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ABSTRACT OF DISSERTATION

The Influence of the Competition in Contracting Act on the Volume of Competitive Prime Contract Awards for Major Hard Goods and Non-Major Hard Goods Purchased by the Department of Defense

This study sought to determine whether changes have occurred in the volume of competitive, noncompetitive, and follow-on prime contracts awarded by the Department of Defense (DOD) since the implementation of the Competition in Contracting Act (CICA) in 1985.

Archival data involving all DOD prime contracts awarded in fiscal years 1966 through 1987 were studied. The data comprised nearly five million individual procurement actions, with a total value in excess of \$1.4 trillion. Awards classified as small purchases were not included.

The volume of competitive, noncompetitive, and follow-on prime contracts for major and non-major hard goods was measured in terms of both dollar amounts and number of procurement actions involved. Statistical tests for differences between pre- and post-CICA contract levels were conducted to determine whether significant changes had occurred.

No statistically significant differences were found between pre- and post-CICA contract volume when measured by dollar amount. When volume was measured by number of procurement actions, there was a statistically significant increase in competitive awards and a decrease in follow-on awards for major hard goods after CICA was implemented; no statistically significant differences were found in awards for non-major hard goods.

These findings suggest that pre-CICA policies and procedures related to the competitive acquisition of major hard goods were not sufficiently effective or were not properly implemented. On the other hand, the lack of any statistically significant differences between pre- and post-CICA measurements related to purchases of non-major hard goods suggests that pre-CICA policies and procedures were sufficient to ensure competitive acquisition of these commodities.

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THE INFLUENCE OF THE COMPETITION IN CONTRACTING ACT (CICA)
ON THE VOLUME OF COMPETITIVE PRIME CONTRACT AWARDS
FOR MAJOR HARD GOODS AND NON-MAJOR HARD GOODS
PURCHASED BY THE DEPARTMENT OF DEFENSE

by

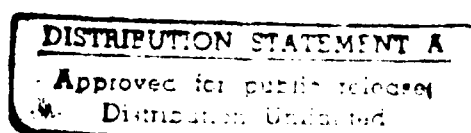
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in Partial Fulfillment of the Requirements for the Degree of
Doctor of Philosophy

November 16, 1988



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ABSTRACT OF DISSERTATION

THE INFLUENCE OF THE COMPETITION IN CONTRACTING ACT (CICA) ON THE VOLUME OF COMPETITIVE PRIME CONTRACT AWARDS FOR MAJOR HARD GOODS AND NON-MAJOR HARD GOODS PURCHASED BY THE DEPARTMENT OF DEFENSE

This study investigated whether or not changes have occurred in the volume of competitive, noncompetitive, and follow-on prime contract awards made by the Department of Defense (DOD), since the implementation of the Competition in Contracting Act (CICA) of 1984.

The research design used was a case study of archival data involving all of the DOD prime contract awards made between fiscal years 1966 and 1987, inclusively. The data consisted of nearly five million individual procurement actions, which collectively had a total value in excess of \$1.4 trillion. Awards classified as small purchases were not included in the research population.

The dependent variables were the levels (percentages) of competitive, noncompetitive, and follow-on prime contract awards for major and non-major hard goods, measured in terms of both dollar awards and procurement actions. The independent variable was the implementation of CICA, which became effective on April 1, 1985. Statistical tests for differences between the pre- and post-CICA levels of the dependent variables were conducted to determine if significant changes had occurred in the post-CICA award data. (111)

The study found that there were no statistically significant differences (.01 or less) between pre- and post-CICA measurements of the dependent variables, when dollar awards were used to measure the variables. When procurement actions were used to measure the variables, a statistically significant increase in competitive awards and a decrease in follow-on awards was observed for major hard goods in the post-CICA data. In contrast, no statistically significant differences were observed in the dependent variables, when procurement actions were used to measure the variables in terms of awards for non-major hard goods.

The study concluded that the observed differences in pre- and post-CICA levels of the dependent variables suggest that pre-CICA policies and procedures related to the competitive acquisition of major hard goods were either not sufficiently effective or they were not being properly implemented. On the other hand, the lack of any statistically significant differences in pre- and post-CICA measurements related to purchases of non-major hard goods suggest that the existing pre-CICA policies and procedures were sufficient to foster the competitive acquisition of these commodities.



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Dedicated To My Wife

PAMELA SORG PETERSON

You are my best friend and my cherished love.

CHAPTER I

INTRODUCTION

BACKGROUND

The Report on the Office of the Secretary of Defense, which was prepared in 1983 as a result of the President's Private Sector Survey on Cost Control (Grace Commission), cited the Department of Defense as probably the most complex organization in the free world today. Some of the reasons given to explain this complexity were the sheer size of the organization and the political importance of defense spending.¹

The Department of Defense (DOD) is unique in many respects, among them, the volume of business the DOD conducts with the private sector, and the many different types of businesses that deal with the DOD. The relationship of these businesses with the DOD range from occasional sales of existing commercial products to complete dependency upon the DOD for the purchase of unique military hardware and services.

All of the thousands of private sector contractors and subcontractors involved in defense spending are interested and concerned about the manner in which the DOD conducts its business. As sellers, these contractors seek an opportunity

¹ President's Private Sector Survey On Cost Control, Report on the Office of the Secretary of Defense, Washington, D.C.: GPO, 1983, p. 5.

to share in the annual volume of defense spending. As the buyer, the DOD seeks to optimize its returns for the purchases it makes with public funds. Various other public and private sector parties, including Congress and special interest groups, are also concerned and involved in defense spending.

This study investigated the issue of competition for the award of defense contracts. Competition is broadly defined as a market condition in which two or more contractors are expected to submit bids or offers in response to a DOD procurement solicitation. The DOD makes explicit distinctions between various forms of competition, and this research investigated each of these forms. Competitive awards, for example, may be the result of price competition and/or design or technical competition. Awards are considered to be noncompetitive if only one contractor (sole source) is considered for the award. Also, awards may involve follow-on work to an incumbent contractor, after the award of an original competitive contract. Complete definitions of competitive, noncompetitive, and follow-on awards are provided in the glossary. As will be shown in the next chapter, arriving at a common definition of "competition" frequently has been troublesome.

Discussion of the levels or volume of competition refers to the percentage (%) of prime contract award dollars or procurement actions (transactions) attributable to each form of competition. For example, during a given period, the sum total of the respective percentage levels of dollar awards for competitive, noncompetitive, and follow-on awards would equal 100 percent of all DOD contract award dollars. Similarly, during a given

period, the sum total of the respective percentage levels of procurement actions for competitive, noncompetitive, and follow-on awards would equal 100 percent of all individual DOD procurement actions. Definitions of a prime contract award and a procurement action are provided in the glossary. To facilitate readability in this paper, the general discussion of the levels or volume of competition refers to the percentage of dollar awards, unless specifically mentioned otherwise.

This research did not focus on contract awards, which are commonly classified in defense and federal procurements as "small purchases." Today, such awards involve individual procurement actions of \$25,000 or less. A complete definition of small purchases is provided in the glossary. The scope of this study included all the DOD prime contract awards (dollars and actions) above the small purchase thresholds made during the period of fiscal years 1966 -1987, inclusively.

To comprehensively investigate competition in defense procurements, it is necessary to make distinctions, not only to determine the various forms of competition, but also to distinguish these forms by the various goods and services being acquired. Appendix 1 provides a detailed outline of the different groupings of goods and services (called DOD Claimant Programs) under investigation in this research. The thirteen DOD Claimant Programs considered in this research encompass all goods and services acquired by the DOD, via prime contract awards.

The DOD Claimant Programs described in Appendix 1 are grouped into two categories, for purposes of establishing a

theoretical framework and the subsequent hypotheses tested in this research. The two categories are major hard goods and non-major hard goods. Both categories are specifically defined in the glossary. Throughout the text of this study, the term, "weapon system(s)" is synonymous with major hard goods; all other goods and services (non-weapon systems) are synonymous with non-major hard goods. Also, distinctions made in this research about unique features of the defense market or defense industry are presented in the context of an industry supplying major hard goods (weapon systems) to the DOD. Most of the non-major hard goods acquired by the DOD are purchased in a market structure (non-defense industry) and under market conditions similar to those experienced by commercial buyers in the private sector.

The government has recognized the importance of competition in federal procurement. National policy has relied upon competition, almost since the birth of the nation. For example, congressional preference for competition in public procurements can be traced to statutory requirements for formal advertising (bidding) as early as 1809 (2 U.S. Statute 536). In its role as a buyer, the government has fundamentally viewed the market as a free market; a market, which should allow for free entry and exit and provide an equal opportunity for interested contractors to compete for government contracts. Over time, however, many of the products acquired by the government have become highly unique products, not widely available in a "traditional free market" (perfect competition) economy. This phenomenon is perhaps most pronounced in the procurement activities of the DOD.

With competition as the paradigm, the government has

repeatedly taken steps to promote more competition in federal procurements. Throughout the tenure of the Reagan Administration, increased attention was focused upon the issue of competition in government procurement. The President, by Executive Order 12352, on March 17, 1982, directed all agency heads to establish criteria for enhancing effective competition in government procurements and limiting noncompetitive actions. On August 11, 1983, the President again emphasized the Administration's concern over noncompetitive procurement practices, via a Presidential Memorandum.² In this Presidential Memorandum to the heads of departments and agencies, the President directed the Administrator, Office of Federal Procurement Policy (OFPP), to issue a policy directive on noncompetitive procurement. The OFPP Policy Letter 84-2, which described circumstances under which noncompetitive procurements must be justified, was published in the Federal Register on February 27, 1984. Before this policy could be implemented, via the Federal Acquisition Regulation (FAR), the Competition in Contracting Act of 1984 (Public Law 98-369) was enacted. Since this Act contained similar controls on noncompetitive procurement, the OFPP rescinded Policy Letter 84-2 on August 30, 1984. With the passage of this law, Congress for the first time established an explicit statutory mandate that all federal government agencies use competitive procurement practices to the maximum extent possible.

2

U.S., President, Memorandum for the Heads of Departments and Agencies. Subject: "Competition in Federal Procurement." 11 August 1983.

The Competition in Contracting Act, or CICA as it is commonly called, enacted as part of the Deficit Reduction Act of 1984, became effective on April 1, 1985. CICA required that as of April 1, 1985, all federal agencies provide for full and open competition in all new solicitation and subsequent contract awards unless, a specific statutory exception permitted otherwise (see glossary for definition of full and open competition). The law established justifications, approvals, and notice requirements for contracts to be awarded under conditions other than full and open competition. In addition, the Act established a requirement for the appointment of a "Competition Advocate" in each executive agency. This individual was to be responsible for promoting competition in his or her respective agency.

CICA essentially established a fixed date (April 1, 1985) after which all federal contract awards would be subject to new statutory requirements aimed at increasing the volume (dollars and actions) of competitive procurements. The law made no distinction or recognition concerning market conditions and product mixes in the defense industry that might influence the extent to which additional competition could be stimulated. As subsequent material in this study will show, there are unique features inherent in the defense industry and the products produced by that industry that suggest that this market segment may not respond to a legislative mandate for increased competition.

Professor George C. Lodge of the Harvard Business School has
3
said:

It is a dangerous delusion to keep mumbling the old myths of free enterprise when they are irrelevant. Ethics require calling a spade a spade. If we are to save the noblest and best of free enterprise and strengthen the force of market competition, we must be clear about where it is relevant and where it is not.

The implication of Professor Lodge's statement, taken in the context of defense procurement, may suggest that competition in defense contracting does not always operate in line with conventional wisdom. It may also suggest that if more competition is not feasible, additional measures by the government to stimulate competition will be unproductive.

This research investigated the issue of competition in defense procurement in an attempt to determine if the government has influenced the volume of competitive awards (dollars and actions) by legislative mandate.

THE RESEARCH QUESTION

Has there been a change in the volume of competitive, noncompetitive, and follow-on prime contract awards made by the Department of Defense (DOD), as measured by the percentage of dollar awards and procurement actions for major hard goods and non-major hard goods, since the implementation of the Competition in Contracting Act of 1984?

3
G.C. Lodge, review of The Ethical Basis of Economic Freedom (edited by Ivan Hill), New York Times, October 24, 1976., cited by Jacques S. Gansler, The Defense Industry, (Cambridge, MA: MIT Press, 1980), p. 29.

SIGNIFICANCE OF THE RESEARCH

Competition in defense procurement has received more attention than competition in any other federal government department or agency. This scrutiny is probably attributable to two fundamental reasons. First, and probably most apparent, are the repeated "horror stories" of perceived overpriced DOD purchases related to sole source (noncompetitive) acquisitions. Examples include the Navy's purchase of \$435 claw hammers (Gould Simulation Systems) and \$640 toilet seats (Lockheed), and the Air Force's purchase of \$7,622 coffee makers (Weber Aircraft Company).⁴ The second reason is related to the huge volume of spending involved in defense procurements. About 50 percent of the total DOD budget authority each year is spent on defense contracts, and the DOD procurements account for about 80 percent⁵ of all federal procurements.

In view of the importance of competition in defense procurements, not only to the DOD but also to the hundreds of defense contractors, it is worthwhile to pursue and develop a more complete understanding of this subject. This study helps to show whether or not legislation is an effective way to stimulate competition in defense procurements. It also suggests which commodities and services seem to be influenced most by increased

⁴ Christopher Cerf and Henry Beard, The Pentagon Catalog: Ordinary Products at Extraordinary Prices, (New York: Workman Publishing Company, 1986), pp. 5, 12, and 14.

⁵ These figures were compiled from OMB budget data and DOD procurement data. See OMB, The United States Budget in Brief and DOD, Prime Contract Awards (PO3), for particular years.

efforts to stimulate competition.

The results of this research provide the DOD acquisition officials and other concerned individuals with some empirical measure of competition in defense procurements, and some empirical data concerning the efficacy of recent competition initiatives. This research also provides guidance and information for future research concerning the issue of competition in defense procurement. Finally, the results of this study may be useful in formulating future policies pertaining to competition for some defense related goods and services. Obviously, the need to understand the nature of competition in defense procurement precedes the prudent formulation and implementation of policies meant to impact such competition. The results of poorly conceived procurement policies affect not only the public trust in the DOD procurement process, but also the long-term relationships between the DOD and the defense contractors.

Thus, this research provides a comprehensive investigation of competition in defense procurement over the past twenty two years and it shows how such competition has been influenced by the Competition in Contracting Act.

Following this introduction, Chapter II provides a review of the relevant literature concerning competition in federal procurements, and the legislative history of the Competition in Contracting Act of 1984. Chapter III provides a description of the theoretical framework surrounding the hypotheses tested in this research. The hypotheses and the methodology used to test

the hypotheses are described in Chapter IV. Chapter V describes the findings from the research and presents an interpretation of the findings. A summary of the study and conclusions are provided in Chapter VI.

CHAPTER II

HISTORICAL PERSPECTIVE AND LITERATURE REVIEW

INTRODUCTION

Comptroller General of the United States, Charles Bowsher, stated that there exists in American society a true erosion of faith in government and in many programs conceived and carried out by government agencies. This erosion, he believed, affects not only the institutions of government, but also the private-sector industries that support government programs.¹

The DOD and the defense industry are frequently the focus of public suspicion. In the pages that follow, an investigation is made concerning one aspect of the DOD and defense industry relationship that is often the subject of criticism. This study looks at competition in defense contracting and recent legislative efforts taken to overcome a perception, by many, that too few competitive contract awards are made by the DOD.

Martin, et. al. (1978) defined procurement research related to the DOD, so that a common foundation could be used when discussing the subject. They classified the procurement research

¹ Charles A. Bowsher, "Strengthening the Government-Industry Partnership," Program Manager, January-February 1984, p. 2.

efforts and functions into various areas, to identify those areas most frequently investigated.² The researchers' methodology involved a content analysis of 114 articles involving procurement research. These articles were published during a five year period in Proceedings, a publication that highlights material presented at the annual DOD Procurement Symposia. The researchers found, as might be expected, that the sources of the DOD procurement research were generally the DOD activities. Specifically, 71 percent of the material reviewed emanated from the DOD or the Armed Services. The remaining 29 percent originated from non-DOD activities: Federal agencies (10%) and private business/universities (19%).³

Three principal sources for relevant literature were used in this research. These sources were the Defense Technical Information Center (DTIC), located in Alexandria, Virginia; the Defense Logistics Studies Information Exchange (DLSIE), located at Fort Lee, Virginia;⁴ and the Pentagon Library.

This chapter first reviews the historical background of competition in federal procurement, and provides an overview of the legislative history surrounding the Competition in Contracting Act of 1984 (CICA). Next, the chapter considers

² Martin D. Martin, et al., "A Proposed Definition and Taxonomy for Procurement Research in the Department of Defense," National Contract Management Journal, vol.II, No. 2 (Winter 1977-1978): 91.

³ Ibid., p. 93.

⁴ DTIC has a widely recognized coding system for cataloging material maintained by that activity. References cited in this research frequently will list the appropriate DTIC code number.

Congress's intent in enacting CICA. The next section discusses the subject of cost savings resulting from competition, and the various factors that seem to affect competition. The final section of this chapter focuses on the issue of noncompetitive contract awards and cost growth, fundamental reasons why, in recent years, procurement reform has been pervasive.

