate when buying large-dollar commercial items (Propositions 2A, 2B, 2C, and 2E).

As discussed in Chapter II, however, Templin questions whether the marketplace can perform adequately when the DOD is a party to the acquisition of the commercial items. TCE also would question whether the contracting officer can rely on market governance as the dollar value, technological complexity, and length of contract increase. Support for this alternative theory would be found if contracting officers “made do” with existing tools or used modified or new price analysis tools to evaluate proposed and negotiated prices (Propositions 2D, 2E, 3A, and 3B).

Second, the discussion of game theory in Chapter II points to the potential for contractors to propose unreasonably low prices with the intent to lock-in to a program and later recoup costs through follow-on acquisitions. Such “buy-ins” likely will occur in head-to-head competitions, say game theory proponents. Lamm and Vose theorize that the likelihood of a buy-in strategy increases as the amount of buyer control over the seller decreases (1988). Could companies proposing state-of-the-art products on a sole-source basis also “buy-in” to long-term development programs? Support for this theory would

result from a finding that the contracting officer attempted to prevent a buy-in by the contractor (Proposition 3C). Such a finding at least would indicate that the contracting officers were concerned about the potential of a buy-in.

The Federal Acquisition Streamlining Act embraces the concept that marketplace price-setting mechanisms will be effective even for purchases of leading-edge items that have yet been sold in the market. Possible support for this assumption can be found in contestable market theory, which proposes that a company will price a product at a reasonable level in order to discourage potential competitors from entering the market. Propositions 4A, 4B and 4C address the applicability of this theory to DOD buys of state-of-the-art commercial items.

### **Protections of Quality**

A case study methodology, like all research designs, needs to ensure that standards of quality are met for construct validity, internal validity, external validity, and reliability (Yin, 1994). Measures that were taken to assure quality in each area are discussed below.

Two tactics that Yin (1994) recommends to ensure construct validity were used in this research. First, data was collected from multiple sources to facilitate a triangulation of converging lines of inquiry. Triangulation of data sources and of theory-based perspectives on the same data was accomplished where possible. A second tactic used was the establishment of a chain of evidence. Yin recommends that a case study database be developed and that the research report cite relevant portions of that database: "The

principle is to allow an external observer--the reader of the case study, for example--to follow the derivation of any evidence from initial research questions to ultimate case study conclusions" (1994:98).

Pattern matching, as recommended by Yin, was used to ensure internal validity. Yin says that pattern matching helps to ensure that inferences about data collected are correct. The technique was used also to help rule out all rival explanations. Analyzing data within the framework of several well-established theories contributed to the external validity of the research. Analysis of multiple cases also enabled discovery of any replication of phenomena across cases as well as helped to explain why the phenomena do not occur in other cases.

Yin recommends that a case study protocol and database be used to ensure the final quality criterion of reliability. Case study procedures for this research were documented in the protocol and study database that are discussed in the next section.

### **Case Study Protocol**

Yin calls the case study protocol a major tactic for increasing reliability of the study and for guiding the research (1994). Elements of this protocol that were applicable to this research were (1) an overview of the study; (2) sources of data; (3) case study questions; and (4) the case study database.

**Overview of the Study.** Participants in the research were informed of the goals of the study. Participants also were guaranteed confidentiality in order to encourage open, honest discourse during interviews. Data collected was known in detail only by members

of the research team (Schmitt and Klimoski, 1991). The data associated with individual cases was summarized on an overview basis to protect confidentiality. Analysis was reported on a cross-case basis to ensure this anonymity (Yin, 1994).

**Sources of Data.** The research addressed the perceptions of all AFMC contracting personnel involved in the five acquisitions. The term “contracting officer” has been used throughout this report as it is that individual who has primary responsibility for ensuring that contracts are awarded at fair and reasonable prices. FAR 2.101 defines a contracting officer as “a person with the authority to enter into, administer, and/or terminate contracts and make related determinations and findings.” The perceptions and decisions of contracting officers were of critical importance to this study. The perceptions and recommendations of procurement support personnel also were analyzed. Interviews were conducted with four contracting officers, two contract specialists, and two price analysts. Contract file documentation from procurement staff officers and program management representatives also was analyzed.

A limitation of this case study is that it focused on the government’s perception of the effectiveness of price analysis tools and techniques. Contractor representatives were not interviewed as it is believed they would not participate in a meaningful manner. Disclosure of pricing information and strategies could jeopardize their future bargaining positions. Contractors also may not find it to be in their best interest to help the DOD to strengthen its arsenal of tools to use at the negotiating table. Analysis of contractor positions, perceptions, and strategies was confined to a review of contractor correspondence and other documents in the government contract files.



Sources of documentary evidence were the packages requesting approval to waive the submission of certified cost or pricing data, as well as documents included in official contract files. Waiver packages filed at AFMC headquarters were reviewed in total. The one contract file housed at Wright-Patterson AFB was reviewed in its entirety. Study participants furnished applicable portions of the other contracts.

**Case Study Questions.** An overview list of the basic questions addressed during interviews and while reviewing documentation is at Appendix B. The questions were mapped to the study's investigative questions where possible. The questions represented reminders to the researcher of the data to be collected, as recommended by Yin (1994). Schmitt and Klimoski characterize interviews as "conversations with a purpose" (1991:139). Actual questions addressed to research participants were open-ended and dynamic in order to facilitate rich discourse. Numerous follow-up questions or questions unique to the circumstances of a particular case were discussed during interviews.

**Database.** Notes were kept during data collection in the field. Data points collected from each document or interview were reduced to separate computerized note cards. All note cards from a single source were coded (A-001-01 through E-019-xx) to maintain linkage with the data source. The alpha code referenced the case. The middle three numbers referred to a document or interview related to the case. The last two numbers referred to a data point associated with that document. Data cited on each card was pattern coded.

## Summary

The primary aim of this research was to explore whether the existing price analysis techniques will be useful in negotiating larger-dollar acquisitions of state-of-the-art or modified commercial items. The research also examined whether there are any actions, in addition to price analysis, that a contracting officer can attempt to protect government interests when buying such commercial items. The research was stimulated by the recent passage and forthcoming implementation of the Federal Acquisition Streamlining Act of 1994, which requires the federal government to purchase commercial items to the maximum extent practicable.

Several steps were taken to ensure the quality of the research. Five pricing actions that simulated acquisitions of such commercial items were researched. The multiple-case study design and the use of broad investigative questions facilitated discovery of compelling and robust findings. Multiple sources of data were used to ensure construct validity. Pattern-matching was used to ensure internal validity and a case-study protocol was developed to ensure reliability.

Results of this exploratory research are reported and analyzed in the next chapter. The findings will facilitate the quantitative research that will be possible after the streamlining act reforms have been implemented fully. Results also will assist decision-makers as they form the policy guidance necessary to ensure successful implementation.

#### IV. Results and Analysis

Detailed analysis of five acquisitions was performed during this exploratory research of whether existing price analysis techniques are sufficient to evaluate prices of cutting-edge or modified commercial items. This chapter begins by describing the acquisitions that were researched. Included in this overview is a summary of the data that was collected and analyzed. The chapter then discusses the analysis of the findings associated with each of the four investigative questions and related propositions identified in Chapter III. The analysis will be on a cross-case basis to maintain confidentiality.

##### **Overview of Cases**

A review of files located in the Pricing and Finance Division of the Air Force Materiel Command (AFMC) Directorate of Contracting resulted in the selection of five cases that most closely fit the parameters of this study. The contractors involved in all five cases refused to submit certified cost or pricing data for items they claimed were either commercial or non-developmental. The Assistant Secretary of the Air Force (Acquisition) or his deputy approved the waivers in four of the cases. The chief of the Pricing and Contracting Administration Division at Air Staff agreed with the contracting officer in the fifth case that a waiver was not required and that the contractor's submission of a Standard Form 1412, "Claim for Exemption from Submission of Certified Cost or Pricing Data," was sufficient documentation for the action.

Table 5 summarizes the data collected. The data is grouped by the study's pattern codes, which are defined in Appendix A.

TABLE 5  
SUMMARY OF DATA

CODE	CASE A	CASE B	CASE C	CASE D	CASE E
ASST-Sell	No	No	Yes	No	Yes
ASST-Buy	Yes	Yes	Yes	Yes	Yes
BARR-CICA	Yes	Yes	Yes	No	Yes
BARR-Ktr	Yes	Yes	Yes	Yes	Yes
BUY-Curr	No	No	No	No	No
BUY-Evi	No	No	No	No	No
CON-Govt	No	No	No	No	No
CON-Ktr	Yes	Yes	Yes	Yes	Yes
DOL-<5m	No	Yes	No	Yes	Yes
DOL-5-50m	No	No	Yes	No	No
DOL->50m	Yes	No	No	No	No
DIS-Con	Yes	Yes	No	Yes	No
DIS-Neg	No	Unknown	No	Unknown	No
FREQ-Recur	Yes	Yes	Yes	Yes	Yes
INFO-DCAA	No	Yes	Yes	Yes	No
INFO-Prime	No	No	Yes	Yes	Yes
INFO-Oth	Yes	No	No	Yes	No
INFO-Tech	No	Yes	Yes	Yes	Yes
INFO-Off	Yes	Yes	Yes	Yes	Yes
LEN-Ini	No	Yes	Yes	Yes	Yes
LEN-4yrs	Yes	No	No	No	No
MKT-Comp	Yes	Yes	Yes	Yes	Yes
MKT-Oth	No	No	No	No	No
MKT-SS	No	No	No	No	No
PRES-Fund	No	Yes	No	No	No
PRES-None	No	No	No	No	No
PRES-Pol	Yes	Yes	No	No	Yes
PRES-Sched	No	No	Yes	Yes	Yes
PRES-Urg	Yes	No	Yes	Yes	Yes

TABLE 5 (Continued)

CODE	CASE A	CASE B	CASE C	CASE D	CASE E
REL-Coop	Yes	No	No	No	No
REL-Dis	No	Yes	Yes	Yes	Yes
RQMT-Comm	Yes	Yes	No	Unknown	Yes
RQMT-NDI	No	No	Yes	Unknown	No
RQMT-Dev	No	No	No	Unknown	No
RSLT-Chng	No	Yes	No	Yes	No
RSLT-Lit	Yes	No	Yes	No	Yes
T&C-Govt	Yes	No	No	Yes	No
T&C-Ktr	Yes	No	No	No	Yes
TOOL-Aux	Yes	Yes	Yes	No	Yes
TOOL-Oth	No	No	No	Yes	No
TOOL-Pri	No	No	No	No	No
TOOL-Sec	Yes	Yes	Yes	Yes	Yes
TYPE-FFP	No	Yes	Yes	Yes	Yes
TYPE-Oth	Yes	No	No	No	No

Four of the offerors are large companies. Three of those companies are among the top 100 defense contractors in terms of dollars awarded in Fiscal Year 1993 prime contract awards ("Top 100 Defense Contractors," 1994:34-36). The fifth offeror is a small business whose only defense business prior to this action was through the Small Business Innovative Research program.

All but one of the cases involved follow-on acquisitions. Three of the companies were subcontractors on actions acquired through modifications to existing prime contracts. The two other cases involved the award of new prime contracts. All of the

contract actions were negotiated on a sole-source basis. Four of the contracts were firm fixed price while the fifth established fixed prices for estimated quantities of items to be ordered.