COMPETITION: AN HISTORICAL PERSPECTIVE

Since the early 1800s, Congress has consistently sought to establish competition as the paradigm in federal government procurement. The thinking then, and until very recently, was that competitive procurement is best achieved through a method of buying called "formal advertising." With this form of procurement, bids are solicited, received, and opened, and the subsequent contract is awarded to the bidder submitting the lowest bid price. In 1809, Congress established the statutory requirement for formal advertising, and in so doing, also established the preference for competition in government procurements.⁵

Formal advertising as a method of procurement does not provide for any open discussion between the government (buyer) and the bidders about aspects of the purchase before the contract

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2 U.S. Statute 536 (1809), cited by Curtis Lee Coy, "The Competition in Contracting Act of 1984" (Masters thesis, Naval Postgraduate School, June 1986), DTIC #AD-A171-394, p. 22.

is awarded.⁶ For procurements of complex goods or services, this lack of flexibility frequently was troublesome, and it was recognized that exceptions to the use of formal advertising procedures were necessary. Under certain situations, therefore, procurements by negotiation were allowed, so that the government representatives could discuss the proposed buy with prospective contractors prior to contract award. The requirements for formal advertising were relaxed during World War I and again in World War II. In December 1941, at the beginning of the U.S. involvement in World War II, the Congress passed the First War Powers Act, which authorized the President to give the departments involved in the war the authority to make contracts "without regard to the provisions of the law relating to the⁷ making, performance, amendment, or modification of contracts." Subsequently, the War Production Board, which had been given control over wartime production and procurement under Executive Order 9024, prohibited the use of formal advertising without specific authorization.⁸

After World War II, federal procurement policies were established in two statutes that provided the foundation for subsequent procurement legislation and regulation. The Armed

⁶ A modified form of formal advertising called "Two-Step Formal Advertising" allowed the government and the potential contractors to discuss technical aspects of the proposed purchase in step one. In step two priced bids were solicited based on the technical proposals established in step one. The eventual contract would be awarded solely on the basis of price.

⁷ 55 U.S. Statute 838 (1941), cited by Coy, "Competition in Contracting Act of 1984," p. 23.

⁸ Coy, "Competition in Contracting Act of 1984," p. 23.

Services Procurement Act (ASPA) of 1947, codified in 10 U.S.C. Chapter 137, applies to the procurement activities of the Department of Defense, the National Aeronautics and Space Administration, and the Coast Guard. The Federal Property and Administrative Services Act (FPASA) of 1949, codified in 41 U.S.C. 251, generally governs the procurement activities of all civilian agencies. In total, there are over 4,000 legislative provisions, which directly affect or impinge upon the federal procurement process.⁹

In both of the aforementioned statutes, procurement by means of formal advertising was established as the preferred method. The principle rationale was that this method of buying promoted the maximum competition and a sense of fairness in federal procurement. It was recognized, however, that, at times, formal advertising was either not feasible or practicable. To provide for legislative direction in such situations, both statutes permitted procurement by negotiations. Specific conditions permitting exemption from the formal advertising requirements were explicitly outlined in each law. The Armed Services Procurement Act of 1947, which governed defense procurements, provided for 17 such exceptions, including such contingencies as national emergency, public exigency, small purchases, situations for which it was impracticable to obtain competition, purchase of work related to research and development, classified

procurements, and procurements supporting industrial mobilization.¹⁰ The Federal Property and Administrative Services Act of 1949, which governed procurements by civil agencies, provided for generally the same exceptions.

Over time, the use of negotiations rather than formal advertising increased. The complexity of the goods and services acquired and the difficulty of providing adequate specifications to allow for formal advertising contributed to the increased use of negotiations. Also, procurement personnel often looked for ways to justify negotiations, because they were either faster, easier, or allowed for awards to specific contractors. Many other reasons could be given to explain the increased use of negotiations over formal advertising, but the essential reason probably centered around the flexibility provided in negotiations and the absence of such flexibility in formal advertising. By 1960, negotiation accounted for over 85 percent of all federal contract award dollars.¹¹ By fiscal year 1984, formal advertising accounted for less than 6 percent of the contract dollars awarded by the DOD.¹²

The trend toward more negotiated awards in the DOD, as well as in all federal procurements, had a very significant effect on

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See 10 U.S.C. Sec. 2304 for a full listing of the 17 exceptions to formal advertising.

¹¹

U.S. Congress, Senate, Competition in Contracting Act of 1983, S. Rept. 98-50 to accompany S.338, 98th Cong., 2nd sess., March 31, 1983, p. 8.

¹²

Department of Defense, Washington Headquarters Service, Prime Contract Awards, Publication P03 (Washington, D.C.: GPO, 1985), p. 49.

perceptions of many people in both the public and private sectors. Formal advertising or "bidding" was generally understood to be a fair way to award contracts, and a way to ensure maximum competition. On the other hand, awards made via negotiations held sinister connotations, implying a give and take relationship often accomplished in secrecy and promoting parochial interests.

Unfortunately, the public perception was that negotiation involved noncompetitive procurements.¹³ In reality a negotiated procurement could be either a competitive negotiation, where many prospective contractors might be involved, or a noncompetitive negotiation, where only one source is involved. Competitive negotiations are conducted in the full spirit and intent of a competitive procurement. Over the last 25 years, about 30 percent of the total DOD contract dollars each year have been awarded as a result of competitive negotiations.¹⁴ However, the misconception by many people that all negotiated procurements are awarded on a noncompetitive basis seems to have tainted public opinion.

Formal advertising requires precise specifications, terms and conditions--a common baseline that permits award solely on the basis of price.¹⁵ If awards are to be based, in part, on factors other than price, such as design and performance, formal

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OFPP, Proposal For Uniform Procurement, p. 30.

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See Table 9, DOD, Prime Contract Awards (P03), for each applicable year.

¹⁵

OFPP, Proposal For Uniform Procurement, p.27.

advertising is simply not feasible. When the DOD buys many of its weapon systems and other sophisticated goods and services, price may not be the only factor that is important to consider in determining which contractor should receive the award. Clark¹⁶ Clifford, former Secretary of Defense, illustrated this point:

...The complexity of most military products is such that formal advertisement procedures simply cannot be made to work in the vast majority of cases.....It is the substance, rather than the form, of competition which should be of principal concern to the Congress and the public.

In 1969, pursuant to Public Law 91-129, Congress established the Commission on Government Procurement to study the federal procurement process and make recommendations for improvement. This study, which lasted 2 1/2 years, was perhaps the most comprehensive study of its kind. In December 1972, the Commission released its findings, and made 149 recommendations to¹⁷ improve the procurement process. The Commission recommended that formal advertising remain the preferred procurement method, but that competitive negotiation be authorized as an acceptable and efficient alternative. The Commission's intent was not that there should be more negotiation and less advertising but that competitive negotiation should be recognized in law as a sound buying method, which the Government should prefer when market

¹⁶
Honorable Clark M. Clifford, Secretary of Defense, Fiscal Year 1970 Posture Statement, p. 146, cited in OFPP, Proposal For Uniform Procurement, p. 30.

¹⁷
Commission on Government Procurement, Report of the Commission on Government Procurement, Vol. 1-4, GPO, December 1972.

conditions are not appropriate for the use of formal¹⁸ advertising. It would take the Congress the next 12 years to finally pass legislation that addressed this specific issue. That eventual legislation was the Competition in Contracting Act of 1984.

The Commission of Government Procurement also recommended that an Office of Federal Procurement Policy (OFPP) be established to provide a focal point for federal procurement. In response to this recommendation, Congress enacted Public Law 93-400, "The Office of Federal Procurement Policy Act." This 1974 law established the OFPP in the Office of Management and Budget (OMB), and, among other things, charged the OFPP with implementing the Commission's many recommendations for¹⁹ procurement reform. Public Law 93-400 provided for an initial five-year authorization for the OFPP. In 1979, pursuant to Public Law 96-83, "The Office of Federal Procurement Policy Act Amendment of 1979," Congress reauthorized the OFPP for an additional five years. Congress directed the OFPP, in this law, to develop and propose a uniform, comprehensive, and innovative procurement system for use by all federal agencies, without²⁰ regard to current barriers or statutory requirements. Subsequently, the OFPP utilized sixteen interagency task groups to examine the various procurement processes, and to make

¹⁸ Report of the Commission on Government Procurement, cited by Coy, "Competition in Contracting Act of 1984," p. 27.

¹⁹ OFPP, Proposal For Uniform Procurement, p. 134.

²⁰ Ibid., p. 2.

subsequent recommendations. One of the issues identified by the task groups was the need to establish clear policy that competitive negotiation was equal to any other method of competitive procurement and the existing preference for formal advertising should be eliminated.²¹

The OFPP submitted to Congress a "Proposal For A Uniform Federal Procurement System" on February 26, 1982. This document incorporated many of the Commission's earlier recommendations, as well as recommendations that were provided by the OFPP interagency task groups. To add support for the OFPP's proposal, President Reagan issued Presidential Executive Order 12352, "Federal Procurement Reforms," on March 17, 1982. Among other things, this Executive Order directed the heads of executive agencies engaged in the procurement of products and services from the private sector to:

Establish criteria for enhancing effective competition and limiting noncompetitive actions. These criteria shall seek to improve competition by such actions as eliminating unnecessary Government specifications and simplifying those that must be retained, expanding the purchase of available commercial goods and services, and, where practical, using functionally-oriented specifications or otherwise describing Government needs so as to permit greater latitude for private sector response.

In addition, this Executive Order mandated the implementation of a single simplified Federal Acquisition Regulation (FAR) to replace the various individual regulations

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Ibid., pp. 3 and 137.

22

U.S., President, Presidential Executive Order 12352, "Federal Procurement Reforms," March 17, 1982, Section 1(d).

used by separate executive agencies.²³ The FAR was implemented on 1 April 1984, and it replaced the Defense Acquisition Regulation (DAR), formerly called the Armed Services Procurement Regulation (ASPR), and the Federal Procurement Regulation (FPR), which was used by civil agencies.

The OFPP Policy Letter 84-2, which described circumstances under which noncompetitive procurements could be justified, was published in the Federal Register on February 27, 1984. This policy letter was issued in response to a Presidential Memorandum²⁴ of August 11, 1983, emphasizing the Administration's continued concern over noncompetitive procurement practices. Before this policy could be implemented via the Federal Acquisition Regulation (FAR), the Competition in Contracting Act of 1984 (Public Law 98-369) was enacted on 18 July 1984. Consequently, on August 30, 1984, the OFPP rescinded Policy Letter 84-2, since its contents were moot.

Although the discussion up to this point has focused broadly on the historical developments concerning competition in the federal procurement process, these developments seem most significantly influenced by the procurement practices of the DOD. The DOD influence is simply a function of its huge procurement activity. The DOD accounts for about 80 percent of the total federal contract award dollars spent each year. This volume of

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Ibid., Section 2.

²⁴

U.S., President, Memorandum for the Heads of Departments and Agencies. Subject: "Competition in Federal Procurement." August 11, 1983.

defense procurement exceeds \$150 billion annually and accounts for more than 50 percent of the total annual outlays for national defense. Looked at in another way, annual defense procurement equates to about four percent of the annual gross national product.²⁵ Currently, the DOD processes approximately 15 million procurement actions (contract transactions) each year.²⁶ This equates to an average of about 57,000 actions each business day. In addition, the DOD has over 20,000 people directly involved in the formation and negotiation of contracts, and another 26,000 people involved in contract administration, about 75 percent of the total federal government workforce in this functional area.²⁷ Clearly, the magnitude of defense procurement shapes federal procurement policy and influences the economy of this country.

COMPETITION IN CONTRACTING ACT OF 1984: LEGISLATIVE HISTORY

The Competition in Contracting Act of 1984, called CICA, was enacted as Title VII of the Deficit Reduction Act, Public Law 98-369, on 18 July 1984. CICA represents the culmination of several

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These figures were compiled from OMB budget data and DOD procurement data. See OMB, The United States Budget in Brief and DOD, Prime Contract Awards(P03), for particular years.

²⁶

See Table 16, DOD, Prime Contract Awards(P03), for particular years.

²⁷

U.S., Congress, Senate, Committee on Armed Services, Competition in Contracting Act of 1983, Hearings before the Committee on Armed Services on S.338. (S. Hrg. 98-385) 98th Cong., 1st sess., June 7, 9, 1983, p. 48.

years of procurement reform within the federal government. The actual language of CICA represents a compromise among provisions in three legislative proposals introduced during the 98th Congress--S.338, the proposed "Competition in Contracting Act of 1983;" H.R. 2545, the proposed "Defense Procurement Reform Act of 1983;" and H.R. 5184, the proposed "Competition in Contracting Act of 1984."²⁸ Each of these bills, as well as numerous similar proposals simultaneously considered by the Congress, was intended to stem the growing use of sole-source or noncompetitive procurement procedures, and ultimately, to substantially reduce federal expenditures.²⁹

Although CICA, as enacted, applies to the procurement activities of all federal agencies, the clear influence and dominant role of the DOD procurement practices in shaping this legislation is unmistakable. What follows is a brief summary, prepared by the General Accounting Office, of the background³⁰ concerning each of the three bills mentioned above. The influence of the DOD procurements on each of these bills is noteworthy.

S. 338, 98th Cong., 1st Sess. (1983), which was the major source of the language of the Competition in Contracting Act, had previously passed the Senate as an independent measure on December 11, 1983. The history of its consideration is one of frustration over the

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U.S. Comptroller General, Federal Regulations Need To Be Revised To Fully Realize the Purpose of the Competition in Contracting Act of 1984. Report by the Comptroller General of the United States, GAO/OGC-85-14, August 21, 1985, p. 60.

²⁹

Ibid.

³⁰

Ibid., pp. 60 and 61.

growing use of noncompetitive procurement procedures at the same time that procurement budgets, particularly the DOD budget, were increasing dramatically. Congressional concern focused on estimated savings of between 15 and 50 percent from the use of competitive procedures, particularly regarding over \$19 billion spent annually by DOD for spare parts, mostly on a noncompetitive basis. To overcome the "institutional bias" against competition, S.338 contained sole-source justification and reporting requirements, as well as provisions establishing "advocates for competition" within each agency.

H.R. 2545, 98th Cong., 1st Sess. (1983), was identical in many ways to S.338, although directed specifically to increased effective competition in DOD procurements. Excessive prices paid by DOD for spare parts was the subject of five hearings by the Investigations Subcommittee of the House Committee on Armed Services, to which H.R. 2545 was referred. Both the Senate and House Committees on Armed Services were deeply concerned about the spare parts pricing "scandal" in DOD. For example, the Conference Report on the Department of Defense Authorization Bill, 1984, H.R. 5167, noted the following with respect to procurement reform:

"The conferees discussed at length the impact that the recent examples of excessive payments for common items have had on every aspect of the congressional consideration of the defense budget, the process for acquisition of supplies by the Department of Defense, and the management of the Department of Defense in general. The recurrence of seemingly inexplicable occurrences such as these mandate legislative attention. While acknowledging the recent initiatives undertaken by the Department of Defense, only legislation will ensure that the recent initiatives will result in systemic changes."

H.R. 5184, 98th Cong., 2d. Sess. (1984), the proposed Competition in Contracting Act of 1984 was also intended to overcome the reluctance of federal agencies to use competitive procedures. Section 2741 of the act, establishing the procurement protest system, was adopted from this bill. In introducing this legislation, the Chairman, House Committee on Government Operations, stated:

"While federal procurement regulations require agencies to award contracts on a competitive basis, inventive procurement officials within the agencies have found numerous ways to circumvent or get around

these requirements altogether. As a result, this problem is getting worse. . . . As a result of not using full and open competition, the Government is spending billions of dollars each year in excessive prices for its goods and services. The horror stories that we have all heard concerning DOD's acquisition of spare parts are a vivid example of the waste and abuse that is rampant within DOD. In this regard, the Government Operations Committee found that costs for spare parts decreased drastically when competition is used--by as much as 80 percent."

Although CICA is a compromise among provisions in the aforementioned legislative proposals, S. 338 became the law, essentially, because Senator William Cohen (R-ME) succeeded in having S. 338 adopted as an amendment to the Deficit Reduction Act of 1984 (Public Law 98-369).

CICA made sweeping changes to the Armed Services Procurement Act of 1947 and the Federal Property and Administrative Services Act of 1949, the two statutes mentioned earlier that serve as the foundation for federal procurement. Other statutes, such as the Office of Federal Procurement Policy Act, were also amended.

CICA established "full and open competition" as the standard for federal procurement. The term, "full and open competition," when used with respect to a procurement, means that all reasonable sources are permitted to submit sealed bids or competitive proposals on the procurement. A reasonable source means a prospective contractor who:

(A) has adequate financial resources to perform the contract or the ability to obtain such resources.

³¹
Competition in Contracting Act of 1984 P.L. 98-369,
Section 2731.

³²
Ibid.

(B) is able to comply with the required or proposed delivery or performance schedule, taking into consideration all existing commercial and government business commitments.

(C) has a satisfactory performance record.

(D) has a satisfactory record of integrity and business ethics.

(E) has the necessary organization experience, accounting and operational controls, and technical skills or the ability to obtain such organization experience, controls, and skills.

(F) has the necessary production, construction, and technical equipment and facilities or the ability to obtain such equipment and facilities; and

(G) is otherwise qualified and eligible to receive an award under applicable laws and regulations.

In addition to the statutory mandate for competitive procedures to obtain full and open competition, CICA resulted in other significant procurement reforms. A summary of the other major changes in procurement policy and regulations resulting from CICA is outlined below:

- * eliminates preference for formal advertising and puts competitive negotiation on the same level as sealed bid procedures (sealed bidding is the term used in place of formal advertising)

- * requires sealed bid procedures if:

- (1) Time permits the solicitation, submission, and evaluation of sealed bids
- (2) The award will be made on the basis of price and other price-related factors
- (3) Discussions with the responding offerors about their bids is not necessary
- (4) Receipt of more than one sealed bid may be reasonably expected

- * eliminates the 17 exceptions to formal advertising and establishes seven exceptions under which other than competitive procedures may be used. The exceptions are:

- (1) Only one responsible source
- (2) Unusual and compelling urgency
- (3) Industrial mobilization; or experimental, developmental, or research work
- (4) International agreements
- (5) Authorized or required by statute
- (6) National security
- (7) Public interest

- * requires written justification and approval for the use of other than competitive procedures
- * permits the use of competitive procedures that allow only small business to compete, and permits awards that restrict competition pursuant to other provisions of law and regulations, such as awards to minority businesses
- * requires the use of advance procurement planning and market research
- * expands the statutory requirements for contractors to submit certified cost or pricing data
- * requires agencies to furnish and publicize information about pending procurements
- * requires reports to Congress regarding competitive and noncompetitive awards
- * requires an advocate for competition in each executive agency
- * establishes formal bid protest procedures

As can be seen, the provisions of CICA encompass a range of issues. CICA's main purpose, however, was to increase the number of competitive contract awards in the federal government; this broad purpose is the subject of this research. Whereas most of the individual provisions incorporated within CICA deal directly or indirectly with competition, CICA's overall intent to promote more competitive awards is the specific focus of this study.

The efficacy of CICA, as it pertains to increasing the volume of competitive awards (dollars and actions) in defense procurements, must be considered not only in view of the law itself, but also in view of the intent of Congress in enacting the law. The next section highlights the role of Congress and its intent in passing CICA. The unique nature of competition in defense procurements is also outlined.

THE INTENT OF CONGRESS

The Congress has always monitored defense policy, but until the early 1960s its participation in systems acquisition matters was primarily after the fact. When systems procurement costs of billions rather than tens or hundreds of millions of dollars became common, in the the 1960s, Congress began to participate³³ actively in the system selection process.

Congressional interest in defense procurement is understandable for many reasons, but three seem especially noteworthy. First, as mentioned earlier, the sheer volume of public funds that flow through the DOD procurement process make defense contracting an area of particular interest to Congress. Perhaps to a greater degree than most any other budget line, expenditures relating to defense procurement are controllable, and Congress can "manipulate" such expenditures during budgetary processes each fiscal year. Second, defense procurement expenditures that flow directly to American business create jobs, stimulate the economy and innovation, and win votes in home states. Finally, the acquisition of the right weapons in the right quantities and at the appropriate times can have a dramatic influence on the nation's ability to sustain itself militarily. Unlike the situation of even the recent past, today's weapon systems are extremely complex and highly technical. Generally, they are not produced quickly, nor are they produced in great

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Michael D. Rich, Competition in the Acquisition of Major Weapon Systems: Legislative Perspectives (Santa Monica, CA: The RAND Corporation, R-2058-PR, [November 1976]), p. iii.

volumes, as were weapons in the past. As a result, detailed acquisition plans must be developed, so as to provide for the appropriate weapons systems needed far into the future. In short, the technology of modern warfare is such that weapons can be destroyed at a much faster pace than they can be replaced.

Increased congressional interest in defense spending can perhaps be illustrated by the number of reports Congress solicits from the DOD. In fiscal year 1970, for example, Congress requested from the DOD 36 reports and/or studies relating to defense spending. By fiscal year 1985, the number of such reports and studies requested had increased to 458 (nearly a 1,200 percent increase). Also, in fiscal year 1970, Congress mandated 64 statutory provisions that impacted the DOD procurement process. By fiscal year 1985, the number of statutory provisions that affected defense procurement had grown³⁴ to 213 (over a 200 percent increase).

Although most of the reports and studies included in the aforementioned figures were one-time feasibility studies, or reports for specific purposes or programs, there are currently three recurring reports that Congress receives that specifically relate to defense procurement. These reports are the Selected Acquisition Report (SAR), which is a quarterly status report on major acquisition programs; the Unit Cost Reports, which are

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U.S., Congress, House, Committee on Armed Services, Defense Department Authorization and Oversight Hearings on Department of Defense Authorization of Appropriations for Fiscal Year 1986, H.R. 1872, (H.A.S.C. No. 99-2), 99th Cong., 1st sess., February 5, 6, and 7, 1985, p. 32.

reports to highlight cost growths early enough in an acquisition, to allow remedial action; and the Acquisition Strategy Report, which outlines the objectives, resources, management assumptions, extent of competition, proposed contract types, and program structure at the inception of each major system acquisition.³⁵

In a 1976 report, prepared by the RAND Corporation as part of the Project RAND research "System Acquisition Policy Studies," the congressional attitudes toward competition in major weapon systems acquisitions were investigated. The report suggested that congressional treatment of issues relating to the procurement of weapon systems is often shallow. In explaining this apparent lack of thoroughness in congressional hearings, the report offered three reasons. First, because of the volume of business undertaken during limited hours, the hearings of any single committee or subcommittee are usually sparsely attended by the members themselves. Second, few in attendance question witnesses extensively, leaving much of it to professional committee staff members. Third, questions asked by a congressman do not necessarily reveal his or her personal interest, since many are written by staff members.³⁶ This shortcoming is certainly not peculiar to defense procurement issues, nor is it necessarily damaging, taken in the context of the overall conclusions reached in congressional debates. On the other hand,

³⁵ Virginia L. Wydler, "Reports To Congress Relative To Major Weapon Systems Acquisition: Their Impact on the Acquisition Process," (Masters Thesis, Naval Postgraduate School, September 1986), DTIC #AD-A176-050, pp. 22-34.

³⁶ Rich, Legislative Perspectives, p. 5.

as the RAND report suggested, "The result is that the amalgam of comments, questions, statements, and opinions that emerges is not clearly representative, nor is it clearly complete."³⁷

One frequent phenomenon about the acquisition of major weapon systems³⁸ is the pattern followed in the development of such systems. Generally, five sequential phases occur in the life cycle of a major weapon system acquisition. These phases are: initial design, development, initial production, full production, and reprocurement.³⁹ The DOD labels these phases differently, but the cycle is essentially the same. In the DOD the life cycle of a major system is defined by the following four phases: Concept Exploration, Demonstration and Validation (DEM-VAL), Full Scale Engineering Development (FSED), and Production and Deployment.⁴⁰

When the subject of competition is related to the life cycle of major systems, an extremely important feature must be

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Ibid.

³⁸

Major defense acquisition programs (major systems) are defined in 10 U.S.C. 2432(a)(1) and further outlined in DOD Directive 5000.1, "Major Systems Acquisitions." Generally, such programs are estimated to require an eventual total expenditure for research, development, test and evaluation (RDT&E) of more than \$200 million (based on FY80 constant dollars) or eventual total expenditures for procurement (production) of more than \$1 billion (FY80 constant dollars).

³⁹

For a detailed discussion see J. Ronald Fox, Arming America: How the U.S. Buys Weapons (Cambridge: Harvard University Press, 1974), or see M. J. Peck and F. M. Scherer, The Weapons Acquisition Process: An Economic Analysis (Cambridge: Harvard University Press, 1962).

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For detailed discussions see OMB Circular A-109, "Major Systems Acquisition," DOD Directive 5000.1, "Major Systems Acquisitions," and DOD Directives 5000.2, "Major Systems Acquisition Procedures."

recognized. As a system moves through the acquisition life cycle, the nature of competition relating to that system changes in two major ways: it changes in the mix of benefits sought by the DOD from the competition itself, and it changes in terms of the cost of supporting the competitive environment.⁴¹ This feature of competition for major systems is not present when the DOD buys the more routine goods and services that are akin to general commercial products sold in substantial quantities to the general public. Colleen Preston, counsel for Procurement Policy, U.S. House Armed Services Committee, illustrated this important feature about competition in the following anecdotal remark. She said, "Perhaps the largeness and complexity of the military establishment directs media attention on the most minute, easily grasped issues in hopes that understanding the process of buying a bolt will yield an understanding of the whole process."⁴²

In the early phases of an acquisition for a major system, the mix of benefits sought by the DOD from competition generally involves design and technical considerations. The price paid to the defense contractor(s) for the early design and technical development of the system may be of only minor importance, since often the deliverable product is only a "paper" product. At this point in system acquisitions, competition is normally thought of

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K.A. Archibald et al., Factors Affecting the Use of Competition in Weapon System Acquisitions (Santa Monica, CA: The RAND Corporation, R-2706-DR&E, [February 1981]), DTIC #AD-A097-349, p. v.

42

Colleen A. Preston, "Congress and the Acquisition Process: Some Recommendations for Improvement," National Contract Management Journal Vol. 20, Issue 1. (Summer 1986): 1.

as design or technical competition. Design or technical competition (also referred to as "rivalry" in some literature⁴³) is the process of generating alternative potential solutions to satisfy a mission need, and selecting the best system, price and other factors considered.⁴⁴ Design or technical competition, in contrast to price competition, is used to develop a precise technical description of the system, i.e., drawings, specifications, and perhaps even the necessary technology.⁴⁵

During the early phases in the system's life cycle, competition is usually intense, as contractors try to win the awards that will eventually lead them to the production phase of the cycle, the "cash cow" in defense acquisition. Since several defense contractors usually compete in the early phases of the system's life cycle, the cost to the government of supporting such competition is minimal. Thus, in the beginning of the system's acquisition process, the DOD typically looks for competition to provide a mix of optimal design and technical benefits. Also, during this period, there is usually an associated low cost of maintaining a competitive environment.

As the major system moves further through its acquisition

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R.E. Johnson and G.R. Hall, Public Policy Toward Subcontracting (Santa Monica, CA: The RAND Corporation, RM-4570-PR, [May 1965]), p. 11.

44

Benjamin R. Sellers, "Competition in the Acquisition of Major Weapon Systems" (Masters Thesis, Naval Postgraduate School, September 1978), DTIC #AD-A078-268, pp. 17-18.

45

William B. Williams, Guidelines For the Application of Competition (Fort Lee, VA: The Army Procurement Research Office, [June 1982]), DTIC #AD-A118-011, p. 6.

life cycle, the design and technical issues and problems are identified and resolved in a competitive environment. As the production phase approaches, the mix of benefits the DOD seeks from competition begins to change from design and technical factors to savings achieved through lower prices. The focus on the benefits of competition shifts from exploiting design opportunities early in development to a focus on the final product in terms of its unit production cost and the effects of one or more producers in the defense industrial base.⁴⁶ Also, as the system matures and moves further through its life cycle, the number of defense contractors competing for awards diminishes. As the number of contractors competing for the system decreases, the cost to the government to maintain a competitive environment may increase significantly, especially if the DOD must employ some form of dual sourcing⁴⁷ to ensure that a competitive environment is maintained.

Price competition refers to situations where market forces determine the prices the government will pay for the goods and services it needs.⁴⁸ In a 1982 DOD-sponsored study, the Logistics Management Institute investigated the circumstances

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John C. McKeown, "Increasing Competition in the Acquisition Process," Concepts 5 (Summer 1982): 26.

⁴⁷

Dual sourcing (also called second sourcing) is an acquisition strategy whereby two or more contractors are awarded contracts for the same or similar items so that a competitive environment exists for subsequent purchases. Dual sourcing may also be used to support industrial mobilization requirements.

⁴⁸

Richard P. White and Myron G. Myers, Competition in DOD Acquisitions (Washington, D.C.: Logistics Management Institute, LMI Task RE907, [May 1979]), DTIC #AD-A078-295, p. 1-1.

favoring price competition. The researchers found that price competition in the defense market was possible and beneficial only when the following two conditions were satisfied:⁴⁹

1. Adequate Description: The product or service is describable in a rigorous but not overly restrictive fashion, so that potential suppliers can understand and comply with the government's requirements.
2. Available Suppliers: The government has access to at least two independent suppliers with the technical competence and requisite facilities to satisfy the requirements.

The study pointed out that it was immaterial whether the procurement was for spare parts, shoes, electronic components, or a major system, because if either condition was not satisfied, price competition was either impossible or seriously compromised.⁵⁰

In the context of defense procurement, the distinction between different forms of competition is not a trivial point. Sellers (1979) suggested that many times the term "competition" is used too loosely, leaving in question the type of competition,⁵¹ because design and price competition are independent concepts. Even when the difference between price competition and design or technical competition is recognized, there may still be confusion over the "method" of procurement. For example, formal

⁴⁹ Myron G. Myers, Paul R. McClenon, and Harry M. Tayloe, Price Competition in the DOD (Washington, D.C.: Logistics Management Institute, LMI Task RE105, [September 1982]), pp. 2-2 and 2-3.

⁵⁰

Ibid., p. 2-3.

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Sellers, "Competition in the Acquisition of Major Systems," p. 16.

advertising (called sealed bidding since the enactment of CICA) equates exclusively to price competition. On the other hand, negotiation (either competitive or noncompetitive) could be based on price alone or on price and design or technical considerations, or any number of other factors. While many in Congress recognize these important distinctions, there appears a definite tendency to think of competition in defense procurement in terms of price competition, and to focus on the dollar savings that result from such competition.

Researchers in the RAND Corporation have suggested that conventional wisdom and underlying theory of how competition in DOD acquisitions should function are lacking, both in a quantitative and qualitative sense. They point out that a careful reading of congressional testimony leads one to suspect that in the legislative context the term competition usually⁵² implies price competition. The study also cautions that when major systems are involved, price competition is uncommon, since it does not generally come into play until the reprocurement phase, and even then, factors other than price are usually⁵³ included in award criteria.

In his study of legislative perspectives regarding competition in the acquisition of major weapon systems, Rich (1976) stated that usually when a legislator cites a number as "the percentage of the total DOD expenditures spent on 'competition'," he is equating competition with formally

⁵²Archibald, Factors Affecting Competition, p. 5.⁵³

Ibid.

advertised procurements and nothing else.⁵⁴ He cites as an example Senator Proxmire's statement that . . . "of all our procurement, only 11 percent is competitive."⁵⁵ This figure is the correct percentage of the total DOD dollar awards attributable to formal advertising in 1970, the year to which Senator Proxmire was referring. However, if competition were defined as both price competition and design or technical competition involving either formal advertising or negotiation, the actual percentage of total dollar awards for the DOD contracts made competitively in 1970 was 42.8 percent.⁵⁶

Although the foregoing discussion highlights the perhaps overly conservative view of competition frequently displayed by Congress, the DOD in its zeal to demonstrate positive statistics that reflect competitive awards perhaps errs in the other direction. In describing the DOD's view about competition, Rich⁵⁷ (1976) had this to say:

DOD spokesmen recognize the distinction between price and design competition but will combine the concepts if questioned about competition in general. Moreover, DOD subscribes to the belief that once there is competition or rivalry of some variety for a system, procurement of the system is forever competitive, even if follow-on buys are conducted in a sole source environment. Thus, in DOD parlance, "competition" characterizes all but sole source acquisitions.

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Rich, Legislative Perspectives, pp. 7-8.

⁵⁵

Ibid., p. 8.

⁵⁶

See DOD, Prime Contract Awards(P03), Table 9, for Fiscal Year 1970.

⁵⁷

Rich, Legislative Perspectives, p. 7.

The work done by Rich (1976) in the RAND Corporation study mentioned above is now over twelve years old; however, the general situation he describes is still very common. Examples of both conservative and liberal interruptions of "competition" in defense procurement are pervasive in the literature. Again, Rich (1976) provides a key insight, which is still appropriate, when he suggests that the mastery of innumerable acronyms is no longer the primary semantic hurdle in the study of the weapons acquisition process. Rather, the challenge is to understand how the word, "competition" is used.

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A review of legislative history suggests that congressional views concerning the benefits of competition can be associated with one or more of the following statements:

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- * Competition saves money.
- * Competition curbs cost growth.
- * Competition promotes innovation and technological change.
- * Competition enhances mobilization capability and industrial responsiveness.
- * Competition appeals to our sense of "fair play." It maintains the integrity of the federal procurement system by ensuring that government contracts are awarded on the basis of merit rather than favoritism.

Professor John Cibinic, Jr., National Law Center, The George Washington University, in testimony before the Committee on Government Affairs, in 1982, stated that he believed that

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Ibid., p. 6.

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U.S., Congress, Senate, Committee on Government Affairs, Legislative History, Public Law 98-369, Senate Report No. 98-50. (St. Paul: West Publishing Company, 1985), pp. 2175 - 2176, cited by Mark E. Presar, "Assessing the Impact of Recent Competition Related Legislation on the Workload of Systems Contracting Personnel at Air Force Systems Command Product Divisions" (Masters Thesis, Air Force Institute of Technology, AFIT/GLM/LSM/865-61, September 1986) DTIC #AD-A174-458, p. 34.

competition was the "bottomline" in the acquisition process,⁶⁰ essentially, because it assured fairness if properly employed.

He reinforced Rich's 1976 statement that . . . "Congress apparently regards the awarding of large and long-term contracts without competition as giving the appearance of unfairness (to the rest of the industry), so that an additional and indirect benefit stems from the view that competition, in whatever form,⁶¹ is the functional equivalent of equity."

The difficulties of measuring objectively the significance of "fairness" relating to competition in defense procurement are undoubtedly pervasive. No specific work in this regard was found in the literature. However, a recent study that attempted to identify reasons why firms are reluctant to engage in defense procurement may be suggestive.⁶² Lamm (1987) used a survey questionnaire to determine, in part, what the primary reasons were that a firm was not at that time involved in defense business, or why it intended to get out of such business if it was involved. The sample of firms to be surveyed was selected based on firms that had previously indicated a reluctance to get involved in defense contracts, as well as firms that were current defense contractors. Firms in the sample were either prime

⁶⁰ U.S., Congress, Senate, Committee on Government Affairs, Competition in the Federal Procurement Process, Hearings Before the Committee on Government Affairs on S.2127, 97th Cong., 2d sess., June 29, 1982, p. 9.