The proposed price of the five actions ranged from approximately \$1.5 million to \$360 million. The portion subject to price analysis alone of each of the five actions ranged from approximately \$1.5 million to \$70 million. Analysis of nearly the entire dollar amount of one action was based on price analysis. The amounts of interest to this study were only portions of the other four actions. One waiver amount, for example, was for only about 5 percent of the entire proposed cost.

Two of the cases were negotiated at a product center. Another was negotiated at a centralized contracting organization reporting to a product center. The other two cases were negotiated at an Air Logistics Center. Four of the cases involved computer or communications technology. The fifth acquisition was for aircraft spare parts. One acquisition was accomplished under the Foreign Military Sales (FMS) program.

AFMC contracting personnel who were interviewed had between 11 and 20 years experience in DOD contracting. All but three had been involved with the acquisition program or the contractor for at least two years prior to the researched acquisition. Most of the AFMC personnel had little experience with buying commercial items, especially at the prime contract level. None had ever sought a waiver from Air Staff, although one had experience obtaining one-time exemptions as allowed by FAR 15.804-3(g).

All five companies, of course, refused to submit certified cost or pricing data. Several alleged that their products were developed for commercial markets. They,

therefore, did not accumulate cost data sufficient to enable certification. The contractors cited the substantial cost of accumulating detailed cost data as a reason for foregoing such data accumulation. The costs, they said, would be passed to all customers, thereby increasing the price of their commercial item to the point that it would no longer be price competitive. At least one contractor feared the potential of a defective pricing case if the government later determined that any data was less than accurate, complete, and current. Others feared that release of such proprietary cost data would jeopardize their competitive position in the market. They claimed that submission of the data to the government could lead to the release of sensitive information to competitors. One of the contractors feared that the government would use the data to reverse engineer the contractor's product in order to develop specifications sufficient to conduct competitions for future requirements.

### **Investigative Question 1**

The first question guiding this research effort focuses on whether the contracting officer would have to seek approval to waive submission of certified cost or pricing data if the pricing action were to occur after implementation of the Federal Acquisition Streamlining Act. Three of the cases clearly involved acquisition of leading-edge or modified commercial items, for which certified cost or pricing data will no longer be required after the act is implemented. One of the cases involved the acquisition of a nondevelopmental item never intended for sale in the commercial marketplace. The answer is less clear in the remaining case.

The items acquired in three cases indeed were commercial in nature. One contractor claimed that the offered products were developed for sale in the commercial marketplace. The items, however, had not yet been sold in substantial sales to the general public. The streamlining act recognizes this possibility by defining a commercial item, in part, as an item that will be available for sale in the marketplace in time to meet the government's delivery schedule. Initial proposed implementing guidance also recognizes the dangers of analyzing proposed prices based on estimated future sales and prices by allowing for a price adjustment if such sales do not materialize (Proposed FAR 15.804-1(b)(2)(iii)). Analysis of this case provides significant insight into potential processes and problems that the contracting officer faces upon implementation of the streamlining act.

The second case that clearly simulates the emerging environment for acquiring commercial items involved the acquisition of items derived from commercial items. The contracting officer in this case decided, with the concurrence of Air Staff and over the objections of the Defense Contract Audit Agency, that the proposed items were so commercial in nature that any differences between the items and their commercial counterparts could be evaluated without resorting to cost analysis. An analysis of this case revealed two distinctive price analysis approaches.

The contractor in the last case claimed that the products were modified commercial products. Data documented in the waiver package indicates that AFMC headquarters personnel agree with this assertion. It is interesting to note that the contracting officer disagrees. The hardware indeed is a commercial product available off-the-shelf. The internal algorithms, however, are necessary for the product to operate and



it is that algorithm that was acquired to meet the unique requirements of the DOD.

Analysis of this case provides insight into the difficult decisions concerning interpretations of law and guidance that soon may dominate the commercial-acquisition environment.

The streamlining act creates the right for dissatisfied companies to protest a contracting officer's decision about whether an item is commercial.

One case involved acquisition of items developed at private expense for the military market. The developer substantially modified another vendor's commercial technology to meet military needs. Neither the developer nor the contracting officer believes the militarized items meet the definition of commerciality. The developer, however, believes the items meet the definition of nondevelopmental item incorporated in the streamlining act. The items were developed at private expense exclusively and are being used by an agency of the United States. The proposed implementing guidance for FAR Case 94-721 is silent on whether a contractor proposing a nondevelopmental item is exempt from the requirement to submit certified cost or pricing data. The guidance does emphasize, however, that the contracting officer should exhaust all means of price analysis before requiring the contractor, as a last resort, to submit certified cost or pricing data. The analysis of this case also identified potential problems that may arise when buying commercial or nondevelopmental items after the streamlining act is implemented.

Whether the remaining case simulates the commercial-acquisition environment is debatable. The contractor in the case alleged that the offered products had been developed for the commercial market. What little market that materialized soon disintegrated to the point that sales were only to the Department of Defense (DOD).

Initial DOD acquisitions were exempted from the submission of certified cost or pricing data in recognition of the commercial sales that had occurred. As these sales discontinued, the contractor suggested that the contracting officer obtain a one-time exemption as allowed by FAR 15.804-3(g) for exceptional circumstances, such as when an established commercial market dissolves. The problem in this particular case is that the contractor is under investigation for allegedly fraudulently claiming the products were commercially available for sale to the general public. The case highlights another potential problem for contracting officers buying products emerging from technological advances: how can the contracting officers determine whether a contractor actually has a commercial market or at least a chance to develop such a market?

All of the cases provided insight into price analysis processes and difficulties. These findings will be reported below in the discussions associated with the three remaining investigative questions.

## **Investigative Question 2**

This investigative question examines how the contracting officer and other procurement personnel ensured that fair and reasonable prices were negotiated. DOD contracting personnel in all five cases resorted to price analysis to establish the reasonableness of proposed and negotiated prices for at least portions of each acquisition. Four of the five cases also had elements that were not commercial in nature and, therefore, were evaluated through analysis of detailed, certified cost or pricing information. These cost analyses were not the subject of this research.

Table 6 identifies the price analysis techniques used in each of the cases. Three of the propositions associated with this investigative question examine the usefulness of price

TABLE 6  
PRICE ANALYSIS TOOLS PROPOSED OR USED

TOOL	CASE A	CASE B	CASE C	CASE D	CASE E
<b><i>Primary Techniques</i></b>					
Compare to Other Prices Resulting from Adequate Price Competition	No	No	No	No	No
Compare to Published or Catalog Prices	No	No	Attempted	Attempted	Attempted
<b><i>Secondary Techniques</i></b>					
Compare to Historical Prices	Attempted	Attempted	Used	Used	Used
Compare to Prices for Similar Items	Used	No	Used	No	No
Compare to Market Data	No	Attempted	Used	No	No
Compare to Cost Estimating Relationships	No	Used	No	No	No
Compare to Government Estimates	No	No	No	No	No
<b><i>Auxiliary Techniques</i></b>					
Value Analysis	Used	No	Used	No	Used
Visual Analysis	No	Used	No	No	No
<b><i>Other Techniques</i></b>					
Regression Analysis	No	Attempted	No	No	No
Life Cycle Cost Analysis	No	Attempted	No	No	No
Market/Business Analysis	No	No	No	Used	No
Most Favored Customer Clause	No	Attempted	No	Used	No

analysis tools listed in Table 3. It should be noted that the systematic categorization of price analysis techniques used is the researcher's interpretation of the data collected from the case files or through interviews. None of the personnel interviewed indicated that he or she reviewed the Armed Services Pricing Manual (ASPM) in an attempt to outline a

price analysis strategy. One representative, in fact, indicated that the ASPM provides good basic information for the beginner; cost and price analysts quickly replace reviews of the guidance with techniques learned through experience.

**Proposition 2A.** This proposition was that the contracting officer did not use the two primary comparison techniques, with or without modification. These primary price analysis techniques are (1) comparison of proposed prices received in response to the solicitation; and (2) comparison of proposed prices with competitive published price lists, with published market prices, or with prices set by law or regulation.

Adequate Price Competition. The first primary technique assumes that adequate price competition resulted from the solicitation. The AFMC personnel involved in the five cases could not rely on this primary and conclusive comparison technique because all of the cases were sole-source acquisitions. The contracting officers would not have had to request a waiver of the requirement for certified cost or pricing data if the acquisition was competitive. Whether future acquisitions of leading-edge or modified commercial items can be competitive is unknown. Procurement personnel in three of the cases were struggling to develop procedures to encourage competition in follow-on acquisitions.

Comparison to Published Price Lists. Contractors in three of the cases alleged that their prices were based on price lists. The contracting officers, however, did not accept these allegations. The items had not been sold in substantial quantities to the

general public. Some of the price lists were marked proprietary and, therefore, were not available for inspection by the public. None of the prices had been established by law or regulation.

The procurement personnel in each of the cases attempted to conduct cost analyses after it was determined that suitable published catalog or price lists were not available. The contracting personnel had little experience with acquisitions of commercial items. They all were more familiar with conducting cost analyses of detailed data. Contracting personnel unsuccessfully attempted to obtain cost or pricing data, first with the intent that the data be certified. The contracting personnel in three of the cases then attempted to obtain the data with the promise that certification would not be required. Three of the contractors provided briefings of some portions of cost or pricing data but then refused to furnish copies of the data or even of the briefings. All attempts to obtain detailed cost information ultimately were unsuccessful. All of the contractors threatened to forego the DOD business rather than provide the sensitive cost or pricing data.

All of the contracting officers and specialists were pressured to complete the acquisition. They were facing time and schedule constraints, political pressures, and the need to satisfy urgent requirements. The contracting officers were expected to move ahead and to move ahead quickly. Failure to negotiate a contract award would result in work stoppages deemed unacceptable to the program managers and upper management. The contracting officers believed they were left with little choice but to seek authority to waive the requirement to submit certified cost or pricing data and to find another method to evaluate the proposed prices. Two of the contracting officers stated they had hoped

that the waivers would be disapproved. Such a disapproval would provide the contracting officers the ammunition needed to call the contractors' bluffs. The contractors then would have to provide the data or the program would be halted.

**Proposition 2B.** This proposition was that the contracting officer used the secondary comparison techniques, with or without modification. These price analysis techniques are comparison of proposed prices (1) to historical prices of same or similar items; (2) to pricing data of same or similar items; (3) to market data such as producer price indices; (4) to cost estimating relationships; and (5) to independent government cost estimates. Table 6 indicates that the AFMC contracting personnel used at least one of the secondary comparison techniques, as analyzed below, in each of the pricing cases.

Historical Price Comparisons. All of the procurement personnel, as required by regulation, attempted to compare the proposed prices with historical prices of same or similar items. One prime contractor's price analysis, which was accepted by the contracting officer, was based substantially on this technique. The contractor was able to compare the proposed prices to historical prices, which were established via price and technical competition among three competitors. Prices determined via adequate price competition are considered to be fair and reasonable; the historical prices provided a good basis for comparison to the instant acquisition. Less emphasis was placed on the historical price comparisons used in two other cases. Historical price comparisons were not possible in the two remaining cases. Difficulties that limited the usefulness of this technique are listed in Table 7.