⁶¹ Rich, Legislative Perspectives, p. vi.

⁶² David V. Lamm, An Analysis of Reasons Why Companies Refuse To Participate in Defense Business (Monterey, CA: The Naval Postgraduate School, [March 1987]), DTIC #AD-A179-338.

contractors, subcontractors, or both. The 213 firms that responded to the questionnaire indicated the following principal reasons why they refused to engage in defense business or were contemplating getting out of such business (listed in rank order):⁶³

1. Burdensome paperwork (70% of respondents indicated this).
2. Government bidding methods.
3. Inflexible procurement practices.
4. More attractive commercial opportunities.

Of these four principal reasons, "Government bidding methods" may be suggestive of some dissatisfaction in the fairness of defense procurement. The aspect(s) concerning "government bidding methods" that were bothersome to the firms is unknown, since the researcher provided no definition or explanation. However, "government bidding methods" may not relate to the issue of competition because "competition forced them out," as a separate reason, was ranked third from the bottom in the list of reasons compiled, and only 8.6 percent of the responding firms indicated this as a reason for dissatisfaction.⁶⁴

The researcher did note that with greater emphasis placed on competition in defense procurements, because of CICA, it would seem reasonable to expect that a higher number of firms would be forced out of the DOD business, due to more competition.⁶⁵ Perhaps one of the most significant findings from Lamm's study was the point that companies refusing the DOD

⁶³

Ibid., p. 88.

⁶⁴

Ibid., pp. 74 and 89.

⁶⁵

Ibid., p. 74.

business have essentially no difference in their reasons for dissatisfaction than do those companies which are involved in defense business.⁶⁶

It seems that some in Congress believe that a lack of "full and open competition" undermines the integrity of the competitive procurement process. In this sense, competition is not viewed as existing or not existing, but rather it is viewed as existing in matters of degree; some degree of competition is unacceptable, whereas some greater degree of competition is acceptable. Again, the legislative history supporting the development of CICA is illustrative. In a report outlining H.R. 5184, one of three congressional proposals that eventually resulted in CICA, Congressman Brooks, Chairman of The Committee on Government Operations, explained the Committee's view on competition:⁶⁷

The FAR (Federal Acquisition Regulation) states that sufficient competition is achieved as long as offers are received (emphasis added) from at least two independent sources that are capable of satisfying the requirements of the agencies. Thus, the standard for competition is not whether an agency has opened up a procurement to all qualified sources, but whether it received at least two bids. In the Committee's view, an acquisition is hardly competitive when it is limited (emphasis added) to just two independent sources, since additional bidders are often available to meet a government requirement. Using the traditional view, an agency may select two of its favorite vendors and then assert that a "reasonable degree of competition" had been achieved. The Committee believes that full and open competition exists only (emphasis added) when all vendors are allowed to compete in an agency acquisition.

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Ibid., p. 90.

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U.S., Congress, House, Committee on Government Operations, Competition in Contracting Act of 1984, Report Together With Separate and Dissenting Views on H.R. 5184, H. Rept. 98-1157, 98th Cong., 2d sess., October 10, 1984, p. 16.

An obvious but perhaps subtle distinction should be pointed out here. There is a big difference in the degree of competition that may exist in the market when only two offers are received. For example, 100 vendors may have been invited to participate (Invitations for Bid [IFB's] or Requests for Proposals [RFP's]) and yet only two elected to respond. On the other hand, perhaps only two vendors were invited (limited) to participate and both responded. It would appear that the Committee focused its attention on the second example; however, a closer reading of the report seems to suggest that both situations were considered.⁶⁸

Again, citing from the report:

Under the bill, when an agency receives only one bid or negotiates with only one offeror, the procurement is to be considered a non-competitive acquisition. This requirement recognizes that while the agency may use competitive procedures, the result may nonetheless be that only one company submits a bid; and it is, therefore, a sole-source procurement. Further, it has been the Committee's experience that many of these so-called competitive procurements are actually designed for one specific bidder and should meet the requirements for a sole-source justification. Even when an agency made a good faith effort to have competition, the outcome directs that the procurement still should be reviewed as a sole-source procurement to determine if excessive costs are involved or if the government is getting quality products or services.

With this view of competition in mind, H.R. 5184 provided⁶⁹ the following mandate:

Sec. 202(f)(2). In any procurement conducted under subsection (b) or (c) in which the executive agency receives only one bid or proposal from a responsible source, the procurement shall be considered

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Ibid., p. 21.

⁶⁹

Ibid., p. 3.

noncompetitive and the award shall not be made until the justifications, certifications, and approvals required under subsection (d)(2) have been completed.

In an accompanying separate view to the aforementioned Report on H.R. 5184, Congressmen Erlenborn and Clinger pointed out their concern about the wisdom of the Committee's viewing
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competition in such a strict sense.

.....We are concerned, however, that in its haste to report out this particular piece of legislation, the Committee has left unanswered several important questions. We pose them here in the hopes that, as the bill progresses through the legislative process, others might provide some answers.

1. Competition is not a goal itself, but a means to the goal of efficient and economical procurements. Might the inflexible application of the means occasionally interfere with the achievement of the goal? From the government's perspective, every procurement has two costs, the price of the item and the administrative costs related to the contract. If limiting competition on a particular contract increases the price of the item by a smaller amount than the decrease in administrative costs, wouldn't full and open competition result in a less efficient procurement?.....

The Senate proposal, S. 338, was far less restrictive in terms of its limiting the meaning of "full and open competition".
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A review of the bill's language will illustrate this point:

Sec. 2302(3). 'Competitive procedures' means procedures under which the head of an agency enters into a contract after soliciting (emphasis added) sealed bids or competitive proposals from more than one source that is capable of satisfying the needs of the agency.

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Ibid., P. 64.

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See S.338, The Competition in Contracting Act of 1983, Section 2302(3), as passed by the Senate on 11 November 1983.

Rather than determining the extent of competition based on the number of actual bids or proposals received, S. 338 seemed to focus more on the spirit and intent of the solicitation, i.e., were two or more sources solicited? This approach seems to be more in line with market theory, in which the marketplace is allowed to dictate the extent of competition.

It is noteworthy that Public Law 98-72⁷², which was enacted August 11, 1983, had already established a legislative mandate for the publication of notices of all proposed federal government procurements in the Commerce Business Daily. This law, which amended section 8(e) of the Small Business Act (15 USC 637), empowered the Secretary of Commerce to obtain notice of all proposed competitive and noncompetitive procurement actions greater than \$10,000, before such actions were released by federal agencies in the form of solicitations. CICA also included language with essentially the same intent as Public Law 98-72, when it mandated that executive agencies furnish the Secretary of Commerce the notice mentioned above.⁷³ Thus, more than casual attempts were being made to inform the public at large of proposed procurements. This policy, it seems, would give prospective contractors an "opportunity" to be alerted to potential federal contract offerings. Notices of proposed procurements that appear in the Commerce Business Daily provide the reader with a brief description of the goods or services

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Public Law 98-72, 98th Cong., 97 STAT 403, August 11, 1983.

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See Subtitle C, Section 2732, Public Law 98-369 (Div. B, Title VII) 98 STAT 1175, The Competition in Contracting Act of 1984, July 18, 1984.

being solicited and information that would allow interested prospective contractors to call or write the appropriate procurement office to request a copy of the solicitation document.

When CICA was enacted, the language of the law was even more liberal than originally proposed in S.338, regarding the "degree" of competition that must be obtained for a procurement to be considered competitive. As enacted, CICA states:

Sec. 2302(2). Competitive procedures means procedures under which the head of an agency enters into a contract pursuant to full and open competition.

Recall from earlier discussion that pursuant to CICA, full and open competition means that all reasonable sources are permitted to submit sealed bids or competitive proposals. This final language in the law seems to reflect more accurately what the Commission on Government Procurement (1972) had in mind in terms of the competition. The Commission had recommended a need to solicit from a "competitive" rather than a "maximum" number of sources.

The foregoing discussion highlights the rather broad range of interpretations Congress holds in the context of defining what constitutes adequate competition in government procurement. Again, like the distinction between different forms of

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Ibid., Subtitle B, Section 2722.

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Commission on Government Procurement, Report on the Commission on Government Procurement, Vol. 2, December 1972, see Part B: "Acquisition of Research and Development" and Part C: "Acquisition of Major Systems."

competition (price or design and technical) and different methods of contracting (formal advertising and negotiation), the perception of what constitutes adequate competition is not a trivial point.

Earlier, it was suggested that Congress views competition as beneficial for several reasons, most important among them perhaps is the issue of fairness or equity in the award of government contracts. Colleen Preston points out an interesting distinction. She says that prior to CICA, the standard for competition was focused from a buyer's standpoint; i.e., if there were sufficient offers to ensure that the government would get a reasonable price, there was no reason to secure bids from the fifth, or for that matter the fiftieth, potential bidder.⁷⁶ Under CICA, however, with its concept of full and open competition, she feels that competition is now focused from the seller's standpoint; i.e., if a potential seller could provide a quality product at a cheaper price to the government, that seller should be allowed to bid.⁷⁷ She said that this latter philosophy is more attractive to Congress, because it represents a sense of fairness.⁷⁸

Whereas in the eyes of Congress "fairness" may be perceived as the most important benefit accruing from competition, the literature seems to suggest that Congress is more frequently concerned about competition for the sake of securing the lowest

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Preston, "Congress and the Acquisition Process," p. 5.

⁷⁷

Ibid.

⁷⁸

Ibid.

price and subsequent savings. In other words, it appears that the more realistic perception held by Congress is that more competition actually equates to more price competition, which would subsequently equate to more cost savings. The next section reviews the literature which seems to support the importance of cost savings as the key benefit to be derived from increased volumes of competition.

SAVINGS FROM COMPETITION

Most people would expect that buying things in a competitive market would result in their paying a lower price. This lower price would, in turn, result in the buyer's realizing some savings, relative to what his costs would have been in the absence of a competitive market.

In the late 1970s, and to an even greater extent in the early 1980s, media coverage of "horror stories" about waste of public funds resulting from poor procurement practices in the DOD were commonplace. On March 7, 1983, the cover of Time magazine featured a drawing of Franklin C. Spinney, a Pentagon analyst, and a headline that read, "U.S. Defense Spending -- Are Billions Being Wasted?"⁷⁹ The article in that issue of Time described in detail, and provided many examples of, apparent inefficiencies and improprieties in defense procurement of major weapon systems. Other media disclosures of spare parts procurement fiascoes were

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Walter Isaacson, "The Winds of Reform," Time, March 7, 1983, pp. 12-30.

commonplace, and frequently the lack of competition in the DOD procurements was cited as the culprit. On December 21 and 22, 1983, for example, newspapers around the country carried a picture of Senator William V. Roth, Jr. (R-Del) decorating a Christmas tree with ornaments made from allegedly overpriced military spare parts.⁸⁰

From complete weapon systems to mundane spare parts, the DOD procurement practices were being questioned, vigorously investigated, and frequently condemned. Occasionally, in its zeal to report yet another new example of waste, the media coverage became a "witch hunt." Journalist William F. Buckley, Jr., explained this general situation when he said that there were people who hated expensive Navy hammers, not because they minded expensive hammers, but because they minded the Navy.⁸¹ In the main, however, serious problems were uncovered, and the need for procurement reform in the DOD had perhaps never before received so much attention. Amid the stories and debates, the central issue that repeatedly surfaced was the lack of competition in defense procurements.

Conventional wisdom holds that competition is good and more competition is even better. It is widely believed in Congress, for example, that greater use of competition in the acquisition process would help combat the rising costs of modern weapon

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See, for example, Richmond Times-Dispatch, 21 December 1983, p. A-2 and Washington Post, 22 December 1983.

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Washington Post, 20 August 1985.

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 systems. In explaining the views of the Committee on Governmental Operations, Congressman Jack Brooks said, "While the use of competition may not be considered worthwhile by some officials, it is the only (emphasis added) way for the government to obtain the best products for the best prices." 83 While this statement may be a hyperbole, the importance to Congress of increasing competition in defense procurement is unmistakable. Also unmistakable is the penchant for many members of Congress to focus on "the best price" as the key concern behind the drive for increased competition. The opening remarks by Senator John Tower, Chairman of the Senate Committee on Armed Services, during hearings on S. 338, is representative of this point. He said, in referring to the DOD procurements, " . . . there ought to be competition for these items in order to make certain that the American taxpayer is getting the best price." 84

Few would argue with the general notion that competition saves the buyer money. Most people have had personal experience with competition in their purchases of everything from groceries to automobiles. They look to competition to help provide the lower prices that save them money and bring them the products and services they desire. As buyers, however, most individuals have a very small personal investment in maintaining a competitive environment. The investment may be no greater than a few extra gallons of gasoline consumed in the course of shopping around for

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Rich, Legislative Perspectives, p. v.

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U.S., Congress, House, H. Rept. 98-1157, p. 18.

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U.S., Congress, Senate, S. Hrg. 98-385, p. 42.

the best buy. Unfortunately, the cost/benefit relationship in the competitive acquisition of major weapon systems is far more complicated and, as such, much less understood.

In the context of defense procurement, Sellers (1979) may have explained the cost/benefit relationship best when he said, ". . . Effective competition exists when the expected value of the benefits to be derived from competition exceed the expected costs of creating competition."⁸⁵ This marginal cost approach to competition is rarely at issue when individuals participate in the marketplace but it is of extreme importance when DOD is the buyer. As will be shown later in this chapter, the vast majority of all research concerning competition in defense procurement has focused on the issue of cost savings resulting from lower prices.

In an early study by Hall and Johnson (1968), they gave a succinct explanation of how a defense contractor differs from usual businesses in the manufacturing industry. The following explanation from their paper is provided:⁸⁶

For any specific weapon system the product does not pass from firm to firm by means of market transactions with each "owner" of the system making a contribution to the value added. Instead, a single firm is the prime contractor for all stages and other firms make their value-added contributions through providing goods and services to that firm as subcontractors or vendors. It is this vertical control of responsibility (emphasis added) for the weapon system that distinguishes the industrial organization of the weapon systems industry from the usual manufacturing industry.

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Sellers, "Competition in the Acquisition of Major Weapon Systems," p. 21.

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G.R. Hall and R.E. Johnson, Competition in the Procurement of Military Hard Goods (Santa Monica, CA: The RAND Corporation, P-3796-1, [June 1968]), DTIC #AD-671110, p. 17.

Hall and Johnson (1968) have also provided an insightful explanation that illustrates, in general, competition in the defense industry.⁸⁷

Traditionally, competition is studied by examining the structural characteristics of markets; i.e., demand characteristics, the number of firms, their relative sizes (concentration), and the entry conditions. For weapon systems, the structural conditions necessary for workable competition are generally present. However, actual competitive performance in the weapon systems market is greatly influenced by a unique form of product differentiation. The weapon system's prime contractor is usually responsible for the system throughout the program, including stages to be contracted for later. The receipt of an initial research and development contract that is later selected for further development possesses a product distinct from those of all other firms. Upon receipt of the first contract in a program the original contractor often becomes the only viable source for subsequent purchases related to that program. The contractor has acquired a differentiated product (emphasis added) in the sense that if the DOD wants to buy that particular system or its related hard goods it must in some way involve the incumbent contractor. Thus, the competitive difficulties (uniqueness) of major weapon systems acquisition stem in large part from this special form of product differentiation.

In addition to the differentiated products, many other aspects of the defense industry seem to set it apart from other businesses, in the manufacturing, as well as the service sectors of our economy. Archibald, et al. (1981) explained that the market for major weapon systems differs from the economic structural ideal in the following essential ways:⁸⁸

1. Final products do not exist at the time developers are selected and they usually do not exist in final form when producers are selected.
2. There are very few buyers for major weapon systems. Usually only one -- the DOD (a monopsony).

⁸⁷

Ibid., pp. 18-20.

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Archibald, Factors Affecting Competition, pp. 4-5.

3. Buyers have very imperfect information concerning the price and functional specifications of the products, their own need for the products (i.e., the threat is uncertain and changing), and the relevant budgetary constraints, especially in future years.

4. Entry and exit of firms in the defense industry is slow and costly.

The unique characteristics of the defense industry suggest that conventional thinking about free market economics is not always relevant; free market in this sense refers to a market condition where the absence of market barriers allows a firm to freely enter or exit the market. Jacques S. Gansler, economist and former Deputy Assistant Secretary of Defense for Material Acquisition and former Assistant Director of Defense Research and Engineering, has pointed out that the business operations between the defense industry and the DOD deviate widely from conventional free market theory.⁸⁹ In the defense industry the "invisible hand" of free market forces and the notions of competition have⁹⁰ often given way to the illusory hand of political economics. Members of Congress and others frequently overlook the absence of a traditional free market when addressing issues involving the defense industry. However, notwithstanding the lack of a free market in this industry, many people believe that the invisible⁹¹ hand of market forces still operates.

⁸⁹ Jacques S. Gansler, The Defense Industry (Cambridge, MA: MIT Press, 1980), p. 1.

⁹⁰ Blair A. Peterson, "The Defense Industry: An Illusion of a Free Market," National Contract Management Journal, Vol. 20, Issue 2 (Winter 1987): 105.

⁹¹ Ibid., p. 111.

With such a huge budget and buying power, one might expect that the DOD would enjoy the most advantageous prices available, all things being equal. Experience, however, has shown that frequently the goods and services acquired by the DOD cost more than those same or similar goods and services would cost, if purchased by a firm in the private sector. The point that items frequently do cost more when the DOD is the buyer presents a paradox. The paradox, however, is perhaps one of general misunderstanding, rather than one of simple economics. The fallacy is that all things are not equal. There are some basic differences in buying philosophies between public and private procurement practices.

In the procurement activity of the corporate buyer, the goals are likely to involve productivity, innovation, and efficiency, all targeted at increasing the firm's profitability. In essence, there is one goal in private procurement: to buy efficiently to increase profits. In public procurement there may be many individual and simultaneous goals, and they frequently conflict. For example, in defense acquisitions one objective is to achieve competition, yet, many socio-economic programs can be supported only in procurements involving less than full and open competition; awards set aside for small business or awards for socially or economically disadvantaged businesses are examples. Another objective is buying at the lowest price, and yet, other socio-economic programs supported by the DOD procurements dictate that the DOD will pay more than would otherwise be necessary; awards made pursuant to the Davis-Bacon Act in construction

contracts are examples.⁹² In short, in the federal procurement process, and particularly in the DOD, there are a multiplicity of objectives.⁹³

Regardless of the many unique aspects of the defense industry and the multiplicity of objectives expected from defense procurement, competition is still viewed as the primary way to achieve savings in the DOD contracting. The literature frequently illustrates that a single percentage value or range of percentage values have been used by Congress and others to categorize the potential savings expected from competition. In the 1960s for example, Secretary of Defense McNamara, based on GAO evidence and on studies conducted within the DOD, used a 25 percent estimate for determining savings in shifts from noncompetitive to competitive defense procurements.⁹⁴ Later, the Committee on

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For a discussion of the impact of the Davis-Bacon Act, 40 U.S.C. 276, see Daniel L. Babcock and Ray E. Fellows, "Impact of Socio-Economic Programs on Military Procurement Cost--A Survey of Military Research," National Contract Management Journal (Winter 1977-1978): 111., and also see "Labor Standards: Senate Hearing, GAO Report Adds Fuel To Davis-Bacon Repeal Controversy," Federal Contract Reports, No. 780, 7 May 1979, pp. A-16 and A-17.

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For a detailed comparison of public vs. private sector buying features see Stanley N. Sherman, Government Procurement Management (Gaithersburg, MD: Wordcrafters Publications, 1981), pp. 4-7.

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See U.S., Congress, Joint Economic Committee, Subcommittee on Federal Procurement and Regulations, Hearings on Economic Impact of Federal Procurement, 89th Cong., 1st sess., GPO, Washington, D.C., 1965, pp. 12-14. Some relevant GAO reports are contained in U.S., Congress, Joint Economic Committee, Subcommittee of Federal Procurement and Regulations, Background Material on Economic Impact of Federal Procurement-1966, 89th Cong., 2d sess., GPO, Washington, D.C., 1966, cited by Hall and Johnson, Competition in the Procurement of Military Hard Goods, p. 5.

Government Operations concluded that the government has historically received price discounts on competitive⁹⁵ procurements, ranging from 15 percent to as high as 70 percent.

The Committee also pointed out that the Office of Federal Procurement Policy (OFPP) uses the estimate of 20 percent savings⁹⁶ from competition.

A RAND Corporation study, that investigated factors affecting the use of competition in defense procurements, pointed out that quantitative evidence about the influence of competition on acquisitions is subject to theoretical and empirical qualifications. Nonetheless, most observers agreed that⁹⁷ competition produces many significant benefits, such as:

- * Lower unit prices
- * Improved product quality
- * Faster rates of learning by manufacturers
- * Greater technological progress
- * Enhanced industrial productivity
- * Enhanced surge and mobilization capability
- * More equitable award process

As has already been mentioned, there is considerable difficulty in measuring empirically the benefits of competition in defense procurements. Archibald (1981) concluded that the opportunities to measure the benefits of competition are generally limited to measuring the dollar benefits of competition⁹⁸ in the reprocurement of goods and services. This is an

⁹⁵ U.S., Congress, House, H. Rept. 98-1157, p. 14.

⁹⁶ Ibid., p 32.

⁹⁷ Archibald, Factors Affecting Competition, p. 3.

⁹⁸ Ibid., p. 26.

important point, because reprourement implies that the item in question has been purchased before. Subsequent comparisons of similar purchases may suffer from inherent internal validity threats because of history and selection bias.⁹⁹ Nevertheless, as Archibald (1981) cautions, for competition to have a net dollar savings, all costs associated with the competition must be offset by price reductions resulting from the competition. It is not enough simply to have faith that competition will result in savings.¹⁰⁰

Several studies have investigated the factors that seem to affect competition and the degree of savings that is likely to result from the competition. Most studies have identified the same general factors. Perhaps the most comprehensive listing of such factors is provided by Williams (1982) in his study done for the Army Procurement Research Office. In this study, he identifies eleven factors that can have an effect on competition in defense procurement. Those factors are listed below, with some supplemental references provided.¹⁰¹

1. Production Quantities . . . the ultimate quantities to be produced. Generally, with larger production quantities there tends to be more production competition.

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For a detailed discussion of threats to internal validity in research see, Donald T. Campbell and Julian C. Stanley, Experimental and Quasi-Experimental Designs For Research (Boston: Houghton Mifflin Company, 1963), p. 5.

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Archibald, Factors Affecting Competition, p. 28.

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Williams, Guidelines For the Application of Competition, pp. 107-110.

2. Length of Production Cycle . . . a short production cycle and/or high production rate may limit the time in which second sourcing can be generated.

3. Funding . . . additional congressional appropriations early in a program's life cycle are usually needed to promote competition later during the production phase.

4. Complexity of the System . . . generally, there are¹⁰² fewer viable competitors for complex systems.

5. Proprietary Data . . . inability to transfer such data and technology transfer impede competition.

6. Facilitization and Tooling Cost . . . if such start-up costs are high, competition may not be feasible.

7. Logistics Requirements . . . need for maintainability, supportability, and standardization¹⁰³ may limit competitive possibilities.

8. Critical or Scarce Material . . . inability to obtain

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For a description of the effects of item complexity, see Steven J. Zamparelli, "Competition in the Acquisition of Replenishment Spare Parts" (Masters Thesis, Air Force Institute of Technology, September 1983), DTIC #AD-A135-562, p. 28., and also see Archibald, et al. Factors Affecting Competition, p. 18.

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For a discussion of a 1982 Army Material Systems Analysis Activity (AMSAA) study that suggested reliability objectives should be given only little weight in acquisition strategy selection see, AMSAA, Strategy Selection For the Production Phase of Weapon System Acquisition (Fort Lee, VA: Army Procurement Research Office, APRO 81-05, [May 1982]), p. 33., cited by Zamparelli, "Competition for Spare Parts," p. 29. Also, for a discussion that suggests that quality for competitively acquired spare parts was less than for sole source acquired spare parts see, Alan E. Olsen; James E. Cunningham; and Donald J. Wilkins, "A Cost-Benefit Analysis of Competitive Versus Sole Source Procurements of Aircraft Replenishment Spare Parts" (Masters Thesis, Air Force Institute of Technology, January 1974), DTIC #AD-A777-247, cited by Zamparelli, "Competition for Spare Parts," p. 30.

such material may limit available competition.

9. Production Leadtime . . . the longer the production leadtime, the longer it will take to bring a second source into production, and the less appealing second sourcing becomes.¹⁰⁴

10. Subcontractors and Vendors . . . limited subcontractors or vendors, existing contractual relations between prime and subcontractors, and the inability to breakout components and subcontractor items can impede competition.¹⁰⁵

11. Economic Cycle . . . commercial versus military demand, interest rates, cash flows, etc., all influence the levels of competition.

Willis R. Greer, Jr., and Shu S. Liao, professors at the Naval Postgraduate School, have suggested that the factors that most strongly affect a contractor's pricing strategy are not associated with the contractor's perception of competitive pressures, but rather, these factors are more closely correlated

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For a study that suggests that production administrative leadtime has been generally stable or decreasing in spite of recent legislative and policy changes in defense procurement see, The Impact of Contracting Initiatives on Leadtimes (Alexandria, VA: Defense Logistics Agency, [November 1986]), DTIC #AD-A179-349.

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For a study that suggests that increasing prime contract competition via multiyear procurement does not result in noticeable increases in subcontractor competition see, Anthony M. Dovie, "An Analysis of the Effects of Multiyear Procurement on Competition at the Subcontractor Level" (Masters Thesis, Naval Postgraduate School, December 1985), DTIC #AD-A165-590.

to the following four points:

1. The contractor's perceived profitability from the specific contract.
2. The state of capacity utilization within the contractor's industry.
3. The general business condition as a function of the trend in demand for the contractor's product or service.
4. The degree to which common subcontractors will be used by competing prime contractors.

In addition, two other factors appear repeatedly in the literature as having an impact on the savings that may result from competition in defense procurement: costs (recurring and non-recurring), and learning curves or price improvement curves.

Obviously, cost can be associated with several of the aforementioned factors; however, when considered in its own right it probably is of paramount importance. As Berg, et al.(1985) explain, "Most analyses of the effects of competition focus on how competition will change the costs directly related to production. These costs are called recurring costs; they include items such as material and manufacturing labor. From the government's point of view the recurring cost, as used in competition analysis, is the unit price the government pays for a weapon system. The focus on unit price arises from the fact that competitive savings, if they exist, result from reductions in

unit prices over the life of the system."¹⁰⁷ To consider recurring cost only may be adequate in some determinations of savings resulting from competition, but as Archibald (1981) cautioned earlier, all costs must be considered. This issue becomes more significant as the DOD finds it necessary to "create" or maintain a competitive environment throughout the weapon system's life cycle, through the use of some form of dual sourcing.¹⁰⁸ In these cases the added nonrecurring costs associated with establishing and carrying a second source must certainly be considered before a determination of net savings from competition can be established.

With very few exceptions, empirical studies that have investigated the issue of savings resulting from competition in defense procurements have incorporated learning curve theory in their analyses. Learning curve theory generally states, that as the number of units produced doubles, the unit production cost is reduced by some constant percentage because of the learning gained in earlier production. Cost reductions are attributable to improvements in both the manufacturing process and the product design, as more production experience is gained. Generally, researchers in previous studies have projected the original

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Robert Berg, Richard Dennis, and James Jondrow, Price Analysis and the Effects of Competition (Alexandria, VA: Center for Naval Analyses, [October 1985]), DTIC #AD-A161-145, p. 1.

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For a discussion on the various forms of dual sourcing see, Benjamin R. Sellers, "Second Sourcing: A Way To Enhance Production Competition," Program Manager, May-June 1983, pp. 10-21 and 31., and also see Establishing Competitive Production Sources (Fort Belvoir, VA: Defense Systems Management College, August 1984).

producer's (sole source) learning curve into the future, based on his previous contract prices. These projections are used to forecast what the sole source producer "would have charged" for his products in the absence of competition. These estimated prices are then compared with known prices actually paid by the DOD in subsequent competitive procurements for the same items. Savings resulting from competition are generally assumed to be the difference between the two prices.

The production conditions that seem to best support learning curve theory are situations such as a high proportion of manual labor, uninterrupted production, production of complex items, no major changes in design, and continuous pressure to improve.¹⁰⁹

These conditions are important to consider, because many weapon systems are complex and utilize high degrees of manual labor. On the other hand, frequent changes in design, performance, funding, and schedule are common in weapon system programs, and these conditions tend to mitigate the reliability of learning curve theory in such programs. For these reasons, Archibald (1981) concluded that although results from many studies have suggested that learning curve theory was relevant, when it came to predicting price reductions resulting from competition, his study found the theory not to be helpful in explaining such situations. He even suggested that learning curve theory may have been a hindrance.¹¹⁰

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Roland D. Kankey, "Learning Curves: An Overview," Estimator (Journal of the National Estimating Society), Spring 1983: 16.

¹¹⁰

Archibald, Factors Affecting Price Competition, p. 52.

Other important weaknesses in using learning curve theory were highlighted by Berg (1985). In this study, which focused specifically on the application of learning curve theory in analyzing the effects of competition in twelve earlier studies, the researchers pointed out that conclusions drawn in earlier research utilizing this theory should be suspect. The researchers explained that virtually all of the unit price models (models developed to measure the change in unit price incident to the introduction of competition) had been based on the learning curve paradigm.¹¹¹

The procurement literature tends to push the generalization of the learning curve effect beyond unit production costs; it makes the implicit assumption that the effects of learning are pervasive, and that any cost reductions are passed through directly to price reductions. Thus, the learning curve is frequently described in the literature as a price improvement curve (PIC).¹¹² In summarizing their findings, Berg (1985)¹¹³ concluded:

The PIC approach to competition analysis has many shortcomings, the main one being the uncertainty about how competition affects the pricing behavior (emphasis added) of firms before a competitor is introduced (referring here to a sole source contractor). The implicit, maintained hypothesis in the literature is that competition has no effect prior to its introduction. However, there are a number of ways in which this assumption can be violated In addition to the theoretical problems, there is the problem of the

¹¹¹

Berg, Price Analysis and the Effects of Competition, p. 1.

¹¹²

Ibid.

¹¹³

Ibid., p. 17

extreme variation in the estimated effects of competition on completed programs. This variation, which occurs across types of competition, within given types of competition, and across different studies of the same program, provides little guidance on where competition is most effective, and highlights the inadequacy of the PIC model as a tool for analyzing competition.

Berg (1985) suggested that to assume competition had no effect prior to its introduction may be shortsighted. Two examples were offered to support this position.

1. Penetration (limit) pricing . . . if the government has not committed to competition, the sole source firm may set a price low enough to discourage the introduction of competition.
2. Skimming pricing . . . if the sole source contractor expects the government to be committed to competition in the future, the contractor may set a high price and lower it, as necessary, to meet competition.

In the two cited examples, competition could affect the pricing behavior of the sole source firm, even before competition actually exists or is introduced. In the case of limit pricing, the original price would be understated; in skimming, the original price would be overstated, relative to a competitive market price in each case.

In recent years several studies have been undertaken to measure empirically the degree of savings that has resulted from procurements of similar items that have transitioned from sole source to competitive buys. Table 1 below provides a summary of some of the more well known studies. Each study is identified by its commonly recognized name.

Table 1
RESULTS OF PREVIOUS RESEARCH

NAME OF STUDY	YEAR	SAMPLE SIZE (SYSTEMS)	TYPE OF ITEMS	AVERAGE (%) SAVINGS	RANGE OF SAVINGS (%)
ECON 72	1972	22	Electronic	56%	n/a
IDA 74	1974	19	Electronic & Missile Sub- Systems	37%	60% to 0%
APRO 78	1978	16	Weapon Systems	13.7%	51% to (-)13%
APRO 79	1979	22	Ammunition	7.1%	25% to (-)30%
IDA 79	1979	31	Sample drawn from data in ECON 72, IDA 74 and APRO 78	35.1%	64% to (-)23%
ASC 82	1982	45	Electronic, Missiles, misc.	33%	68% to (-)16%

SOURCES: ECON 72: U.S. Army, The Cost Effects of Sole Source vs. Competitive Procurement (Fort Monmouth, NJ: Army Electronic Command, Cost Analysis Division, Comptroller, [February 1972]); IDA 74: Morris Zusman et al., A Quantitative Examination of Cost-Quantity Relationships, Competition During Reprocurement, and Military Versus Commercial Prices for Three Types of Vehicles (Arlington, VA: Institute for Defense Analyses, AD-784, Vol. II, [March 1974]); APRO 78: Edward T. Lovett and Monte G. Norton, Determining and Forecasting Savings From Competing Previously Sole Source/Noncompetitive Contracts (Fort Lee, VA: U.S. Army Procurement Research Office, Army Logistics Management Center, APRO 709-3, DTIC #AD-A064-168 [October 1978]); APRO 79: Richard C. Brannon, Richard P. Burns, and John I. Neely, Forecasting Savings From Repetitive Competition With Multiple Awards (Fort Lee, VA: U.S. Army Procurement Research Office, Army Logistics Management Center, APRO 807, DTIC #AD-A078-342, [November 1979]); IDA 79: George G. Daly, Howard P. Gates, and James A. Schuttinga, The Effect of Price Competition on Weapon System Acquisition Costs (Arlington, VA: Institute For Defense Analyses, IDA P-1423, DTIC #AD-A078-232, [September 1979]); ASC 82: Lou Kratz, Larry Cox, and David Elam, Sustained Competition For Defense Procurements: Evidence, Theory and Applications (Arlington, VA: The Analytic Sciences Corporation, EM-208-1-WA, [April 1982]).

From the information in Table 1, it can readily be seen that a wide variation in savings was found both within and among the various studies. Several factors may account for this situation, in addition to the methodology used in the application of the learning curve model and differences in the items (systems) studied. One study defined savings as the average reduction in unit prices following competition without introducing control variables (ECON 72), while another (IDA 74) defined savings the same way, except it controlled for learning, using price as the baseline. The APRO 78 and APRO 79 studies defined savings as the average reduction in unit prices following competition after controlling for inflation, learning (recurring cost based), and nonrecurring costs; however, the APRO 79 study assumed a 95 percent learning curve for all items. The IDA 79 study controlled for inflation, learning (price based), nonrecurring costs, and net present value discounting in defining savings. The ASC 82 study relied on learning curve theory (cost based) to project savings.