TABLE 7

## PROBLEMS WITH HISTORICAL PRICE COMPARISONS

PROBLEM	DESCRIPTION
<b>No History</b>	There were no historical prices for the acquisition that was a first-time buy. This is likely to be a problem for buys of new commercial products emerging from advances in technology.
<b>Provisioning Spares</b>	The only previous buy for one of the acquisitions had been for provisioning spares acquired as part of a production contract. The prices were not deemed sufficient for comparison purposes because there was no unit price integrity.
<b>Price Database</b>	One contracting officer described difficulty in identifying historical prices. Researching such prices throughout the DOD or federal government can be impossible. The contracting officer is forced to rely on the contractor for such information.
<b>Product Differences</b>	Determining whether the historical prices are for same or similar items also is difficult. This appears to be a significant problem for computer and communications products, where configurations can vary dramatically.
<b>Reasonableness of Historical Prices</b>	Personnel involved in one case questioned the credibility of historical prices. The prime contractor selected the subcontractor to replace another subcontractor already under contract. The potential subcontractors did not compete head-to-head and the new subcontractor was able to estimate the prices at which the original subcontract was awarded.
<b>Future Use of Negotiated Prices</b>	One interviewee expressed concern that the price negotiated on the instant acquisition would be used for future comparisons. He said procurement personnel often just review a database to determine that the historical prices were determined via price analysis or via cost analysis. They may not review the actual price negotiation memorandum, which may highlights problems or need for adjustment of the comparison prices.

Comparisons to Pricing Data for Similar Items. Procurement personnel in two of the cases modified the market price comparison technique. They first attempted to compare the proposed products to same items available in the marketplace. Comparisons were complicated when it was determined that there were no identical commercially available products or products so similar that the differences could be evaluated solely by price analysis. The products being acquired were selected for use because their capabilities exceeded those of other products on the market and were the only products to meet the government's minimum requirements.

Contract file documentation in one case indicated that procurement personnel performed "the ordinary comparisons that a commercial organization would make to determine that the prices are the best that it could obtain and are in the price ranges of its competitors." Both cases followed a similar methodology. One analysis was performed by consultant contractors hired by the offeror. The other analysis, which serves as the foundation for the discussion below, was performed by an AFMC cost and price analyst.

The first step was to identify at least two commercial products that were the closest approximations to each of the products being acquired. Procurement personnel relied on the contractors to accomplish this step. The price analyst relied on the program manager to perform a technical evaluation of the identified products. The program manager agreed with the selections, stating that the products selected for the comparisons are representative of the contractor's products.

The second step in this price analysis was to determine the market share captured by the companies that produced the comparable products. The price analyst needed to



verify that the comparison products were produced by firms that held a substantial market share instead of by fly-by-night companies. Again, the contractor provided the information about the market shares held by its competitors and the program manager attested to the information. The analyst indicated that such information also could be obtained from the administrative contracting officer responsible for the competing firms.

The price analyst believes that the credibility of the entire market price analysis rests on this technical evaluation of the market. If the technical evaluation was in error, the market price analysis was incorrect. The analyst sees a need for personnel independent of the program office to perform or verify such technical evaluations. He questions the objectivity of program office personnel, who have a vested interest in seeing the contract awarded. The analyst also has worked for the Defense Logistics Agency, which employs such independent engineers to perform technical evaluations.

The third step taken by the price analyst was to verify the prices of the lowest priced comparable product. The analyst compared the proposed prices to price lists or verbal quotes from competitors. The analyst did not identify his position or his purpose when he called the companies to request price information. He said he was concerned that a competitor who was aware of the purpose of obtaining the pricing information might refuse to participate or might provide misleading information in an effort to jeopardize the proposed contractor's position. The analyst also did not review any price discounts because the anticipated contract would not include quantity discounts. The contractor's proposed prices were less than or nearly equal to the prices of the comparable products.

A similar process was used during the market price analyses performed by consultants hired by one of the offerors. Data collected during this research indicated several problems. First, the analyses did not address the prices of add-ons or peripherals, both of which were included in the instant acquisition. Second, the analyses did not address the basis for the comparison prices. It could not be determined whether the comparison prices were established through adequate price competition, through published catalog prices, or through some other basis. Third, the fact that the consultants were hired by the contractor raised questions concerning the credibility of the study.

Comparisons to Market Data and Producer Price Indices. AFMC procurement personnel in two cases at least attempted to compare changes in prices to producer price indices. The data was used as supplementary support for other price analyses. A potential concern identified was that such published indices do not address the price life cycle of a commercial product. Documentation in one file, for example, indicated that prices tend to drop by 40 to 60 percent in the first two years of the life cycle of a commercial computer. Price indices may justify price increases due to inflation.

Application of Cost Estimating Relationships. The third secondary comparison technique is to apply cost estimating relationships and other rough yardstick estimates to the item in order to analyze the prices. This technique was the primary price analysis conducted during one of the cases. The contractor derived its prices for the Air Force product based on the prices of its commercial product and the differences between the two product lines. Government procurement and engineering personnel performed a

visual analysis of the commercial and military applications and agreed that the similarities in the parts were substantial enough to justify estimating the price of military parts from commercial parts. The government cost and price analyst determined a cost per unit of the critical element of the product. This cost was used to determine the unit price that government personnel tried to negotiate.

Whether the technique was successful is not known. The price analyst was quite comfortable. The offeror, however, did not accept the technique as a basis for pricing. A negotiation impasse was reached and the contracting officer settled at a price somewhere between the government's objective price and the contractor's proposed price.

Comparison to Independent Cost Estimates. The final secondary comparison technique listed in procurement regulations is to compare proposed prices to an independent government cost estimate. Government procurement personnel did not use this technique in any of the five cases. There are many possible, but not definitive explanations for this finding. Government personnel may find it difficult to establish an independent estimate for commercial items for which prices vary with the unique abilities and practices of producing companies. Government personnel may not have prepared detailed independent cost estimates for these acquisitions. Such cost estimates traditionally are prepared prior to receipt and review of the offeror's proposal. The need for such an estimate may not have been identified until well after the offeror's proposals were opened and reviewed. Any estimates that were prepared may have devoted little attention to the commercial products involved, instead focusing on the overall acquisition.

**Proposition 2C.** This proposition was that the contracting officer used the auxiliary comparisons, with or without modification, to supplement the more conclusive primary and secondary comparisons. Auxiliary comparisons include visual and value analysis. Evidence of visual analysis emerged from the case in which the AFMC personnel examined the differences between the commercial product and the one being offered to the Air Force. Value analysis was used to supplement other analyses in three of the cases.

Value analysis requires the buyer to isolate the reasons for differences in prices quoted for similar products. One company, over the span of seven years and at the request of the contracting officer, hired consultants to identify capabilities and prices of products available in the market segment of militarized computer products. The consultants identified a single configuration and then reduced product capabilities to a single measure. The consultants concluded that the products offered to the DOD provided more computing power per dollar of price, and, therefore, were the best value.

Contracting personnel identified several concerns with this "bang for the buck" approach. First, the market analyses failed to address the price impact of necessary peripherals. Second, the analysts compared price list to price list; they did not evaluate prices established through a competitive process. Third, the data may be somewhat suspect as the consultants were not independent from the contractor; they were paid by the contractor. The biggest problem with the studies is that it would be difficult for any other conclusion to be reached, according to the contracting officer. The products offered by the subcontractor represent the next generation in technology. The next generation, by definition, should have more capability than the current generation.

A prime contractor attempted other value analyses. Representatives analyzed the differences among the militarized computer they were buying and ruggedized and commercial computers. The contractor's engineers participated in this process. The militarized computer cost from two to four times more than its ruggedized counterpart. This price differential was within differentials found in other studies of this nature, according to documentation the prime contractor furnished to the contracting officer.

**Proposition 2D.** This proposition was that the contracting officer or contractor developed new price analysis techniques. Data collected from these five cases revealed attempts, not all of them successful, to assure that the prices were fair and reasonable using four new techniques: (1) regression analysis; (2) life cycle cost analysis; (3) market or business analysis; and (4) incorporation of a most favored customer clause.

Regression Analysis. One of the products acquired was adapted from a commercial product for military use. Representatives of the contractor performed multiple regression analysis to derive their proposed prices from the catalog prices of the commercial counterparts. The representatives regressed several variables they said impacted price. They claimed a coefficient of determination of more than .90. A coefficient close to 1 is strong evidence that the model fits the data well (McClave and Benson, 1994:546). Government personnel, however, did not accept the analysis for two reasons. DCAA representatives believed that the analysis was cost analysis and, therefore, evidence that differences between the commercial and modified-commercial product could not be substantiated by price analysis alone. The price analyst determined that the regressed variables all measured the same element: the volume of a specific component in

each unit. He chose to base his recommended prices on a parametric relationship of cost per unit of the critical element. The negotiated price, however, fell between his recommended price and the contractor's proposed price. The contracting officer and the contractor negotiator agreed to a price roughly in the middle of the two positions after negotiators reached an impasse.

Life Cycle Cost Analysis. One Price Negotiation Memorandum indicated a reliance on a life cycle cost analysis as further support for other price analysis techniques used on the acquisition. Procurement personnel indicated in interviews, however, that the life cycle analysis was not assigned much weight in the overall price analysis. Procurement personnel were unable to determine or verify the circumstances of the life cycle cost analysis, which estimated a cost per use. The contracting officer also said that the government briefly considered using life cycle costs as an evaluation factor in an upcoming follow-on acquisition. She said they decided against doing so as they could not develop an analysis that would withstand a protest by a losing contractor. A "fly-off" of competing products would be required in order to validate the analysis, she said.

Market or Business Analysis. Personnel in one price analysis relied heavily on an audit that the DCAA had performed on an earlier similar buy. DCAA recommended in that earlier audit that the contracting officer negotiate a decrement from the offeror's list prices. The contracting officer recommended that the prime contractor negotiate the same decrement in the instant acquisition. The DCAA, in the audit, determined a reasonable price range based on "best effort" analysis given the data available to the government and given reasonable business assumptions. Many of the recommendations

identified in this case can be generalized to acquisitions of commercial items. Market or business analysis data collected in all five cases is summarized in Table 8.

**TABLE 8**  
**BUSINESS ANALYSIS CONSIDERATIONS**

<b>CATEGORY</b>	<b>DESCRIPTION</b>
<b>Pricing Methodology</b>	How did the contractor determine its product pricing? Was the methodology reasonable?
<b>Discounts from List Price</b>	The discount structure should be examined. A contractor who claims that it does not know its cost structure per catalog line item would offer large discounts from price list only if it had sufficient profit to cover unknown cost problems. Profit rates may be excessive. Offering a discount break to the DOD when such breaks are not offered to commercial customers raised a red flag in several of the cases. Interviewees also did not negotiate a discount break because quantities to be purchased were relatively small.
<b>Learning Curve</b>	Product improvements and application of learning curves over a product's life cycle result in decreasing costs to the producer. Have these costs reductions resulted in corresponding price decreases?
<b>Market Trends</b>	Does the commercial market for components, materials, or end items reflect any trends? Are these trends reflected in catalog or proposed prices of products?
<b>Life Cycle</b>	Prices generally decrease over the product's life cycle. A mature product, as a general business practice, sells at a lower price than when introduced, partly because development costs already have been absorbed and manufacturing costs reduced. The rate of price decrease varies with the particular market.
<b>Competition</b>	Is the market competitive? Did the contractor's commercial business result from one-time competitions resulting in long-term relationships or is the contractor facing continuous competition?
<b>Competitor Analysis</b>	What is the competitive position of other companies in the market? Are they actively seeking to compete for the same segment or are they conceding to other producing firms?