A weakness in all of these studies involves serious selection bias in determining the samples, as well as small sample sizes. In each study, items were selected for the sample based upon their first being acquired under noncompetitive (sole source) conditions, with subsequent reprourement accomplished via competition. Obviously, such samples are not representative of all procurements, and the small sample sizes contribute to the discrepancies across the studies. Since these studies each used a time series approach in data analysis, the internal validity threat of history may also be significant.

Several authors and researchers have critiqued the studies outlined in Table 1, as well as other studies that have investigated the question of savings resulting from competition. Archibald (1981) believed that these studies (ASC 82 not included) did not provide convincing evidence of savings resulting from competitive reprocurement, nor did they provide reliable quantitative tools for decision makers.¹¹⁵ He concluded that existing research provided neither quantitative nor qualitative guidance for designing price-competitive reprocurement strategies, and that the underlying theory of how competition should function in weapon systems acquisition seemed to be inadequately developed.¹¹⁶

Greer and Liao (1984) stated that there is widespread belief in the DOD acquisition circles that competition is beneficial to the government, but research suggests that competition has resulted in added life cycle costs almost as often as it has produced savings.¹¹⁷

In the IDA 79 study, the researchers themselves stated that they were forced to make inferences about the potential impact of introducing competition on the basis of a sample that could not be regarded as random nor representative of the universe of weapon system procurements.¹¹⁸ The researchers concluded it likely that no precise and stable predictive relationship exists

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Archibald, Factors Affecting Competition, pp. 45-46.

¹¹⁶

Ibid., pp. vii-viii.

¹¹⁷

Greer and Liao, "A Summary of Recent Research," p. 37.

¹¹⁸

IDA 79, p. 61.

between a reduction in unit costs and the introduction of¹¹⁹
competition to a former sole source acquisition.

Intuitively, and perhaps pragmatically, competition is viewed as a means to an end, the end being lower prices and, hence, cost savings to the government. Congress recognizes that competition generally provides cost savings, and such a recognition was surely an important impetus behind the legislative action leading to the enactment of CICA. It appears, however, that the benefits to be derived from competition in defense acquisitions are very program (item/system) specific, and that such benefits are tied to a complex interaction of many factors. In short, the nature of competition and the savings that may be realized from it appear to differ greatly, based on what is being acquired, i.e., spare parts or a major weapon system.¹²⁰ Thus, the fact that the "price" paid for an item is lower in a competitive buy may be a misleading measure of the net benefit of a competitive acquisition.

¹¹⁹

Ibid., P. 83.

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References to previous studies have generally focused on competition for major systems or more complex components. For two rigorous studies that correlate lower prices paid for spare parts as a result of competition see, William F. Bass and David J. Schmitt, "An Analysis of Causes of Contract Price Changes for Competitive Procurements of Replenishment Spare Parts" (Masters Thesis, Air Force Institute of Technology, September 1984), DTIC #AD-A147-112, and Zamparelli, "Competition in the Acquisition of Replenishment Spare Parts," DTIC #AD-A135-562.

THE INCREASE IN NONCOMPETITIVE CONTRACTS

As already suggested, the procurement reforms of the late 1970s and early 1980s were meant in large part to increase the levels of competition in federal procurements. In regards to the DOD, specifically, there was frequently the allegation that too many contract awards were being made improperly, on a noncompetitive basis. The data used to support such allegations were the DOD's own procurement statistics, which are compiled centrally from information reported by the hundreds of procurement activities around the world.¹²¹ That data, for example, reflected an increase in noncompetitive DOD prime contract awards from 30 percent of the total DOD contract award dollars in fiscal year 1966 to 43.5 percent by fiscal year 1980.¹²²

At the request of the Chairman, Task Force on Government Efficiency, House Committee on the Budget, the General Accounting Office was asked to investigate the apparent reasons for increased noncompetitive awards in defense procurements. The GAO reviewed a sample of noncompetitively awarded DOD contracts from

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DOD procurement data and subsequent statistical information are centrally compiled by the Department of Defense, Washington Headquarters Service, Directorate for Information Operations and Reports (DIOR), 1215 Jefferson-Davis Highway, Suite 1204, Arlington, Virginia 22202-4302. Statistical information pertaining to DOD procurements is provided by DIOR to other federal activities, such as the Federal Procurement Data Center, an activity of the General Services Administration, which acts as the focal point in the Federal Procurement Data System. DIOR also provides DOD procurement information to the Defense Technical Information Center (DTIC).

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See DOD, Prime Contract Awards (P03), Table 9, for applicable years.

fiscal years 1972 and 1978, and concluded that there were instances of contracts improperly awarded on a noncompetitive basis; however, the primary reasons for a decline in price competition as a percentage of DOD's total dollar awards were:¹²³

1. Increased spending on and a concurrent loss of competition for procurements of petroleum and nuclear submarines.
2. Increased use of design and technical competition, rather than price competition, for major weapon systems.
3. Greater emphasis on "set-aside" awards for businesses owned and controlled by socially or economically disadvantaged persons.

The GAO also found that the following processing deficiencies contributed to the award of noncompetitive contracts:¹²⁴

1. Improper use of the "public exigency" exception to justify noncompetitive awards.
2. Inadequate performance of market research prior to solicitation.
3. Insufficient development of a data package to allow for competitive solicitations.
4. Use of specifications that did not represent the government's minimum needs.
5. The over reliance by contracting officers on inappropriate noncompetitive procurement recommendations from technical personnel.

An earlier Logistics Management Institute (LMI) study by White and Myers (1979) had highlighted the effect of petroleum

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U.S., General Accounting Office, DOD Loses Many Competitive Procurement Opportunities (PLRD-81-45), DTIC #AD-A106-583, (July 29, 1981), pp. 11-14.

¹²⁴

Ibid., pp. 4-10.

and submarine awards on noncompetitive DOD procurement statistics. In comparing fiscal year 1972 and 1978 awards, White and Myers found that the drastic reduction in the number of competitive awards for petroleum products plus the drastic increase in the volume of spending for such products combined to make fuel the single commodity category most responsible for the DOD's downward trend in competition, during the period.¹²⁵

Although the oil crisis in 1973-74 had a residual effect on petroleum suppliers and prices, the LMI study suggested that an arbitrary decision by the Defense Fuel Center (DFC), concerning coding of award data, may have had a significant influence on the statistical data. Apparently the DFC, which is the DOD's primary procurement activity for petroleum products, chose to report as noncompetitive many awards that could possibly have been considered competitively solicited.¹²⁶ Thus, the actual magnitude of the effect of petroleum purchases on the DOD noncompetitive procurement statistics is questionable, however, it is probably safe to say that the change in the petroleum market in the 1970's did have a noticeable influence.

After an examination of a random sample of 378 DOD contract files involving awards made by 15 different procurement activities in fiscal year 1979, Don Sowle Associates, Inc., concluded that the reasons listed in Table 2 were the ones most frequently used to justify noncompetitive procurements.

¹²⁵White and Myers, Competition in DOD Procurements, p. 2-5.¹²⁶

Ibid., pp. 2-5 thru 2-7.

Table 2

REASONS FOR NONCOMPETITIVE AWARDS IN DOD PROCUREMENTS

ITEM PURCHASED	REASONS FOR NONCOMPETITIVE AWARDS
Products	Insistence by the users that the single source identified was the only source who was qualified or capable of satisfactory performance. Absence of adequate data (drawings, etc.) owned by the government to foster competition. Failure of the user to give the procurement office sufficient information to allow for competitive solicitations. Lack of resources (mainly personnel) to accomplish additional workloads associated with competitive solicitations and awards. Lack of sufficient time or funds to compete the awards.
Services	Effort was a continuation (follow-on) of earlier work. Award was based on an unsolicited proposal.

 SOURCE: Enhancement of Competition in the Department of Defense (Arlington, VA: Don Sowle Associates, Inc., [May 1980]), pp. 13-14.

The Sowle study concluded that at all activities visited, based on the limited sampling of files, there were no instances found where clear, practical, and advantageous alternatives to noncompetitive awards were present under the circumstances prevailing at the time of solicitation.

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Enhancement of Competition in the Department of Defense (Arlington, VA: Don Sowle Associates, [May 1980]), p. 16.

Congress seems to have a somewhat different opinion concerning the factors that promote noncompetitive awards. According to the Committee on Government Operations, to whom the Competition in Contracting Act of 1984 (H.R. 5184) was referred and subsequently favorably recommended, the deciding factors that cause unacceptable levels of noncompetitive awards are:¹²⁸

1. Reluctance to invest time and effort to ensure that competitive sources of supply are maintained.
2. Lack of personnel with skill and expertise required to conduct a competitive procurement.
3. Dependence (psychological or actual) on the incumbent contractor's product or service.
4. Unwillingness to change current procurement practices.
5. Rewarding performance on factors other than reduced costs.
6. Exaggerating the value of short-term expediencies at the sacrifice of overall cost and performance.
7. Institutional bias toward "in-house" solutions which severely limit full involvement of industry.
8. Unwillingness to commit sufficient time and resources to advanced planning.
9. Inability to clearly and concisely define mission requirements or needs to industry.

Obviously, the views of Congress and those of the researchers whose studies have been mentioned are not in complete accord. It is interesting to note, however, that the Committee made no mention of unique defense market conditions and the frequent weapon systems program instability, resulting from

political/funding changes, as important factors influencing noncompetitive awards. Also, the Committee was critical of procurement officials who suggested that less competition in some situations might be more manageable and less risky than encouraging all qualified companies to compete for federal contract awards.¹²⁹

The congressional view that "full and open competition" is the essence of cost efficiency and overall savings in federal procurement is not in line with current practices in the private sector. In recent years, there has been increasing support for management philosophies and inventory systems that reduce or limit competition to small numbers of vendors who are reliable and dependable sources of supply. In a study by Williams and Bakhshi (1986), of industrial competitive buying approaches, it was concluded that the most popular approach was to compete fully the early buys, and then to select a pool of reliable sources for subsequent competition.¹³⁰ Stanley N. Sherman has suggested that possibly the most significant implication of recent corporate world measures to increase productivity and overall efficiency, such as just-in-time (JIT) systems, is the reduction in the frequency of competitive purchases.¹³¹

One of the most frequently cited criticisms concerning

¹²⁹

Ibid.

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Robert F. Williams and V. Sagar Bakhshi, Industrial Competitive Buying (Fort Lee, VA: Army Procurement Research Office, Paper P-22, [June 1986]), p. 3.

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Stanley N. Sherman, Contract Management: Post Award (Gaithersburg, MD: Wordcrafters Publications, 1987), p. 421.

defense procurements involves cost growths in many of the major systems acquired by the DOD. Generally, it is argued that more competition early in the life cycle of major programs would tend to reduce the degree of cost growth experienced. Research seems to support this conclusion. In a 1979 RAND Corporation study, it was found that the defense programs undertaken within a competitive framework were characterized by considerably lower cost growth rates than programs that did not involve competition (a mean cost growth ratio of 1.6 compared with 1.53).¹³² In a more recent study done by Bell (1983) and reported by The Analytic Sciences Corporation (ASC) at the 1985 National Estimating Society Conference, it was pointed out that the average annual rate of unit procurement cost growth for competitively acquired major systems was 4.4 percent, compared to a 7.3 percent growth for major systems acquired without competition.¹³³ It is interesting to note that the RAND and the ASC studies demonstrated that cost growths in the DOD major weapon systems were generally lower than cost growths experienced in civilian projects of similar complexity and duration.

While lower levels of cost growth appear to have been experienced in competitively acquired major systems, a paradox

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Edmund Dews et al., Acquisition Policy Effectiveness: Department of Defense Experience in the 1970's (Santa Monica, CA: The RAND Corporation, R-2516-DR&E, [October 1979]), DTIC #AD-A091-739, p. 48.

¹³³

J. Bell, Competition as an Acquisition Strategy: Impact of Competitive Research and Development on Procurement Costs (Arlington, VA: Institute for Defense Analyses, IDA Paper P-1744, [November 1983]), cited by Fredrick P. Biery, "Cost Growth and the Use of Competitive Acquisition Strategies," Estimator, Vol. 6, No. 3. (Fall 1985): 15.

seems to operate that prevents more competition for major systems procurements. The previously mentioned studies both reflect that major weapons programs take longer today to field than in earlier years. Both studies also suggest that the development time required has remained essentially unchanged, but that the production phase now takes much longer. The RAND study found that the cause of the longer production phase was lower production rates, and that the cause of the lower production rates was not technical, but fiscal. While higher production rates were generally considered to be feasible, program funding instability often precluded efficient production.¹³⁴ The RAND study cited schedule changes as being responsible for about 40 percent of the total cost growth, in the sample of 31 major programs investigated.¹³⁵ The study also concluded that a very substantial share of the schedule changes were the result of funding instability due to causes external to the programs¹³⁶ (external causes being senior DOD management and Congress).

The paradox that was suggested now begins to unfold. For major weapon systems, it is frequently necessary for the DOD to establish some form of dual sourcing in order to maintain competition, up to and into the production phase. To accomplish this requires more "up front" funding than would otherwise be necessary, since there are considerably more nonrecurring costs

¹³⁴Dews, Acquisition Policy Effectiveness, pp. 59-70.¹³⁵

Ibid., p. 48.

¹³⁶

Ibid., p. 78.

involved in carrying two or more contractors through successive stages of the system's life cycle. Also, it is during the production phase when most of the cost (80-90%)¹³⁷ of acquiring a system are incurred. To reap the most benefits from competition at production, it is generally necessary to have developed the system in a competitive environment. Thus, it is during the system's development when the additional DOD investment is necessary. As Archibald (1981) in his RAND study so clearly stated, "The costs of competition are short term and clear, while the benefits are long term and uncertain."¹³⁸ Since the DOD, like other government agencies, receives its funding from Congress, it is Congress that essentially approves/disapproves the early investment decisions.

Rich (1976), in his investigation of legislative perceptions concerning competition in the DOD acquisitions, suggested that several factors work against congressional support of competition. One such factor involves early investment. He pointed out that it is not easy for members of Congress to "internalize" the future benefits that otherwise make advanced competitive strategies involving greater initial outlays attractive.¹³⁹ Archibald (1981) also suggested that Congress tends to dislike programs with heavy front-end costs, and that

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U.S., Congress, Senate, Subcommittee on Federal Spending Practices, Efficiency, and Open Government, Major Systems Acquisition Reform - Part II, June 16, 1975, p. 32., cited by Benjamin R. Sellers, "Second Sourcing: a Way To Enhance Production Competition," Program Manager, May-June 1983, p. 10.

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Archibald, Factors Effecting Competition, p. 20.

¹³⁹

Rich, Legislative Perspectives, p. vii.

funding requests are reviewed by four different congressional committees, which do not automatically coordinate their decisions; each may require separate persuasion.¹⁴⁰

This general situation of annually justifying a program to perhaps four separate congressional committees has more significance when the average time it takes to develop and field a major weapon system is considered. For example, in the 1950s, it took an average of six years to field new major weapon systems (from program initiation to fielding of first production). Today, the average is 11-13 years, with some programs taking up to 20 years.¹⁴¹ It is unlikely that any new program could proceed through this average fielding cycle without funding and/or schedule perturbations. During this period, at least two Presidents and six separate Congresses would have to maintain consistent support for the original program to "keep it on track" with original plans. Thus, the paradox is that Congress pushes for competition and the avoidance of cost overruns, but early investment funding requirements and program instability work against both goals. Also, cost avoidance is certainly a savings, but it is a future savings. The increased nonrecurring costs, such as extra facilities and administrative costs, to achieve the future savings, are incurred up-front, and there are few "cost avoidance coffers" to draw from initially to fund the added investment.

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Archibald, Factors Effecting Competition, p. 16

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"A Dramatic Policy Change Needed To Streamline Defense," Government Executive, March 1983, p. 22.

One feature of CICA which was meant to foster more competition was the legislative authorization for the use of dual sourcing, where it could be shown that overall costs would be reduced. Of course, the more dollars that are competitively awarded means that fewer dollars will be available for awards on a noncompetitive basis. In 1982, Senator David Pryor asked the General Accounting Office to study the issue of dual sourcing as a method of obtaining competition in the production of supplies and equipment. GAO investigated 27 dual sourced items (programs) and concluded that there was insufficient evidence to permit a conclusion regarding the actual net financial gain or loss realized through dual source competition.¹⁴² GAO further concluded that if dual sourcing were to be employed solely or primarily for the purpose of achieving cost savings through production competition, cost/benefit analysis prior to a dual sourcing decision and commitment would be essential, as dual sourcing's effectiveness as a production cost reduction strategy has yet to be demonstrated by actual experience.¹⁴³

Dual sourcing as a method of enhancing the DOD's mobilization capabilities is yet another issue; however, competition is not meant to stimulate this objective in the same sense or degree that it is meant to stimulate cost savings. In any event, competition in the context of dual sourcing would

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U.S., General Accounting Office, Cost Effectiveness of Dual Sourcing for Production Price Competition Is Uncertain, GAO/NSIAD-84-111, August 31, 1984, p. 49.

¹⁴³

Ibid.

seem to be somewhat artificial, since the DOD is using this method of acquisition to maintain a competitive environment that would otherwise not exist.

Noncompetitive contract awards are intuitively bad in the minds of many people, and perhaps the reason is the implied connotation of a resulting overpriced product or service. Obviously, there are numerous examples where noncompetitive awards have resulted in overpricing, and the DOD certainly has been a frequent party to such contracts. It is important, however, to recognize that overpricing may connote different things, not all of which are necessarily bad.