Most Favored Customer Clauses. Such clauses offer a price protection to supplement the price analysis conducted. The clause, in essence, guarantees that the contractor will not offer a lower price to other buyers over the life of the contract or will apply any lower prices offered to other buyers to the contract (Leenders and others, 1985:310). Available data shows that such a protection was discussed in only two cases. One contractor offered a variation of the clause and another prime contractor offered to obtain the assurance from its subcontractor. Both assurances stopped short of guaranteeing that any reductions in price offered to others under similar acquisition circumstances would be passed to the government.

None of the procurement personnel interviewed initiated a request that the contractor agree to such a clause. Most had never heard of the practice. Some considered it to be too much trouble to monitor the contractor to determine if the government was entitled to any price reductions.

**Proposition 2E.** This proposition assumed that the AFMC contracting personnel were comfortable that the price analysis techniques and negotiation strategies used provided sufficient assurance that negotiated prices were fair and reasonable. All contracting personnel documented the contract files prior to award that the prices negotiated were fair and reasonable. Not all personnel interviewed were entirely comfortable with this determination. Some AFMC personnel indicated that they determined the prices to be fair and reasonable only because the regulations required them to do so. "In our arena, everything that leaves here is at a fair and reasonable price



because we have to say it is,” one interviewee said. One representative unsuccessfully tried to state that he was unable to determine that the prices were not fair and reasonable.

Three of the cases showed little evidence of change in price from that initially proposed by the contractors or subcontractors and that considered to be negotiated. Any differences that were negotiated were attributed to changes in quantity and the associated change in proposed discount rates or to correction of mathematical errors. This finding could mean that the price analysis techniques used did not provide sufficient ammunition to affect a price change. It also could indicate, however, that the prices as proposed were fair and reasonable. One offeror did reduce its overall price by more than 20 percent. Historical price reductions for this contractor were about 5 percent, according to the contracting officer. The price was negotiated on a bottomline basis. There is no insight into whether the price reductions occurred in the commercial parts of the contract or in the parts subject to certified cost or pricing data.

It still would be premature, given the exploratory nature of this research, to hypothesize relationships among the variables associated with this investigative question. Findings that can be reached are:

-- The contracting representatives all believed they were pressured to finalize award. All indicated a desire to accomplish a price analysis and negotiation that resulted in award at a fair and reasonable price. All also stated that the prices were the best obtainable given the circumstances of the acquisition. Would the results have been different if there had been less pressure to award quickly?

-- The dollar value of the pricing case was linked to the amount of concern expressed by the case participants. Interviewees, with one exception, expressed proportionately less concern about whether the negotiated prices were fair and reasonable for the smaller dollar actions than for the larger dollar actions. Other unanticipated variables also affected the amount of concern that the contracting representatives thought was warranted. A contracting representative involved in the FMS case indicated that the analyses and effort might have been more thorough for a non-FMS buy. Similar thoughts were expressed in one case in which a subcontractor was seeking the waiver. The prime contractor is responsible for conducting appropriate price and cost analyses before awarding any subcontract [FAR 15.806-1(a)(1)]. AFMC personnel in the two other cases involving subcontract proposals believed that the prime contractors "tossed the problem over the wall" to the contracting officer.

-- Experience levels of the AFMC procurement personnel were all about the same. Few had extensive experience with pricing commercial items. This may be a source of the difficulties experienced and of the concerns that lower prices could have been negotiated. The cost and price analyst with the most experience in analyzing commercial prices did seem to be the most comfortable that the price analysis techniques used resulted in a negotiation of a fair and reasonable price. Even he faulted the contractor's reasoning for refusing to provide cost or pricing data.

-- Neither the anticipated length of the performance period nor the recurring nature of the acquisitions had an identifiable impact on this question. None of the negotiated agreements included a provision for adjusting prices during the performance

period. Several contractors proposed a process for adjusting prices for new acquisitions; there was no indication, however, of whether such proposals would be accepted.

-- The contracting representatives overall believed that the offeror had the upper hand in all of the acquisitions. "We tried to do what we could to be smart businesswise," said one contracting representative. The AFMC personnel had to rely on what they considered to be the limited information provided by the contractors and other sources. This belief can be linked to the statements by the contracting officers that the prices were the best obtainable under the circumstances. The majority believed that lower prices could have been negotiated if the government could have exerted more control by analyzing detailed cost or pricing data.

-- AFMC representatives in only one of the cases designated the negotiating relationship as cooperative. Representatives involved with the five other cases indicated that they did not trust the contractors. This aura of distrust was exacerbated by the inability to gain access to the detailed cost or pricing data. Some of the distrust can be tied to experiences on previous acquisitions with the same companies. Some can be tied to the general attitude of distrust of government contractors that seems to pervade the DOD acquisition process. The distrustful relationship stimulated the repeated attempts to move the acquisitions to the cost analysis arena.

### **Investigative Question 3**

This investigative question examines whether the contracting officer or the contractor attempted any action, other than the price analysis itself, to protect the

assurance of fair and reasonable prices in each of the instant acquisitions and in any potential follow-on actions. Each of the propositions associated with this investigative question is derived from tenets of classic microeconomics, transactional cost economics, and game theories discussed in Chapter II.

**Proposition 3A.** This proposition was that either the contracting officer or the contractor was able to rely on market forces to establish the governance structure of the contract. Evidence of a reliance on market forces could be found if the terms and conditions specified in the contracts were limited to those generally found in commercial contracts between private parties. This was not the case in the five cases researched. Each incorporated the very detailed, structured clauses required by the FAR. The terms and conditions specified the rights and responsibilities of all parties in such areas as requirements to be met, transportation, packaging, quality assurance, inspection and acceptance, payments, and contract types. All required areas of the FAR were covered.

It was not likely, in the current environment, that any other finding would result. Current regulations require the incorporation of such detailed clauses. Some of the clauses, however, have been identified as barriers discouraging commercial contractors from doing business with the federal government. The Federal Acquisition Streamlining Act directs that the FAR be amended to list clauses that no longer will be required for acquisitions of commercial items. The FAR council is working to identify these clauses. Results associated with this proposition likely will differ for any research conducted after implementation of the streamlining act.

Transaction Cost Economics theory supports the use of a bilateral governance structure such as the current FAR for at least four of the five pricing actions. Only two of the companies involved devoted transaction-specific assets to the acquisitions. The DOD, however, in all five cases, has or will devote transaction-specific assets to the acquisitions of the products. Products acquired in four of the cases, for example, have been incorporated into complex weapon systems. The products cannot be replaced without affecting the overall system and creating, as a minimum, numerous interoperability problems. All of the acquisitions have been or are expected to be recurring. Costs associated with specialized governance systems are more easily justified if transactions are expected to be frequent. Findings concerning the third TCE dimension of uncertainty are mixed. All of the contracts were fixed price, an indication that the contractual parties believed that all uncertainties and risks could be priced at a reasonable level. The dimension of uncertainty also considers the level of anticipated opportunistic behavior. AFMC contracting personnel in four of the cases did not trust the contractors.

One contractual action was characterized by less uncertainty, and the contracting officer attempted to lessen the asset specificity that the government could experience. The contractor representative in this case did attempt to negotiate terms and conditions in the Air Force contract that mirrored his commercial contracts. The contractor, the one with little DOD experience, requested deletion or replacement of 110 standard FAR clauses. The contractor also requested the incorporation of 18 clauses more favorable to the commercial nature of the acquisition. The clauses were from DFARS Part 11, "Acquisition and Distribution of Commercial Products." Procurement personnel declined

to comply with the contractor's request. The AFMC representative explained that clauses designated as mandatory by the FAR could not be deleted. The representative also explained to the sole-source contractor that DFARS Part 11 clauses could be incorporated in contracts for commercial items only if they were awarded through price competition. The contractor accepted both decisions.

One contractor representative also attempted to negotiate payment and warranty terms more in line with his standard commercial practice. The contractor, citing the need to buy components in advance and in large lots due to long procurement leadtimes, requested a graduated payment procedure. The contractor requested an advance payment of 20 percent when an order was placed; payment of 34 percent when the contractor received necessary materials; and payment of 25 percent payment when the ordered items were produced. Final payment then would occur when the end items were delivered to the DOD customer. Contracting personnel thought this payment plan would be an administrative nightmare. They instead proposed the standard FAR clause for progress payments. The parties negotiated an agreement to allow progress payments for orders for items with material costs exceeding \$100,000.

One AFMC contracting representative was not happy with the results of a negotiation for a warranty clause. The government requested warranties of five years and one year for the two different classes of products on the contract. The contractor representative would agree to a warranty of only 90 days for both types of equipment. He

claimed this was the standard for the industry. Government personnel learned after award that the negotiated warranty length was much shorter than the commercial warranties offered by competitors in the industry.

One subcontractor and contractor did ask for all clauses mandated by the Truth in Negotiations Act to be deleted from the contract modification for the instant effort. The government refused, stating that the clauses were mandatory. The contractors did not press the issue, perhaps because they were satisfied just to obtain the waiver from the requirement to submit cost or pricing data, said one interviewee.

**Proposition 3B.** This proposition assumed that either the contracting officer or contractor attempted to incorporate special clauses to protect against the dangers that TCE proponents say are caused by limited information and opportunistic behavior. Evidence supporting this proposition was found in three of the cases.

-- A clause was negotiated in one case to require the contractor to license its protocol to any successor contractor. The clause was designed to ensure that the DOD would not be locked into an indefinite sole-source arrangement with the contractor in recurring acquisitions of the product. Any suitable products developed by other companies could be modified to be compatible with the existing DOD inventory.

-- There was concern in one case that granting the waiver could jeopardize the ongoing investigation into alleged contractor fraud in other similar contracts. The contracting officer was asked to incorporate a clause designed to protect the government against recovering damages resulting from any fraudulent, opportunistic behavior that occurred in earlier transactions.

-- The third finding supporting this proposition was found in the ongoing planning for a follow-on competitive acquisition. Government personnel are concerned that they will not have sufficient information to validate the performance claims for the competing products. The contracting officer is drafting a clause requiring the winning contractor to warrant performance capability. The government will be able to require the contractor to replace any items that do not meet the life cycle performance warranty.

Implications associated with the findings related to the this proposition again are somewhat limited. Three of the efforts were modifications to existing contracts with well-established governance structures. Efforts designed to protect against the dangers of incomplete contracting or opportunistic behavior are more likely to occur when the basic contract document is negotiated. Again, the terms and conditions required by the FAR establish a specialized governance structure. It was not feasible to review the basic contracts, as previously modified. It also was not feasible to examine the contracts issued by the prime contractor to the three subcontractors involved in the cases.

**Proposition 3C.** This proposition assumed that the contracting officer attempted to prevent a buy-in by the contractor. Lamm and Vose state that a buy-in or penetration pricing strategy is more likely to occur as the amount of control that the buyer can exert over the seller decreases (1988). A buy-in would occur if a contractor proposed prices that were unreasonably low with the intent to recoup its losses after award. Impetus for this proposition was derived from the discussion of game theory in Chapter II.

There was evidence of increased seller-control and decreased buyer-control in all five cases. The procurement personnel involved, however, were not concerned that the



contractor was “buying-in” on the instant acquisition. Four of the contracts were follow-on acquisitions. Any buy-in would have occurred when the contractor was selected initially, the interviewees said. Three of the products were selected by prime contractors. Government input into the selections was limited. The contracting personnel in the follow-on acquisitions believed they had no alternative but to negotiate an award to the incumbent contractors or subcontractors. There also was no evidence that the four contractors or subcontractors did buy-in on the initial acquisitions. There was no evidence that the contractors or subcontractors attempted to “get well” in follow-on acquisitions, to include the instant acquisitions. Proposed prices remained fairly constant.