Overpricing may mean that the contractor is making too much profit. It is possible, however, that a given contractor is not making more profit than another and yet his products or services are overpriced because of inefficiency in his operations. A buyer may also perceive something as being overpriced when, in fact, it is fairly priced but, possesses more capability or quality than the buyer needs. An item that a buyer can't afford may also be fairly priced, but because it is not affordable to that buyer it appears to be overpriced. The point is that "overpriced" is a relative term, and the perception of noncompetitive awards equating in some way to overpriced goods and services may be misleading.

There is another side to the issue of too many noncompetitive DOD contracts. The literature seems to make frequent reference (implicit and explicit) about too much competition. John Cibinic provided a simple example of this situation, during his testimony before the Senate Committee on

Armed Services concerning S.338. During these hearings he
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 explained:

You might say, how can you overdo competition? In certain situations, particularly when technical competition is involved, selection of a number of offerors consistent with those available in that particular market, the dollar value of the procurement, and other factors, is of critical importance.

Because competition involves cost, there is a proposal cost for everyone involved in the competition, that goes into the overhead and the Government is ultimately going to pay for it. The more proposals you have, obviously, the more competition you have, but there will be a point of diminishing returns.

In addition, every proposal that is received is supposed to receive a good faith review. Thus, there is a considerable amount involved in the Government's administrative cost. In addition, if you have an overly great number of competitors, let us say 300 competitors, for a \$60,000 study job which you might have in this day and age, you are getting into a situation where someone who is seriously interested in that contract, and a very good competent contractor, may just not choose to compete because the chances of winning are too slim.

That may appear to be an unusual situation, but I have seen a number of cases in which we have had 80 and more offers. That doesn't make the competition effective.

A review of the legislative history surrounding CICA does not reflect any congressional analysis of the potential impact of
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 this legislation on the acquisition workforce. Studies, however, do provide some indication of a negative effect on the procurement workforce, as a result of CICA and other legislative and regulatory requirements. Young et al. (1981) in a Logistics Management Institute study found that even before CICA, increased

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U.S., Congress, Senate, S. Hrg. 98-385, p. 304.

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U.S., Congress, Senate, Committee on Government Affairs, Legislative History, Public Law 98-369, Senate Report 98-50, (St. Paul: West Publishing Company, 1985) cited by Presar, "Assessing the Impact of Recent Competition Legislation," p. 4.

legislative and administrative actions were sufficient to make the procurement process more complex, time consuming, and costly.¹⁴⁶ The Office of Federal Procurement Policy (OFPP) conducted a survey, in 1978 and 1979, of 19 federal agencies. The survey disclosed that the regulatory system, which had evolved to implement the federal procurement statutes and related policy directives, had itself achieved profusion. For example,¹⁴⁷ the survey disclosed the following points:

- * 485 offices regularly issue procurement regulations.
- * 877 different sets of regulations, directives, bulletins, instructions, and similar documents were used in procurement activities.
- * 64,600 pages of regulations were in effect with 21,900 new or revised pages issued each year.

The Defense Logistics Agency (DLA) conducted a study in 1986 to investigate the impact of contracting initiatives on procurement leadtimes. Procurement data from the four DLA hardware centers were reviewed (Defense General Supply Center, Defense Electronics Supply Center, Defense Industrial Supply Center, and Defense Construction Supply Center). The sample of contracts used for the study was drawn from the 3.8 million contracts awarded by these activities between January, 1982 and September, 1985 (small purchases were included). The researchers concluded that administrative leadtime, which is the time it takes to award a contract, had been increasing at a rate

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Robert S. Young, Richard P. White, and Thomas M. O'Hern, Procurement Workload Versus Workforce--A Growing Imbalance (Washington, D.C.: Logistics Management Institute, [May 1981]), DTIC #AD-A099-992, p. 3-1.

¹⁴⁷

OFPP, Proposed Uniform Federal Procurement System, p. 8.

of approximately 15 days per year, between October 1982 and September 1985.¹⁴⁸ An attempt to correlate specific administrative leadtime increases with individual contracting initiatives was not successful. It was determined that many other factors in concert with the contracting initiatives had combined to elicit the observed increases, and both administrative leadtime and production leadtime for large purchases of sole source items were significantly longer than for competitive items.¹⁴⁹ However, the researchers cautioned that these differences could be due to inherent characteristics of the items purchased, not solely to the method of procurement.¹⁵⁰

In a study specifically focused on the impact of CICA on administrative leadtime, Hedges and Mason (1985) found that increased competition requirements resulting from CICA had caused an increase of approximately six days in the administrative leadtime within the Air Force Logistics Command (AFLC).¹⁵¹ This six day increase, based on AFLC's estimated pipeline (value of inventory in transit from source to user) costs of \$6.9 million per day had resulted in an added inventory cost to AFLC of \$41

¹⁴⁸

The Impact of Contracting Initiatives On Lead Times
(Alexandria, VA: Defense Logistics Agency, [November 1986]), DTIC #AD-A179-349, p. xi.

¹⁴⁹

Ibid.

¹⁵⁰

Ibid.

¹⁵¹

David K. Hedges and Alfred E. Mason, Jr., "Impact of Public Law 98-369 on Air Force Logistics Command Contract Administrative Leadtime," Student Report 85-1115, Air Command and Staff College, Air University, April 1985, p. vii.

¹⁵² million. In interviews with 71 individuals, all of whom worked directly in the contracting function within one of the five Air Force Logistics Centers, 86 percent indicated that CICA had an impact on the time it took them to do their job.¹⁵³

Perry et al. (1985) investigated the issue of leadtimes in the DOD and compared them with leadtimes in the private sector. A sample of 149 identical aviation items (spare parts) was studied. Each of the items in the sample was used both by an airline company and by the DOD, and the respective items were purchased from the same suppliers by both buyers.¹⁵⁴ The comparison of leadtimes resulting from the study is shown below.

Table 3
COMPARATIVE LEADTIME ANALYSIS
(In Days)

	Airline	DOD	DOD-to-Airline Ratio
Administrative Leadtime	30	121	4.0
Production Leadtime	64	315	4.9
Total Leadtime	94	436	4.6

SOURCE: James H. Perry, Jr., Robert A. Burlbaugh, and Kenneth W. Lindstrom, Procurement Leadtime Reduction (Bethesda, MD: Logistics Management Institute, Interim Report ML515-1, [August 1985]), p. 1-7.

¹⁵²

Ibid.

¹⁵³

Ibid., p. 48.

¹⁵⁴

James H. Perry, Jr., Robert A. Burlbaugh, and Kenneth W. Lindstrom, Procurement Leadtime Reduction (Bethesda, MD: Logistics Management Institute, Interim Report ML515-1, [August 1985]).

Perry et al. (1985) found that three areas of policy and procedural differences seem to distinguish the differences between leadtimes of the DOD and the private sector. The three areas were sourcing strategy, procurement methods, and production leadtime management.¹⁵⁵ In regard to procurement methods, the study pointed out that most the DOD procurements considered only price in buying items, while the private sector often placed orders on a basis other than the lowest price; characteristics such as demand, potential vendors, market structure, and essentiality were often considered more important.¹⁵⁶

Colleen Preston has suggested that there has been a frequent lack of discussion in Congress about the limitations and costs of creating competition. She points out that if the goal of competition is to provide everyone the opportunity to sell to the government, then issues concerning limitations and costs are irrelevant. On the other hand, she suggests that if the goal is to ensure cost savings for the government, then there may be a point at which competition produces diminishing returns.¹⁵⁷ She also said, "Competition for contract awards does not cause problems; the process by which the government seeks to preserve its ability to compete does."¹⁵⁸ In her opinion, the problem with the procurement process is the American penchant for seeking "objectivity in decision making," manifested in an ever-

¹⁵⁵

Ibid., p. 2-1.

¹⁵⁶

Ibid., p. 2-2.

¹⁵⁷

Preston, "Congress and the Acquisition Process," pp. 14-15.

¹⁵⁸

Ibid., p. 15.

increasing series of reviews of decisions, after decisions are made. Such a process discourages responsibility by the decision makers.¹⁵⁹ The underlying problem, she claims, is the failure of the system to identify a decision maker, trust that person to make an appropriate decision, and recognize that others could reach a different accommodation of the competing interests.¹⁶⁰

A RAND Corporation study, which focused upon improving the military procurement process, based upon findings in previous RAND research conducted between 1960-1980, suggested that mandated competition was a false solution to the fundamental problems of the defense acquisition process.¹⁶¹ The researchers suggested that competition in defense procurement is poorly understood and that discussion on the subject tends to overlook the extremely high cost of establishing production competition among prime contractors--cost that the government must almost always bear.¹⁶² As has been a frequent disclosure in the literature, the RAND study again emphasizes that competition for major weapon systems is unique among business transactions, and experience from competition for parts and components should not be mistaken for competition involving major systems.¹⁶³

¹⁵⁹

Ibid., p. 16.

¹⁶⁰

Ibid., p. 17.

¹⁶¹

Michael Rich and Edmund Dews, Improving the Military Acquisition Process: Lessons Learned From RAND Research (Santa Monica, CA: The RAND Corporation, R-3373-AF/RC, [February 1986]), DTIC #AD-A165-966, p. 49.

¹⁶²

Ibid.

¹⁶³

Ibid., p. 50.

SUMMARY

Generally, CICA was enacted to increase the volume of competitive awards in federal procurement. An implied intent was to increase the levels of competition, and, thereby, provide more equity (fairness) in the procurement process. The more explicit intent was to promote competition, to achieve more savings from lower prices offered by contractors.

The historical record and legislative history of the Act are replete with examples of the government's preference for competition in federal procurement. Such a preference is certainly understandable and predictable. Unfortunately, there is less consistency in establishing a common understanding of what constitutes "acceptable" forms and levels of competition. There also is some misunderstanding about the nature of competition as it pertains to major weapon systems. The literature supports the notion that the nature of competition changes from a focus on design and/or technical characteristics in early stages of a system's life cycle, to an almost exclusive focus on price competition as the system reaches the production phases. Much has been written and debated about competition for systems during production; however, there is a paucity of relevant literature concerning competition during the development phases.

Few would argue that the acquisition of a major system is a far more complex issue than the acquisition of spare parts. The literature, however, surrounding competition in defense procurements is heavily slanted toward the less complex items.

Studies that have investigated the cost/benefit relationship of competition in defense procurement frequently have reviewed and compared purchases of spare parts and similar items of low technical complexity. Results from such studies, which often tend to illustrate that competition is cost effective, are subsequently generalized to acquisitions involving major systems. The questionable applications of learning curve theory and the incomplete collection of nonrecurring cost data seem to cause large variations in the findings of those few studies that have looked at competition for major systems.

Numerous political and socio-economic considerations enter into the acquisition of major systems, and these further confound the validity of any empirical findings that attempt to equate savings to competition. A simple comparison of economic advantages versus disadvantages pertaining to competition for major weapon systems could be misleading. The one constant that has repeatedly been disclosed is that savings resulting from competition for major systems are extremely program specific.

While the purpose of this study was not to investigate the degree of cost savings resulting from competition in defense procurements, an appreciation for this subject is central to an analysis of the efficacy of CICA. The preceding literature review has highlighted what CICA was meant to do, and why the subject of cost savings and the concern over noncompetitive awards are integral to an understanding of this legislation.

In the simplest sense, logic would seem to suggest that if CICA could promote more competitive awards (dollars and actions),

then the benefits of competition (fairness and cost savings) would tend to follow automatically. Given this introduction, this research investigated whether or not more competitive awards (dollars and actions) have ensued since the enactment of CICA.

CHAPTER III

THEORETICAL FRAMEWORK

INTRODUCTION

This chapter outlines the theoretical framework surrounding the hypotheses described in Chapter IV. As mentioned earlier, references in this paper to major weapon systems are synonymous with major hard goods, and all other goods and services are synonymous with non-major hard goods. Also, references to the unique features of the defense industry refer to the industry that supplies major hard goods (weapon systems) to the DOD.

The degree of competition that exists is a function of several factors. These factors might include the existing market, the buyers, the sellers, and the goods and services being traded. To effect some change in the percentage levels of competitive awards (dollars and actions), some change must first be initiated in one or more of these four basic factors.

The intent of CICA, from the perspective of Congress, was to increase the volume of competitive awards by changing the way the DOD (the buyer) dealt with the private sector (the sellers). In formulating this objective, however, insufficient attention may have been given to the nature of the defense market and to the goods and services being produced and sold to the DOD.

Legislation meant to increase the volume of competitive awards by mandating a change in the buying procedures of the purchaser would seem to assume at least two points:

1. That previous policy and established procedures for stimulating competition were either not sufficiently effective or they were not being properly implemented;
2. That there is pent-up demand in the private sector for more competition and potential sellers want more opportunities to compete for government contracts.

If these assumptions are incorrect, the likelihood that CICA would influence a change in the levels of competitive awards in defense procurements becomes problematic. If previous policy and established procedures were sufficient and were properly implemented, it would suggest that the experienced levels of competition in defense procurement are the actual levels of competition dictated and established by the market.

Given these assumptions, what follows is a conceptual framework that focuses on the four previously mentioned factors (market, buyers, sellers, and products) and how these factors influence competition in defense procurements. It is suggested that, since the defense market frequently operates outside the norms of a conventional free market, the relationships between the DOD and defense contractors are unique. Also, and perhaps most important in the context of competition, it is suggested that the nature of the goods and services being traded in the defense market is also unique.

Because of the market structure in the defense industry and the nature of the goods and services acquired by the DOD, the

theory formulated in this study suggests that the volume of competitive awards (dollars and actions) for major hard goods will not be significantly different under CICA than in those years prior to CICA. It is also suggested that the volume of competitive awards (dollars and actions) for non-major hard goods will not be significantly different under CICA than in the years prior to CICA.

THE MARKET

In free market theory (perfect competition), there is freedom of entry into and exit from the market, and all interested parties can compete. Few markets are actually free markets. Many of today's markets have barriers and frequently, competition is controlled by a few dominant firms.

Recall from Chapter II that CICA established "full and open competition" as the standard for all federal procurements, as of 1 April 1985. Also recall that full and open competition meant that all "reasonable sources" would be permitted to compete. The definition of a reasonable source (see glossary) was broad enough to avoid the elimination of prospective contractors in most cases. CICA even provides in the definition of "reasonable source" that if potential contractors don't currently have the financial resources, organizational experience and skills, and production equipment and facilities, their ability to obtain such assets will suffice. Thus, it appears that Congress, in enacting CICA, viewed competition more in the sense of a free market than in terms of a more restricted market structure.

Jacques S. Gansler, an economist and former Deputy Assistant Secretary of Defense for Material Acquisition, has developed a list of market imperfections and failures that highlight the differences between a traditional free market and the defense market. This list, which appears in Table 4, below, provides a good general comparison of conditions in two market extremes, one of perfect competition (free market), and the other of limited competition (defense market). While many other industries may share some of the features listed in Table 4 for the defense market, collectively, these imperfections and failures seem to set the defense industry apart.

In developing this table, Gansler pointed out that the defense market also differs significantly from traditional oligopoly and monopoly markets, in which the buyer and the seller are essentially in adversary bargaining positions.¹ He suggests that in the defense market, the buyer and seller have a far greater mutuality of interest, and that price plays a relatively minor role.² This feature of an inelastic demand, where relatively large price changes cause relatively small quantity changes, is illustrated by the operation of the defense market. In this market political considerations, rather than price changes, frequently establish the elasticity of demand.

¹ Jacques S. Gansler, The Defense Industry, (Cambridge, MA: MIT Press, 1980), p. 29.

² Ibid.

Table 4

DIFFERENCES BETWEEN A FREE MARKET & THE DEFENSE MARKET

FREE MARKET	DEFENSE MARKET
Many small buyers	One buyer (the DOD)
Many small suppliers	Very few suppliers of major weapon systems
All items small, perfectly divisible, and in large quantities	One ship built every few years, for hundreds of millions of dollars each
Market sets prices	Monopoly or oligopoly pricing--or "buy-in" to "available" funds
Free movement in and out of market	Extensive barriers to entry and exit
Prices set by marginal cost	Prices proportional to total costs
Prices set by marginal utility	Any price paid for the desired performance
Prices fall with reduced demand	Prices rise with reduced demand
Supply adjusts to demand	Large excess capacity
Labor highly mobile	Greatly diminished labor mobility
Decreasing or constant returns to scale	Increasing returns to scale in region of interest
Market shifts rapidly to changes in supply & demand	7-10 years to develop a new system, then 3-5 years to produce
Market smoothly reaches equilibrium	Erratic behavior from year to year
General equilibrium--assumes prices will return to their equilibrium value	Costs have been rising at approximately 5% per year (excluding inflation)

Table 4 (continued)

DIFFERENCES BETWEEN A FREE MARKET & THE DEFENSE INDUSTRY

FREE MARKET	DEFENSE MARKET
Profits equalized across the economy	Wide and consistent profit variations between sectors, even wider between firms
Perfect mobility of capital (money)	Heavy debt, difficulty in borrowing
Mobility of capital (equipment) to changing demand	Large and old capital equipment "locks in" companies
No government involvement	Government is regulator, specifier, banker, judge of claims, etc.
Selection based on price	Selection often based on politics, or sole source, or "negotiation"; only 8% of dollars awarded on price competition
No externalities	All businesses working for DOD must satisfy requirements of OSHA, EEO, awards to areas of high unemployment, small business set-asides, etc.
Prices fixed by market	Most business, with any risk, is for "cost plus fee"
All products of a given type are the same	Essentially, each producer's products are different
Competition is for share of the market	Competition is frequently for all or none of a given market
Production is for inventory	Production occurs after sale
Size of market established by buyers and sellers	Size of market established by "third party" (Congress) via annual budget
Demand sensitive to price	Demand "threat"-sensitive, or responds to availability of new technology; almost never price sensitive

Table 4 (continued)

DIFFERENCES BETWEEN A FREE MARKET & THE DEFENSE INDUSTRY

FREE MARKET	DEFENSE MARKET
Equal technology throughout the industry	Competitive technology
Relatively stable, multiyear commitments	Annual commitments, with frequent changes
Benefits of the purchase go to the buyer	A "public good"
Buyer has the choice of spending now or saving for a later purchase	The DOD spends its annual congressional appropriations

 SOURCE: Jacques S. Gansler, The Defense Industry, (Cambridge, MA: MIT Press, 1980), pp. 30-31.