The fifth case involved a new acquisition from a contractor proposing the only product on the market that could satisfy the minimum requirements of the DOD. Contracting personnel were not concerned that the contractor was proposing prices that were unreasonably low. The AFMC contract specialist said that the contractor representatives, who knew they were not directly competing with other companies, had no reason to “buy-in” to the program. The contractor has not attempted since contract award to negotiate an increase in contract prices.

#### **Investigative Question 4**

Did the contractor or contracting officer try to influence conditions affecting the theorized advantages of contestable markets? This research question focused on entry barriers that discourage potential competitors from entering a marketplace characterized by limited or no competition.

The companies involved in each of the cases operate in markets characterized overall by some level of competition, either real or potential. Each, however, had obtained a competitive advantage for at least the instant DOD-acquisitions. Several have carved-out market niches by specializing in a segment or developing products based on state-of-the-art technology. All five companies have attempted to establish a long-term relationship with the DOD. Each company was locked-in, at least for the instant acquisition, to a sole-source award. The DOD has or will become dependent on transaction-specific assets associated with the acquired products. Four of the products have or will be incorporated into long-term development programs. Replacement of the products would cause interoperability problems.

Such long-term contractual relationships act as barriers discouraging competitors certainly from vying for DOD business. The removal of DOD as a potential customer also could serve as a barrier to discourage potential competitors even from entering a commercial market. This investigative question explores whether the contractual parties attempted any action to influence the continuance of these long-term relationship.

**Proposition 4A.** This proposition assumed that the contractors attempted to erect barriers or to emphasize those that already existed. Evidence supporting this proposition was found in all five cases. The findings are discussed below.

First, the refusal to provide detailed cost or pricing data can be considered an entry barrier. Several of the companies feared that any such proprietary information could be leaked, either intentionally or inadvertently, to competitors. Any companies armed with such sensitive information would realize an advantage if they elected to compete with the

incumbent in the marketplace. Air Force contracting personnel also cited suspicions that opportunities for cost savings were hidden in the data the contractor refused to supply. Such savings could result from increasing competition at the supplier level. The Air Force also might be able to acquire some elements of the products through separate acquisitions. This practice certainly would invite competitors into the market.

Second, the selection of a contractor or subcontractor for a program, especially one under development, helps to guarantee a long-term sole-source relationship with the government. The government in four of the cases had invested a substantial amount in the contractor's products and in related development integrating the products into weapon systems. The contracting officer could not ignore this substantial Air Force investment.

The third barrier strengthens the second barrier. A company producing a commercial or nondevelopmental item owns the rights to all drawings, specifications, and data developed at private expense. The contracting officer cannot stimulate competition by providing the detailed data to competitors so that they can produce like or identical items.

Fourth, many of the contractors or subcontractors protected their product with patents, trademarks, or license agreements. One company claimed that its license agreement with another vendor prohibited it from releasing any cost or pricing data. This license agreement in effect protected both the licensor and the licensee from potential competition. The license permitted the licensee to adapt the commercial products for sale only to military customers. The supplier was protected against competition in the commercial market.

Fifth, several of the contractors referred frequently throughout the documentation included in the contract files to the investments they had in the product. One company opened a plant devoted to the new product. They all indicated that the products were developed solely at private expense, with one company estimating the investment costs to be in excess of \$40 million. References to such sunk costs served to remind the contracting personnel of costs that would have to be duplicated should the Air Force decide to bring another contractor on-line. Any cost savings resulting from a competitive award likely would not offset these significant investment costs that a new contractor would have to incur, the contracting personnel said.

Sixth, at least one contractor negotiated a warranty on the initial acquisition. The warranty specified, as is common practice, that the warranty would be invalid if any one other than the contractor worked on the products. The government had to contract with the contractor to perform a necessary upgrade in order to maintain the warranty.

Finally, two contractors were contemplating further facility investments in support of the acquisition programs. One had to establish a production facility to product the prototype commercial product. The other was investigating the feasibility of establishing an operations and maintenance center in the country participating in the FMS program. Such an action could further enhance the contractor's relationship with the foreign government, which already was directing that only that contractor's products were acceptable for the particular program.

**Proposition 4B.** This proposition assumed that the AFMC personnel involved in the cases would attempt to remove existing entry barriers or to prevent development of

new barriers. Support for this proposition was rather limited in all but two of the cases. Any actions attempted were designed to comply with the Competition in Contracting Act.

AFMC personnel in the one case that was not a follow-on acquisition attempted to prevent a long-term sole-source relationship from developing between the DOD and the contractor. First, integration services were broken out of the overall contract when it was determined during market analysis that only one contractor could provide the hardware but many could perform the integration. This research focused on the hardware contract. Award of a separate integration contract mitigated against the danger that the hardware contractor could design integration services that only his products could meet.

Second, the length of the anticipated contract was shortened from a five-year ordering period to three years for ordering equipment and one for customer support only. The contracting personnel also decided against the usual practice of establishing one ordering period to cover the entire length of the indefinite quantity/indefinite delivery contract. The ordering periods instead were broken into a base one-year period plus three additional one-year options that the government could elect to exercise at its sole discretion. The contracting officer can discontinue the contract without facing termination costs by not exercising the option. Program office and contracting personnel will perform a market analysis each year to determine whether other capable suppliers had entered the market. The contract specialist indicated, in fact, that it appears that several products that meet or exceed the capabilities of the incumbent's products have entered the market. Acquisition personnel are planning a competitive acquisition to award a replacement contract prior to the exercise of the next option.

Finally, the contractor and contracting officer agreed to incorporate a clause requiring the contractor to license its protocol to any successor contractor at a nominal cost. Release of the protocol to a successor contractor will enable the new supplier to ensure that its products are compatible with the previous contractor's products. This clause is designed to alleviate the potential for the government to be reluctant to award to another contractor because it would lose the use of the products already acquired but not compatible with the new products. The license fee is designed to be nominal; however, it could become a barrier to new firms that must include its cost in their proposed products.

Other contracting officers, program office representatives, and prime contractors are looking for ways to encourage future competition. The contracting officer in one case is planning a competitive acquisition related to the instant acquisition. The instant acquisition was for spares for a group of airplanes. The program office wanted to retrofit an earlier lot of planes with the same equipment. Contracting personnel, to include the competition advocate, declined to approve a sole-source award to the contractor. Quantities for the retrofit were deleted from the anticipated contract and procurement personnel are formulating a separate acquisition for the retrofit. The acquisition is expected to be conducted under full and open competition. Personnel involved in other programs are looking for other sources for any future upgrades. The waiver of the requirement for certified cost or pricing data in one case was for only the immediate requirements, instead of for the entire production run as requested by the contractor. Contract file documentation indicates that the company understands that approval of the waiver carried the message to "find another way."

**Proposition 4C.** This proposition assumed that any actions taken by the AFMC contracting personnel to encourage the potential advantages of a contestable market would affect the negotiated price. Credence could be assigned to the theory of contestable markets if it was found that the contracting officer was able to impact price by preventing actions designed to discourage potential competitors from entering the market.

Little support was found that the contractors or subcontractors altered their prices or negotiation strategies in response to the removal of market entry barriers. One interviewee indicated that the contractor proposed reasonable prices as representatives were planning to expand the services related to the product-line. None of the AFMC personnel reported that government actions in this area resulted in decreases in proposed prices. One contractor's proposed discount structure even resulted in an increase in proposed unit prices. A lessor discount applied to the decreased quantity.

## **Conclusion**

This chapter discussed the data collected to address the four investigative questions that were aimed at determining whether available price analysis tools and techniques are sufficient assistance when buying state-of-the-art or modified commercial items. The findings are varied. The variety occurred perhaps because this exploratory research focused on detailed investigations of five acquisitions for products that shared little in common. Several themes cut across the cases. These research conclusions, as well as recommendations for future related research, are the subject of Chapter V. The

research conclusions provide insight into problems that the DOD contracting officer may incur when buying leading-edge or modified commercial items after the Federal Acquisition Streamlining Act is implemented.



## V. Conclusion

The Department of Defense (DOD) must reduce its acquisition costs if it is to meet national security goals in the face of declining budgets. Increasing DOD's use of commercial items is one opportunity to reduce acquisition costs. The Federal Acquisition Streamlining Act of 1994 encourages the federal government to purchase commercial products instead of developing items unique to the DOD. The act facilitates acquisitions of commercial products by removing many of the laws and regulations identified in recent studies as barriers preventing commercial companies from earning DOD business. The primary change of interest to this exploratory research was the limits placed on the contracting officer's right to obtain certified cost or pricing data from the offeror when buying modified commercial or leading-edge commercial products.

Analysis of the data collected during this exploratory research indicates that buying state-of-the-art or modified commercial items will not be simple for DOD contracting officers. Research conclusions discussed below are grouped into the following categories: price analysis techniques; complying with the order precedence; governance structures; penetration pricing strategies; and organizational culture shock. This research was exploratory; findings and conclusions, therefore, are preliminary. Future research recommendations will be discussed before some final thoughts conclude this thesis.

### **Price Analysis Techniques**

The price analysis tools and techniques identified in the Armed Services Pricing Manual (ASPM) and listed in Table 3 closely mirror those listed in private-company

purchasing literature. This fact supports a conclusion that the tools and techniques will provide sufficient basic guidance for the DOD contracting officer buying commercial product, just as the tools are used by purchasing agents for private companies. Analysis of the data collected during this research also provides preliminary support for this conclusion. The tools and techniques are broad and general. DOD contracting personnel involved in the pricing actions investigated during this research were able to adapt the guidance to the circumstances of the individual pricing actions. Analysis of the data, however, does reveal several problems experienced by DOD contracting personnel across the researched contracting actions.

**Primary Comparison Techniques.** The contracting officers involved in the five cases researched were unable to use either of the primary price comparison techniques listed in the ASPM. This finding can be attributed to the the case-selection methodology. None of the contracting officers would have had to seek a waiver of the requirement for certified cost or pricing data if the primary comparisons could have been used.

The nature of state-of-the-art commercial items implies that these tools also may not be readily usable after the Federal Acquisition Streamlining Act is implemented. It is not likely that there will be a sufficient number of producers of a particular leading-edge commercial item to enable an award through a competitive solicitation process. Similarly, prices of state-of-the-art of modified commercial items are not likely to be supported by published price lists set by market forces.

The conclusion that contracting officers buying leading-edge commercial items will not be able to rely on the forces of price competition is further supported by the difficulties

the AFMC representatives experienced as they planned follow-on acquisitions. First, commercial products, especially those that are state-of-the-art, likely have features that products of competitors do not. One contracting officer was struggling with how to structure source selection criteria to ensure fair, defensible comparisons of what could be apples to oranges. The contracting officer also was struggling with how to ensure that the government would award to the firm offering the best value, price and other factors considered. Second, development schedules would be jeopardized severely if an alternate source was selected. The government does not own the rights to detailed drawings and data that another contractor would need in order to replicate the commercial products. Incorporation of any new product would necessitate time and money for integration and testing. Contracting officers said that any competition among potential sources could not be conducted unless or until the program office plans a major upgrade to the host systems.

The market for leading-edge commercial items likely will be characterized by monopolists or oligopolists. Such firms are price-makers, according to classic microeconomics theory. Neither the DOD nor a private entity may rely on the marketplace to ensure that offered prices of such items are fair and reasonable. Why then does the streamlining act encourage the DOD contracting officer to rely on price analysis when buying state-of-the-art commercial items as if market price-setting mechanisms are at work? One explanation is that acquisition reformers are encouraging the government to adopt commercial purchasing practices. Private entities faced with buying leading-edge

items cannot obtain detailed cost or pricing data from the supplier. Why should the federal government have this right, especially given that generating such data has been found to greatly increase acquisition costs?

The concepts set forth by contestable market theory allay some fears that price-gouging will be rampant. An actual competitive market may not be necessary; a potential competitive market may be all that is required to encourage the price-setting monopolist or oligopolist to set those prices at a fair and reasonable level. The price-setting impact attributed to the fear of potential competition works best when there are no barriers preventing those potential competitors from entering or exiting the market.

All of the contractors involved in the five researched cases indeed did attempt to erect market entry barriers. AFMC contracting representatives did attempt to mitigate the effects of those entry barriers. Measures, however, were taken in order to comply with the Competition in Contracting Act (CICA) rather than as conscious acts designed to reduce prices. All of the actions taken were recommended by competition advocates, charged by the FAR with "challenging barriers to and promoting full and open competition in the acquisition of supplies" [FAR 6.502(a)(1)]. This finding supports a preliminary conclusion that the requirements of CICA will encourage the contracting officer to break down market entry barriers whenever possible.

The AFMC contracting personnel involved in the cases did not believe that their actions caused the offerors to reduce their prices. The data and associated analyses, however, are not sufficient support for a definitive conclusion that efforts to remove market entry barriers are ineffective. There are several explanations for the lack of

support for the proposition. The theory may be incorrect; contractors do not price as though operating in a contestable market. Other alternative explanations are more likely. First, the contractors may have established such an advantage that there was no threat of attracting market entrants and no threat that the actions of the contracting officers could tear down the entry barriers. Second, the contractors may have anticipated the actions that the contracting officers attempted and already may have adjusted their prices accordingly. All of the contractors involved are well acquainted with the requirements of CICA, and, therefore, could easily anticipate the actions. Third, the majority of the barrier-breaking actions were taken before the contractors were asked to submit proposals. It is not possible to determine from the contract files and interviews whether the contractors adjusted their pricing strategies prior to proposal submission.

**Secondary Comparison Techniques.** Each of the cases involved at least one of the secondary price analysis techniques listed in Table 3. AFMC contracting representatives in only one of the five cases were able to use more than one of the secondary comparison techniques. The ASPM suggests that at least two of the secondary techniques be used if the primary techniques cannot be used (ASPM, 1987:14-3). Problems associated with each of techniques are discussed below.

Comparison to Historical Prices. First, state-of-the-art products may not have a history of sales to either the government or to private industry. As a result, there may not be any historical data to analyze. Second, the only available price history may be the initial contract. Prices awarded on contracts for provisioning spares may not have the

unit price integrity necessary for use in future price comparisons. Third, it may be difficult or impossible to obtain historical price information from any source other than the contractor.

Comparisons to Prices for Similar Items. AFMC procurement representatives did use a modified version of this technique in two of the pricing cases. The representatives compared the proposed prices to those of products that were the closest approximations of the product being acquired. The price differences between the proposed product and the comparable products were not evaluated through price analysis alone. Personnel identified several problems with this technique. First, the contracting representatives were forced to rely on the information provided by the contractor and the program office. The price comparisons could be effective only if the information supplied to the contracting officer was correct. Second, the comparisons, at least in one of the cases, did not address the prices of add-on or peripheral equipment. Third, the comparison prices had not necessarily been set by market forces and, therefore, did not provide any additional assurance that the comparison prices were fair and reasonable.

Comparisons to Market Data. This technique can best be used when there are prices to adjust through the application of market data such as inflation indices. Again, there may not be a price history for leading-edge or modified-commercial items. This technique may best serve as a means to analyze whether prices of follow-on buys should be adjusted.

Comparisons to Cost Estimating Relationships. This technique was the crux of one of the five pricing actions. The subjectivity of the technique created problems

for the AFMC representatives involved in the case as the contractor was not willing to accept the basis for the rule of thumb. The frequency with which the technique is used may increase after the streamlining act is implemented. Contracting officers may have no choice but to use this technique to estimate the prices of new items from those of established items. The DOD should consider emphasizing this technique in any price analysis guidance issued to facilitate implementation of the streamlining act.

Comparisons to Government Estimates. Contracting officers did not compare prices to independent costs estimates in any of the five cases. It, like comparisons to cost estimating relationships, may increase in importance as contracting officers move down the hierarchy of pricing techniques in search of a tool that will work. The DOD should consider expanding or emphasizing the requirement for independent cost estimates. Any estimate of an overall development effort would have to be detailed down to the commercial-component level.

**Auxiliary Comparison Techniques.** Visual or value analysis was used in all but one of the cases. This finding supports a conclusion that auxiliary comparison techniques may be used more frequently as the number of acquisitions of commercial items increases. The techniques used in the pricing cases focused on conclusions that the products being acquired represented the best value, the best bang for the buck. AFMC contracting representatives, however, expressed concern with these conclusions. It would be difficult to reach any conclusion other than that state-of-the-art products provide the best value.

**New Techniques.** Contracting officers experimented with four techniques not identified in the ASPM. Regression analysis, when used to model cost estimating

relationships, appears to provide promise for future acquisitions, especially those of products modified from commercial products or those developed through advances in technology. Findings identified in this research, however, point to the need for caution in selecting and analyzing variables to be regressed. The contracting officer should ensure that the variables and resulting regression analysis are meaningful measures of the old and new products.

Proposed implementing guidance recommends incorporation of a most-favored customer clause in contracts for commercial items without a substantial sales history. Two offerors did propose modified versions of such a clause. The clauses stopped short of promising to decrease contract prices if lower prices were to be offered to the company's other customers. Contracting officers involved in the five cases did not request incorporation of most-favored customer clauses. Most had never heard of such a clause. Some thought it could be an administrative nightmare to monitor the contractor to determine whether price reductions were warranted. Training on the need for such a clause would be required if the direction remains in the implementing guidance.

Attempts to compare life cycle costs of commercial products may increase if the DOD truly is to acquire best-value products. Contracting representatives attempted to compare cost per use of competing products. The contracting officer, however, did not believe this comparison would withstand protest by any unhappy contractor. Guarding against protest apparently still drives many of the actions of DOD contracting personnel.

The fourth new technique was to adjust prices recommended by the Defense Contract Audit Agency for another acquisition to the prices proposed for the instant



acquisition. The circumstances of this case were unusual and should not pervade the commercial-item acquisition environment. The case does provide insight into the strategic purchasing skills that contracting officers may need to operate successfully in the commercial arena. Contracting officers, for example, need to understand product life cycles, market trends, discount structures, and pricing methodologies.

### **Complying with Order of Preference**

Proposed implementing guidance specifies an order of precedence for sources of pricing information. Data collected during this research indicates that DOD contracting officers may find it difficult to obtain sufficient information from the preferred sources. The guidance directs the contracting officer first to seek any pricing information from within the government. Contracting representatives in the five cases found such internal information to be non-existent, not readily available, or suspect. Internal information probably does not exist for first-time buys of state-of-the-art commercial items. Such acquisitions also could be follow-on buys to initial acquisitions for provisioning spares. Contracts for provisioning spares do not have the unit price integrity necessary to facilitate follow-on comparisons, according to information obtained during research interviews. Others described the difficulty in discovering pricing information from other government procurement offices, even those within AFMC. The contracting representatives were forced to rely on the contractors to provide information and points of contact for research into historical pricing.

The second information source in the proposed order of preference is information obtained from sources other than the government or the contractor. Contracting representatives in the five researched cases identified concerns or lessons learned when following such a course. One identified a need to hide the purpose of his calls to sources to seek price information to compare to the proposed prices. His fear was that price information provided by competitors could be suspect. Several procurement representatives relied on the contractor to identify sources of information and one contractor even hired independent consultants to analyze market prices and supply.

The AFMC procurement personnel recalled reservations about the integrity and credibility of the contractor when identifying alternate sources of market information. None of the representatives, however, initiated their own market research to identify competing firms and products. Instead, they relied on program office representatives to verify sufficiency of the sources identified by the contractor. This reliance on program office evaluations may have several explanations:

(1) AFMC procurement personnel consider the responsibility for market analyses specified in Part 7 of the Federal Acquisition Regulation to rest with the program office; the contracting representatives may consider this market price analysis to be an extension of the market analysis that the program office representatives conduct.

(2) The program office traditionally performs an evaluation of an offeror's technical proposal and procurement personnel involved may consider such a market analysis to be more of a technical evaluation.

(3) Contracting representatives may not have the time to conduct such market analyses.

(4) Contracting representatives may not have the expertise or familiarity with the market of the product to conduct a market analyses.

Contracting officers in all the cases obtained or attempted to obtain information from the offerors. Proposed guidance designates such offeror-provided information as last in the order of precedence. There also are several explanations for this finding. First, all of the involved procurement representatives attempted to obtain certified cost or pricing data sufficient to conduct detailed analyses of the cost elements of the proposed prices. This is the usual arena of operation for acquisitions similar to the five cases. Second, the contracting personnel may not have had the time, desire, ability, or a combination of the three to obtain the pricing information independently. Training on price analysis techniques to use absent detailed cost or pricing data may be warranted.

### **Governance Structures**

The streamlining act moves the federal government a step closer toward reliance on market governance structures when buying commercial items. Data collected during this research, however, questions whether such a governance structure is appropriate for contracts for state-of-the-art commercial items, especially when those items are to be incorporated into DOD-unique systems. Such contracts likely will be recurring, and uncertainty remains high in any development program. Contractors may need to invest in transaction-specific assets necessary to modify commercial items for DOD use. The

researched cases required the DOD to invest in transaction-specific assets; DOD, for example, had to design systems to be compatible with the commercial items.

Any conclusion of whether a market-governance structure would be appropriate for DOD buys of state-of-the-art commercial items would be premature. Data collected in support of this investigative question focused on the contract terms and conditions proposed by either the government or the offerors. Support for a market-governance structure could have been inferred if either party attempted to replace government-unique clauses with standard commercial clauses. Each of these cases occurred before the streamlining act directed that non-statutory FAR clauses be designated as non-mandatory in contracts for commercial items. Contracting officers in the five cases believed they had no choice but to incorporate the terms and conditions mandated by FAR. Four of the contractors also had substantial experience in DOD acquisitions and, therefore, apparently were willing to accept the FAR clauses without question.

Findings associated with this investigative question may be altered dramatically upon implementation of the streamlining act. The act exempts acquisitions of commercial items from at least 19 statutes and directs that the FAR to be amended to list clauses that will no longer be required for use in acquisitions for commercial items (Lumer and Ireton, 1994). Data collected from one of the cases did provide insight into what clauses are objectionable to prospective contractors. The contractor, who had limited experience in government contracting, requested that a significant number of FAR clauses be deleted. The contractor, however, accepted the contracting officers' refusal to delete the

mandatory FAR clauses. A limitation of this research is that there was no feasible method to determine whether the FAR clauses incorporated in each contract affected the contractors' price or negotiation strategies.

### **Penetration Pricing Strategies**

One investigative question of this research extended game theory to address whether companies vying for long-term sole-source contracts would attempt to buy-in to a program. Lamm and Vose theorize that the incidents of a buy-in or penetration pricing strategies will increase as the amount of control that the buyer exercises in the acquisition decreases. AFMC contracting representatives involved in the five cases did believe that the contractor had more control than the government. This belief perhaps can be attributed to the inability of the contracting representatives to gain access to the detailed cost or pricing information held by the contractors.

Analysis of this research data, however, supports a preliminary, though inconclusive, determination that contractors supplying state-of-the-art commercial products do not propose unreasonably low prices in an effort to win a contract and with the intent of recouping costs through follow-on acquisitions. AFMC contracting representatives in four of the cases involving follow-on acquisitions indicated that any such buy-in would have occurred in the initial acquisition. There was no indication that any of the companies increased follow-on prices or attempted to initiate expensive modifications in an effort to recoup any lost costs.

The lack of evidence of buy-in should not lead contracting officers to become less vigilant in their efforts to prevent buy-ins. If acquisition reform efforts are successful, more non-defense industrial base companies will attempt to win DOD business. These companies may be more familiar with penetration pricing strategies in their commercial business, and, therefore, may attempt such a strategy in the DOD market.

### **Organizational Culture Shock**

The analysis of the data collected during this research leads to a conclusion that AFMC contracting personnel are nervous about implementation of the streamlining act. The depth of the change in organizational culture that the act will necessitate is not a surprise. The AFMC personnel involved in the researched cases are used to negotiating from the level-playing field created by the submission of certified cost or pricing data.

Most of the AFMC personnel involved in the five cases had only a cursory knowledge of the provisions of the act. All expressed concern that the act would place more responsibility on the contracting officer for determining fair and reasonable prices but would remove the tools they traditionally use to accomplish that task. They all are comfortable with the security currently provided by the requirement of the Truth in Negotiations Act for contractors to provide certified cost or pricing data for commercial items that have not been sold in substantial quantities to the general public. All but one was uncomfortable with analyzing the prices of state-of-the-art commercial or modified commercial items without this detailed cost or pricing information.

An analysis of all five cases indicates that the determination of whether an item is commercial will continue to be subject to debate between the contractor and the contracting officer. This debate may be settled only in the protest arena. The DOD personnel involved in these cases mentioned that the streamlining act will benefit the contractors at government expense. It is this nervousness and distrust, combined with unfamiliarity with the streamlining act, that perhaps led several of the contracting officers to question whether their acquisitions would be considered commercial in nature.

Contracting officers in all five cases stated in the contract file documentation that the negotiated prices were fair and reasonable to all parties. Several, however, expressed during interviews that they were not entirely comfortable with this conclusion. They feared that the negotiated prices were inflated with excessive profit. The contracting representatives believed that better prices could have been negotiated had they had access to detailed cost or pricing data.

This concern does not necessarily mean that the prices negotiated were not fair and reasonable. The price analysis tools indeed may have been effective. An insurmountable flaw of this study is that there was no access to the contractor's cost or pricing data. The research, therefore, could not compare negotiated prices to the total cost to the contractor. The research instead could investigate only whether the AFMC personnel perceived the tools to be effective. A proposition that emerges from this research is that the contracting officers' nervousness about the effectiveness of price analysis tools stemmed from culture shock. The contracting personnel involved were not experienced in negotiating based on price analysis alone.

## **Recommendations for Future Research**

A goal of this exploratory research was to provide a foundation for related research. Suggested research topics are discussed below. Some of the suggested research would validate and expand the preliminary findings of this study. Other research topics would branch into related areas.

**Research Validation.** This research concludes that pricing guidance established in the ASPM is effective as long as the contracting officer is allowed to adapt the tool to the circumstances of an acquisition. This support for the effectiveness of the existing price analysis tools and techniques is preliminary. Further research should be conducted to validate the findings. This research examined price analysis in AFMC only. Future researchers should consider expanding the study to other commands within the Air Force or to the other military departments. Principle candidates would be commands responsible primarily for acquisitions of semiconductors, computer hardware and software, and telecommunications products. These are the industries that Secretary of Defense William J. Perry says are experiencing the technical leadership critical to the DOD ("Blueprint for Change," 1994:9-10).

This research was based on pricing cases that simulated the environment that will emerge after implementation of the Federal Acquisition Streamlining Act. Changes in the act are designed to facilitate an increase in the number of acquisitions of commercial acquisitions. Future researchers should consider researching the effectiveness of price analysis techniques at some point after the streamlining act is implemented. An



investigation of the effectiveness of the streamlining effort also could be undertaken. Did the number and scope of acquisitions for commercial products actually increase as a result of the acquisition reforms incorporated in the streamlining act?

A limitation of this research was that it investigated only whether AFMC personnel perceived the price analysis tools to be effective. Contracting personnel expressed concern that the prices negotiated were the best obtainable rather than fair and reasonable. The perceptions were muddled by the culture shock expressed by the personnel. Future researchers could attempt a time-series analysis to investigate whether prices negotiated are indeed fair and reasonable. The researcher could track the history of the prices of commercial items from the initial government purchase to succeeding commercial or government acquisitions. The researcher, after allowing for compounding variables such as price changes over the product life cycle, could use the study data to assess whether the price analysis tools used in the initial acquisition were effective.

**Price Analysis Techniques.** This research questions whether primary price comparison techniques can be used with any regularity when acquiring state-of-the-art commercial items. This supports a conclusion that the secondary and auxiliary comparison techniques described in the ASPM will increase in importance. AFMC contracting personnel, however, generally were not able to use more than one of the secondary price comparison techniques, even though the ASPM recommends that more than one be used whenever possible and whenever a primary technique cannot be used. Future research could investigate the usefulness of several of the techniques analyzed in this study.

First, this research supports a conclusion that DOD contracting officers will find it difficult to collect relevant pricing information from sources within the government. Does AFMC or DOD need to develop or expand systems to facilitate searches for historical prices and their associated evaluations? A future researcher could investigate how contracting officers collect such pricing information. Are there any existing databases that store such pricing information? Do existing systems need to be expanded or do new systems need to be developed?

Second, contracting officers may need to rely increasingly more on comparisons to independent cost estimates. How do program offices prepare such estimates? Do program office personnel have the necessary expertise to prepare such cost estimates for commercial products?

Third, do contracting officers need increased training on the use of cost estimating relationships? Whether regression analysis would indeed be a promising price analysis tool needs to be investigated further. A future researcher could develop a regression model to apply to prices negotiated previously. A comparison of the negotiated prices and the regressed prices could provide insight into the usefulness of this tool.

Fourth, do contracting officers need guidance on value and visual analysis? These tools may increase in importance as the federal government works toward buying the products that represent the best value. How can contracting officers, for example, develop cost-per-use criterion that will withstand protest?

**Strategic Purchasing.** Analysis of the data collected during this research stresses that DOD procurement personnel buying a commercial product will need expert

knowledge about business practices and market operations of the particular industry segment. This mirrors a trend in the world of purchasing by private companies toward development of strategic purchasing skills. Future research could address whether DOD contracting officers and other procurement personnel have the business and market analysis skills necessary to operate successfully in the commercial arena.

**Education and Training.** The findings of this research indicate that price analysis guidance cited in the ASPM is sufficiently broad to allow the contracting officer to tailor techniques to fit an acquisition at hand. AFMC personnel indicated in interviews, however, that they consulted the manual only when they lacked actual pricing experience. Future researchers should determine whether existing professional continuing education classes on cost or price analysis provide sufficient training on price analysis. Should the Air Force Institute of Technology and the other DOD educational institutions develop refresher courses devoted entirely to price analysis?

This research identified a concern of whether AFMC technical personnel are equipped to evaluate commercial products. DOD engineers involved in the researched cases were more familiar with evaluations conducted during development of systems to meet detailed specifications, according to some research participants. Research could be conducted to assess whether DOD engineers possess sufficient experience and training to operate in the commercial-product arena. Should continuing education courses be developed to address any identified processes or concerns unique to commercial products?

**Payment Procedures.** The Federal Acquisition Streamlining Act authorizes commercial item payments using commercial terms and conditions when in the best

interest of the government. One contractor involved in the cases that were the subject of this research requested a payment procedure that differed significantly from the standard DOD process. Future research could be conducted to investigate whether there are payment processes common to industry segments, if not to the commercial marketplace as a whole.

**Pilot Programs.** The streamlining act designated several acquisitions as pilot programs to test commercial purchasing practices. A future researcher should consider investigating the pilot programs to determine what practices were developed, how they were developed, and whether they were successful. The Joint Primary Aircraft Training System (JPATS) program would be a primary candidate. The Air Force announced 22 June 1995 that it would award the contract for training aircraft to Raytheon Aircraft Co., which proposed the Beech MK II turboprop. The proposed plane is based on the commercial PC-9 design developed by Pilatus Aircraft Ltd. The selection occurred after a fierce four-year competition involving six aircraft (Hitchens and Holzer, 1995). The research could be modeled after the General Accounting Office's research into the success of the Army's New Training Helicopter program (GAO, 1995A).

**Change Management.** This research concluded that implementation of the Federal Acquisition Streamlining Act will cause a major change in organizational culture. Contracting officers now are used to the assurances of price reasonableness provided by detailed analyses of certified cost or pricing data. The right to obtain such detailed cost information will be limited for items considered commercial or modified commercial.

Future researchers should consider an investigation of methods used to implement the culture change and the results of those efforts. Several change management theories have been developed within the body of organizational behavior literature.

**Clauses.** The streamlining act exempts acquisitions of commercial items from at least 19 statutes and directs that the FAR be amended to list clauses that will no longer be required for use in acquisitions for commercial items (Lumer and Ireton, 1994). Reducing the number of government-unique clauses is an attempt to reduce the barriers that have prevented commercial contractors from selling to the DOD. Future researchers should consider investigating whether the effort to eliminate clauses unnecessary for commercial acquisitions was successful. Do the remaining clauses constitute a barrier discouraging commercial contractors from supplying the DOD? Has the DOD lost necessary protections through the loss of deleted clauses?

**Most-Favored Customer Clauses.** Policy-makers have proposed including a requirement for such a clause in implementing guidance for the streamlining act. AFMC contracting personnel involved in the researched cases were not familiar with most-favored customer clauses. A future researcher could investigate whether incorporation of such a clause in federal government acquisitions has been successful. Most-favored customer clauses have been included in multiple-award schedule contracts awarded by the General Services Administration (GSA) for federal information processing resources. How does the GSA monitor the program? What cost reductions have resulted? How cost-effective is such a program?

**Definition of Commercial Item.** Some of the contracting officers involved in the five researched cases questioned whether the items they were purchasing would meet the definition of commercial item established in the streamlining act. These questions again could be attributed, at least in part, to the looming culture shock. Ritenburg states that the number of protests by unsatisfied parties to a government contracting action will increase because the Federal Acquisition Streamlining Act has added a new category of protest. Unsatisfied parties will be able to protest a contracting officer's decision of whether a proposed product indeed is commercial (Ritenburg, 1995). Analysis of case law that emerges from such protests after implementation of the streamlining act would help policy-makers and contracting officers to fine-tune their guidance and decisions.

### **Final Thoughts**

The Federal Acquisition Streamlining Act of 1994 act directs the federal government to acquire commercial products to the maximum extent practicable. The act also eliminates many of the processes, laws, and regulations that numerous studies have identified as barriers preventing non-defense contractors from supplying the DOD. Of interest to this research was the limits placed on contracting officer's access to certified cost or pricing data when buying state-of-the-art or modified commercial items.

Knowledge is power. The streamlining act limits the knowledge that DOD contracting officers can obtain when acquiring state-of-the-art or modified-commercial items. Data collected during this research indicates these forthcoming changes will stun DOD contracting officers. The act will limit the contracting officer's ability to obtain

knowledge of the detailed cost elements, to include profit, that support a price.

Knowledge of the certified cost or pricing data has been the source of contracting officer control and the source of assurance that the prices that were negotiated indeed were fair and reasonable.

Acquisition reform proponents are encouraging DOD contracting officers to use the price analysis techniques used by their private-enterprise counterparts. Private company purchasing personnel traditionally operate comfortably without the detailed knowledge of cost elements. DOD contracting personnel need to shift their reliance from cost analysis techniques to price analysis techniques. This research concludes that the arsenal of price analysis tools available to DOD contracting officers is sufficiently broad to enable procurement personnel to tailor them to acquisitions of state-of-the-art commercial items. This research also concludes, however, that DOD policy-makers should devote more attention to the potential use of the secondary and auxiliary techniques identified in the ASPM. Much of the improvements that are needed can be traced to a need for expanded training on the use and availability of the techniques.

DOD contracting officers have heard the unsuccessful call for acquisition reform for many years. Today's call, senior military leaders say, is real. The Federal Acquisition Streamlining Act of 1994, together with curbs placed on the use of military specifications, takes a significant step toward the goal of simplifying the acquisition process and reducing acquisition costs. The continuing squeeze on procurement budgets necessitates the success of such cost-cutting efforts if the DOD is to continue to supply national security.

## Appendix A: Case Study Pattern Codes

TABLE 9

### PATTERN CODES

PATTERN CODE	INV QUES	OPERATIONAL DEFINITION
ASST-Sell	2, 3, 4	Asset-Specificity (Seller): The data indicates that the seller needed special purpose investments (such as physical and human assets) are required for the transaction.
ASST-Buy	2, 3, 4	Asset-Specificity (Buyer): The data indicates that the transaction would cause the Department of Defense to devote special purpose investments as a result of the transaction.
BARR-CICA	4	Barrier (Competition in Contracting Act): The data indicates that government representatives at least attempted to remove barriers preventing potential competitors from entering the market and that the attempts were made to comply with CICA..
BARR-Ktr	4	Barrier (Contractor): The data indicates that contractor representatives attempted to erect barriers designed to prevent potential competitors from entering the market or emphasized those barriers that existed already.
BUY-Curr	3	Buy-In (Current Acquisition): The data indicates that the AFMC contracting representative believed the contractor was attempting to buy-in on the instant acquisition.
BUY-Evi	3	Buy-In (Evidence): The data indicates evidence that the contractor attempted a buy-in on previous or current acquisitions.
CON-Govt	2, 3, 4	Control (Government): The data indicates that government representatives thought control could be exerted over the contractor.
CON-Ktr	2, 3, 4	Control (Contractor): The data indicates that government representatives thought that the contractor was controlling the situation.
DIS-Con	2	Discounts (Considered): The data indicates that the negotiators considered applying or developing a quantity-break discount structure to the acquisition.
DIS-Neg	2	Discounts (Negotiated): The data indicates that a quantity-break discount structure was negotiated.
DOL	2, 3	Dollar Value: The dollar value of the amount subject to the waiver of the requirement to submit certified cost or pricing data.
EXP	2, 3, 4	Experience: The number of years the individual has served in a similar capacity or on similar projects



TABLE 9 (Continued)

PATTERN CODES	INV QUES	OPERATIONAL DEFINITIONS
FREQ-Recur	2, 3, 4	Frequency (Recurring): The data indicates that the acquired products had been purchased in the past or would be required again.
INFO-DCAA	2, 3	Information Source (DCAA): The data indicates that the AFMC contracting representative obtained information from DCAA in support of the price analysis.
INFO-Prime	2, 3	Information Source (Prime): The data indicates that the AFMC contracting representative obtained information from the contractor in support of the price analysis. This code is applicable only when the pricing action was part of a contractual action with a higher-tier contractor.
INFO-Off	2, 3	Information Source (Offeror): The data indicates that the AFMC contracting representative obtained information from the offeror.
INFO-Oth	2, 3	Information Source (Other): The data indicates that the AFMC contracting representative obtained information from some other source.
INFO-Tech	2, 3	Information Source (Technical Representative): The data indicates that the AFMC contracting representative obtained information from an engineer, program manager, or other technical expert.
LEN-Ini	2, 3, 4	Length of the Contract (Initial): The number of months or years in the contract performance or delivery period. This subcategory indicates that the contract was for initial quantity only. Performance period was for 1 year or less.
LEN-4Yrs	2, 3, 4	Length of the Contract (Four-Years): Performance period was for four years.
MKT-Comp	2, 3, 4	Market (Competitive): The data indicates that the market environment was perceived to be characterized by adequate competition. This addresses the market conditions, not the individual acquisition.
MKT-Oth	2, 3, 4	Market (Other): The data indicates that the market environment was perceived to be something other than competitive or sole source.
MKT-SS	2, 3, 4	Market (Sole Source): The data indicates that the market environment was perceived to be characterized by limited competition or to be sole-source. This addresses the market conditions, not the individual acquisition.
PRES-Fund	2, 3	Pressure (Funding): The data indicates that there was pressure to award in order to prevent loss of funding.
PRES-None	2, 3	Pressure (None): The data indicates that there was no unusual pressure to acquire the item(s) quickly.
PRES-Pol	2, 3	Pressure (Political): The data indicates that there was pressure to award exerted by upper management in either contracting, the program office, or Air Staff.
PRES-Sched	2, 3	Pressure (Schedule): The data indicates that there was pressure to award in order to meet schedules.
PRES-Urg	2, 3	Pressure (Urgent): The data indicates that the item(s) being acquired were critical or urgently needed.

TABLE 9 (Continued)

PATTERN CODES	INV QUES	OPERATIONAL DEFINITIONS
REL-Coop	2, 3	Relationship (Cooperative): The data indicates that the relationship between the contractors and the government representatives was cooperative throughout the acquisition studied.
REL-Dis	2, 3	Relationship (Distrustful): The data indicates that the relationship between the contractors and the government representatives was distrustful throughout the acquisition studied.
RQMT-Comm	1	Requirement (Commercial): The item(s) being acquired would meet the new definition of commercial item.
RQMT-NDI	1	Requirement (Non-Developmental Item): The item(s) being acquired would meet the new definition of NDI.
RQMT-Dev	1	Requirement (Other): A waiver from certified cost or pricing data was required for some other reason.
RSLT-Chng	2, 3, 4	Result of the Negotiation (Change): The data indicates that there were substantial changes from the proposed to the negotiated prices of the items negotiated through price analysis.
RSLT-Lit	2, 3, 4	Result of the Negotiation (Little Change): The data indicates that any change between the proposed and negotiated prices was insignificant.
T&C-Govt	3, 4	Terms & Conditions (Government Representatives): This category labels terms and conditions and clauses, other than the standard FAR clauses, requested or negotiated by the government.
T&C-Ktr	3, 4	Terms & Conditions (Contractor): This category will label terms and conditions and clauses, other than the standard FAR clauses, requested or negotiated by the contractor.
TOOL-Aux	2	Price Analysis Tool Used (Auxiliary): The data indicates that one or more of the auxiliary price analysis tools listed in Table 3 was used to analyze prices.
TOOL-Oth	2	Price Analysis Tool Used (Other): The data indicates that a new price analysis tool other than one listed in Table 3 was used to analyze prices.
TOOL-Pri	2	Price Analysis Tool Used (Primary): The data indicates that one or more of the primary price analysis tools listed in Table 3 was used to analyze prices.
TOOL-Sec	2	Price Analysis Tool Used (Secondary): The data indicates that one or more of the secondary price analysis tools listed in Table 3 was used to analyze prices.
TYPE-FFP	2, 3, 4	Type of Contract (Firm Fixed Price): The data indicates the contract type for the pricing action was firm fixed price, in which the contractor has full responsibility for the performance costs and resulting profit or loss [FAR 16.101(b)].
TYPE-Oth	2, 3, 4	Type of Contract (Other): The data indicates the contract type for the pricing action was not firm fixed price. Possible types are listed in FAR Part 16 and include cost plus fixed fee and fixed price indefinite quantity/indefinite delivery.

## Appendix B: Data Collection Questions

The following questions served to guide the data collection process. Interviews, however, were open-ended. The list of questions served only as reminders to the researcher.

1. **Experience Information:** What role did the participant play in the case? How long has the participant served in the current position? How much experience does the participant have in related areas? Has the participant been involved in acquisitions of commercial items before? *(General information related to all investigative questions)*
2. **Overview of the Acquisition:** When was action initiated and completed? What were the major milestones? *(General information related to all investigative questions)*
3. **Nature of the Item(s):** What item(s) is being purchased? What will it be used for? Who is the requiring activity? Is the item unique to DOD? Is it commercial in nature? Why did the contracting officer seek a waiver from the requirement for the contractor to submit certified cost or pricing data? *(Related to Investigative Question 1)*
4. **Dollar Value:** What was the anticipated value of the acquisition? What was the proposed price? What was the negotiated price? What type of contracting arrangement was proposed and negotiated? *(Related to Investigative Question 2)*
5. **Nature of the Market:** What characterized the market for the item(s) acquired? Did the contractor operate in a competitive market? Did the contractor have a competitive edge? Did the contractor have no competition? *(Related to Investigative Questions 2, 3, and 4)*
6. **Need for the Item(s):** Did the participants believe that there was a critical or urgent need for the item(s)? *(Related to Investigative Questions 2 and 3)*
7. **Length of Contract:** How long are the proposed and negotiated performance or delivery periods? Were any changes made in the anticipated length and, if so, why were those changes made? *(Related to Investigative Questions 2, 3, and 4)*
8. **Cost/Price Analysis Tools:** How did the participants evaluate whether the proposed prices and/or costs were fair and reasonable? What price analysis techniques, if any, were used? Were tools modified for use? Were new tools developed to use? Who developed the tools? *(Related to Investigative Question 2)*

9. **Perception of the Price Analysis:** How useful were the price analysis tools? What did they show? How helpful were they in the negotiation? What difficulties, if any, occurred? What improvements, if any, are needed? *(Related to Investigative Question 2)*

10. **Information:** What pricing information did the government request the contractor to provide? Why? What was provided? Why? What information was available from other sources and what were those sources? Did the participant believe that the known information was sufficient to enable negotiation of a fair and reasonable price? *(Related to Investigative Questions 2 and 3)*

11. **Overview of Discussions:** Describe the fact-finding and negotiation process. What were the attitudes? What information was exchanged? What information was not exchanged? *(Related to Investigative Questions 2 and 3)*

12. **Control:** Was the contractor, the contracting officer, or the requiring activity in the driver's seat? Did the government attempt any steps to exert control over the contractor? *(Related to Investigative Questions 2, 3, and 4)*

13. **Terms and Conditions:** Were any unique terms and conditions proposed by the contracting officer or the contractor? What was the intent of any such terms and conditions? Why were they necessary? Did the contractor request deletion of any terms and conditions cited in the request for proposal? What terms and conditions were incorporated in the final document? *(Related to Investigative Questions 3 and 4)*

14. **Potential Buy-in:** Do the data indicate that there was a potential for a buy-in? Did the contracting officer attempt any steps to prevent a buy-in? Why or why not? What steps, if any, were taken? Have problems arisen since the award that may have been prevented if action had been taken during the pre-award phase? *(Related to Investigative Questions 3 and 4)*

15. **Follow-on Action:** How has the contract been modified since the case of interest? Are there any pending modifications? Is there an opportunity for direct observation? *(Related to Investigative Questions 3 and 4)*

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