This lengthy list of market differences suggests that the defense industry does not operate in a free market environment. Also, these differences between a free market and the defense market are not limited and subtle, but extensive and blatant.

To further illustrate the unique nature of the defense market and to distinguish its operation from other markets, Gansler has also identified the several barriers to market entry, described below in Table 5.

Table 5

BARRIERS TO ENTRY INTO DEFENSE MARKET

ENTRY BARRIER	DESCRIPTION
Marketing Problems	There is no advertising of any significance, since advertising is an unallowable cost in defense procurement. Most selling is done directly. Understanding how DOD operates and does business requires specialized talents and a large marketing organization.
Inelastic Demand	A firm entering the defense market cannot assume that after it makes the investment to build a new plant, its output can be brought along with that of the other suppliers -- even if the new firm lowers prices -- since the total number of units demanded is established by the perceived threat and the available budget. Inelastic demand is reinforced by the fact that most defense products require large capital investments, which yield economies of scale to existing large defense contractors.
Brand Loyalty	There is a great deal of allegiance between the Services and established defense firms.
Demand for Higher Performance	Awarding defense contracts is based primarily on improved performance, rather than on price. A firm entering the market cannot simply duplicate an existing product at a lower price.
Need for Engineering and Scientific Capability	Early competition in the defense market is often based on design or technical factors. In order to compete, a firm must have not only production capability, but also a large R&D capability.
Specialized Equipment	Much of the very specialized equipment required has been bought by the DOD and supplied to individual contractors.
Need for Capital	To prepare a proposal for a major system might cost millions of dollars. The financial community often looks with disfavor on the defense market because of program/funding instability, and because getting capital for such investments may become difficult.

Table 5 (continued)

BARRIERS TO ENTRY INTO DEFENSE MARKET

ENTRY BARRIER	DESCRIPTION
Reporting Requirements	Firms must be willing to establish systems compatible with defense requirements for accounting, management, drawing, inspection, welding, and so forth.
Market Environment	The defense market is very unpredictable. Funding levels change constantly and programs are on again-off again. This lack of stability does not encourage new suppliers to enter the market.
Political Considerations	Members of Congress try to keep contractors in their districts in the defense business. Those contractors in other locations are not encouraged to enter.
Federal Regulations	Requirements, such as those of OSHA, EEO, SBA, and EPA, are much more rigidly applied to firms doing work for the government than in the commercial sector.
Security Clearance	The lack of a security clearance often makes it impossible to do defense work.
Social Stigma	The disincentive to engage in defense work is especially strong if the major share of a company's business is in the civilian sector.

 SOURCE: Jacques S. Gansler, The Defense Industry, (Cambridge, MA: MIT Press, 1980), pp. 46-48.

In addition to these barriers to entry into the defense market, Gansler has also described barriers to exit. Table 6 provides a summary of these barriers to market exit.

Table 6

BARRIERS TO EXIT FROM DEFENSE MARKET

EXIT BARRIER	DESCRIPTION
Financial Reasons	DOD progress payments for work in process provides favorable contractor financing. This encourages financially weak companies to stay in the defense business, while the heavy debt structure that many defense firms have makes it difficult for them to raise the capital for new ventures, in order to leave the industry.
Research and Development	Government sponsorship of RDT&E (especially on cost-reimbursement contracts) encourages firms to stay in defense business, sometimes in the hope of developing commercial products.
Overhead	The large overhead required for defense work makes a company's prices unattractive in the commercial world.
Capital Equipment	Much of the special equipment required for defense lacks flexibility for diversification.
Contract Awards	History has shown that whenever a company has been in bad shape and about to go out of the defense business, it has received the next award -- through a combination of desire, low bids, and political support.
Specialization of Labor	Much of the scientific and engineering labor, characteristic in the defense business, is difficult to apply to civilian products.
Specialization of Marketing	The defense sales force is not, for the most part, suited to the civilian market.
Military Specifications	Use of military specifications makes it difficult to convert engineering and manufacturing forces to the lower cost practices of the commercial world.
Unfilled Orders	Because product developments are often seven-to twelve-years long, and a company at any given time may be in various stages on different programs, a long term commitment is still required, if one chooses to exit.

Table 6 (continued)
BARRIERS TO EXIT FROM DEFENSE MARKET

EXIT BARRIER	DESCRIPTION
Emphasis on Quality Over Quantity	The defense industry tends toward a relatively low rate of production with very high quality. In the commercial world, just the opposite relationship may be most economical.
Foreign Military Sales	Many firms are kept in the defense business because of foreign military sales. Thus, even though a firm may be at a low point in its U.S. defense sales, its foreign military sales might keep it in the industry.
Market Cycles	History has shown that the defense business is cyclical. Many firms stay in defense work with the expectation of "catching" the next cycle.
Profit	High return on investment realized by many firms using government-owned plants and equipment leads to structural rigidity.
Patriotism	There is a sincere patriotic commitment on the part of those firms that have for a number of years been in the defense industry.

SOURCE: Jacques S. Gansler, The Defense Industry, (Cambridge, MA: MIT Press, 1980), pp. 48-50.

These market imperfections and barriers to entry and exit are the reality of business in the defense industry. This reality, however, is often masked by the mistaken perception of a more traditional free market. Collectively, these unique features--as well as the unavoidable fact that major weapon systems have dominated and always will dominate defense procurement expenditures--have shaped the defense industry. This industry has not evolved out of Social Darwinism. It is an industry created and sustained by the government and its continuing requirements for military goods and services.

THE BUYER

The defense industry has one buyer: the government. Even though the DOD has many individual purchasing activities, each buys with public funds, follows essentially the same procurement practices and regulations, and supports the common mission of defense of the nation. Thus, the DOD is the single buyer in the monopsony of weapon systems procurement.

Although foreign military sales are options to the makers of weapon systems, even in these transactions the U.S. government often plays a role. But the existence of the monopsony is only part of the issue. For the defense industry the government is not only the sole buyer, it is also frequently the specifier of the design and performance specifications; the banker through progress payments and other financing arrangements; the judge and jury on issues of dispute; the auditor on questions of allowable costs; the inspector and tester of product performance; and finally, and perhaps most important, the regulator of the industry in general.

The defense industry, typically, is not regarded as a regulated industry. The way in which it is controlled is unique, since the regulator and the buyer are one and the same. Also, the industry is regulated (controlled) in indirect and often subtle ways. For example, most defense contractors involved in weapon system procurements must have individual security clearances for many of their employees, and also facilities security clearances for their plants and work sites. Specific and detailed accounting and inspection systems must be

implemented,³ in accordance with established laws and regulations. Laws and regulations control the profit levels defense contractors can make on certain kinds of defense contracts.⁴ Other laws and regulations control what defense material can be sold in foreign military sales transactions and who may purchase such material.⁵ Laws and regulations dictate what cost or pricing data defense contractors must disclose in their submission of offers to the DOD.⁶ Regulations also mandate a set of standards or criteria that measure the adequacy⁷ of the contractors' own management control systems.

Government decision makers and regulators tend to focus on

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See Public Law 91-379, Cost Accounting Standards Act, 15 August 1970, 50 U.S.C. 2168 et seq., 12 G.C. 285, for background on the Cost Accounting Standards Board and the cost accounting standards. Also see FAR Parts 30 and 31 and DOD FAR Supplement Parts 30 and 31 for specific regulatory guidance pertaining to the cost accounting standards. See military specification, MIL-Q-9858, "Quality Program Requirements," 16 December 1963, and FAR Part 46 and DOD FAR Supplement Part 46 for specific details on required inspection and quality assurance programs required in certain defense contracts.

⁴

See 10 U.S.C. 2306(d) and 41 U.S.C. 254(b) for statutory restrictions on contractor profit levels and FAR 15.903 and DOD FAR Supplement 15.903 for specific regulatory guidance.

⁵

See Public Law 90-629, Arms Export Control Act of 1976, for statutory guidance and DOD FAR Supplement Part 25 for regulatory guidance concerning foreign military sales.

⁶

See Public Law 87-653, Truth in Negotiations Act (10 U.S.C. 2306[f]), for statutory guidance and FAR 15.8 and DOD FAR Supplement 15.8 for specific regulatory details concerning a contractor's requirements for cost or pricing data.

⁷

See DOD Instruction 7000.2, "Performance Measurements for Selected Acquisitions;" MIL-STD-881A, "Work Breakdown Structures for Defense Materiel Items," 25 April 1975; and DOD FAR Supplement Part 34 for specific guidance on requirements for criteria for a contractor's management control system.

individual programs and specific, detailed regulations. There is little natural tendency on their part to consider the structure⁸ of the industry in implementing policy or regulatory decisions. In recognition that this market does not involve open and free price competition, a series of policy substitutes, ranging from regulations through management controls, have been developed to⁹ either replace or correct the lack of a free market. To help understand the evolution of this situation, we need to look at Congress and how it passes the laws that influence the defense industry.

Derald A. Stuart, former Vice President and General Manager, Missile Systems Division, Lockheed Missiles and Space Co., Inc., has provided a valuable explanation of the government-defense¹⁰ industry relationship. What follows is an account of Stuart's insightful explanation of this relationship.

Stuart explains that there are different vantage points when we consider this relationship, and different environments that can shape our subsequent conclusions. The vantage points are the views of industry (the seller), the executive branch (the buyer), the legislative branch (Congress), the public, and the current and future users of the products. The environments are basically economic in character and range from classical "free markets" to

⁸ Gansler, The Defense Industry, p. 73.

⁹ Ibid., p. 72.

¹⁰ Derald A. Stuart, "Government-Industry Contracting: What Should the Relationship Be?", National Contract Management Journal, Vol. 17, Issue 1 (Summer 1983): 47-50.

monopolies. He explains that the public-at-large judges the government-defense industry relationship based on its own direct experience as "buyers." As such, he points out that the public engages in comparison shopping, is suspicious about "free lunches," has been the victim of swindles, has had experience with a "seller's market," and has observed abuse by custodians of other people's money. He also mentions that the public has had many good experiences in the marketplace, but these tend to be forgotten, while memories of bad experiences are lasting. He suggests that the experience base of business-at-large, which is essentially the small business sector of the U.S. economy, is similar to that of the public-at-large, except that here the experience has included being both a buyer and a seller. He explains that as sellers with favorable long-term agreements that assure future sales, businessmen are happy. However, they are not happy if they are the potential sellers who are on the "outside" and have been locked out by someone else's long term agreements. He reminds us that frequently they are the dissatisfied sellers who bring their concerns to the attention of their Congressmen. He also points out that although they may act differently in conducting their own businesses, they frequently ask Congress to intercede on their behalf and to act to solve a particular facet of their business problem. As someone once said, American business has repeatedly come to Congress "to make the ugly go away."

Stuart points out that since the public-at-large and industry-at-large make up the overwhelming majority of Congress' constituency, the attitudes sensed and adopted by the Congressmen

(and reflected in laws and regulations) are the attitudes advocated, though not necessarily practiced, by their constituencies. Specifically, he lists these attitudes as follows:¹¹

1. Act as though there is a classical "free market."
2. Avoid (protect the buyer against) monopoly and other "seller's market" situations.
3. Avoid (protect aspiring sellers from) oligopoly, "brand loyalty," long-term relationships, and other "buyer market" situations.
4. Prevent fraud, corruption, negligence, and abuse of position by agents (buyers).

As previously suggested, when the defense industry is considered, it becomes clear that the DOD's purchases are not made in a classical free market environment. Unfortunately, in this context the laws and regulations, as well as the attitudes of the public and Congress, are often slanted toward the classical economic environment of a free market, rather than the reality of the existing monopsony.

Stuart suggests that the user of a weapon system is usually aware of his needs. He knows what and when he wants something, just as individuals in everyday life are aware of their needs. He points out, however, that in our personal lives, the buyer and the user of the product are usually one and the same. On the other hand, the user of a weapons system is rarely the buyer of that system, and, frequently, he has no participation at all in the acquisition process. He reminds us that frequently in the weapons acquisition environment, the user and the producer are administratively separated by one or more levels of agents.

¹¹

Ibid.

Stuart provides the following illustration. In our personal lives, if an acquisition is time-sensitive, few would "comparison shop." Similarly, when a highly specialized service or product is needed, few would shop for prices. A person with a toothache or broken leg, for example, has no wish to comparison shop; to that person the nonclassical marketplace is appropriate. Later, after the crisis is over, the insurance adjuster might question the bills if they appeared to be out of line. This analogy, Stuart suggests, is a parallel to the cases of military procurement during World War II and the subsequent post war reviews by Congress. The disclosure of inefficiencies, inappropriateness, and downright fraud in defense procurements resulted in laws and regulations intended to prevent similar problems in the future. It also left a residual distrust, in the Congress, of both individual and joint motives of industry and the buying military. This distrust was reemphasized by President Eisenhower's often misquoted farewell speech . . . "Beware of the military-industrial complex . . ."¹²

The idea of laissez faire is no more valid in the defense industry than in many other regulated facets of our economy. In the wave of deregulation that we have experienced in the past few years, the defense industry has been forced to march to a different drummer. Just as political factors have ultimately taken precedence over all other variables in explaining the

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Ibid.

almost revolutionary direction in which deregulation has headed,¹³ these same factors seem to have created more control in the DOD dealings with the defense industry. Examples include the rash of GAO audits and the DOD inspections of defense contractors, in recent years, following the familiar "horror stories" of overpriced spare parts.

Overall, the push in the 1980s for federal procurement reform, including CICA, has been probably more pronounced than during any other period since World War II. The buying activities of the DOD, especially, have been scrutinized. As has been suggested, many of the controls have been implemented in the context of promoting economic activity typical of a free market. It seems difficult, however, to rationalize free market theory for the defense industry in a market structure which is clearly a monopsony.

If one concludes that the DOD, as a buyer, is essentially no different from a very large corporation with multiple divisions, the comparison is flawed. Unlike a corporation, whose procurement functions may be divided and dispersed among several subordinate divisions, the DOD still lacks the "corporate autonomy" present in the private sector. The DOD procurements are dependent upon a number of externalities that are not comparable in the private sector; Congress and the authorization and appropriation processes serve as examples.

¹³

Susan J. Tolchin and Martin Tolchin, Dismantling America: The Rush To Deregulate, (New York: Oxford University Press, 1983), p. 25.

THE SELLERS

The market for the DOD procurements is huge. In fiscal year 1985, for example, approximately \$150 billion was spent by the DOD on prime contracts for work done in the U.S.¹⁴ To put this volume of spending (buying) into some perspective, it can be compared to the total sales of General Motors, approximately \$63 billion in 1985.

Given this huge volume of spending, it would seem that suppliers would be rushing to enter the defense market. Indeed, in a free market this would probably be the case. However, as previously mentioned, numerous barriers to entry reduce the probability of new firms entering the defense market.

Like many other industries in the U.S., the bulk of the total dollar volume of defense business flows to a very few large contractors, and it is, essentially, these contractors that form the nucleus of the defense industry. It is also these few large defense contractors that most clearly exemplify the previous discussion about market imperfections and market barriers. Table 7 will help to illustrate the concentration of a few large contractors in this industry, and the predominant share of the total DOD contract dollars they receive each year.

¹⁴

Department of Defense, Washington Headquarters Service, Directorate of Information Operations and Reports (DIOR), Prime Contract Awards, P03, Table 3, Fiscal Year 1985, (Washington, D.C.: Government Printing Office).

Table 7
THE LARGEST DEFENSE CONTRACTORS

Percent of Total DOD Prime Contract Dollars Awarded
by Fiscal Year

GROUP RANK	85	84	83	82	81	80	79	78	77	76
TOP 5	22.5	22.0	20.6	19.6	17.7	18.8	20.7	22.5	17.7	19.1
TOP 25	51.0	50.5	50.6	45.9	43.8	45.2	46.1	48.7	46.9	48.4
TOP 100	70.1	69.1	69.9	65.9	66.4	65.9	66.4	68.5	67.7	69.0

SOURCE: These figures were compiled from DOD procurement statistics. Refer to Department of Defense, Washington Headquarters Service, 100 Companies Receiving The Largest Dollar Volume of Prime Contract Awards, Publication P01, and Prime Contract Awards, Publication P03, (Washington, D.C.: Government Printing Office).

It can readily be seen from Table 7 that a handful of the largest DOD contractors are receiving the majority of the DOD procurement funds each year. What is not so apparent from the figures shown is the consistency with which the largest groups of the DOD contractors share this market. For example, by collecting the data for the groupings shown above over the past 25 years, and then calculating the mean percentages for each respective decade, the results of this consistency can be highlighted. Table 8 represents this compilation.

Table 8

GROUPING OF LARGEST DOD CONTRACTORS by DECADES
(Percentage of Total Dollar Prime Contract Awards)

GROUPING	1980s	1970s	1960s
Top 5 Contractors	19.7	19.9	21.9
Top 25 Contractors	47.2	48.2	49.0
Top 100 Contractors	67.4	68.5	70.1

SOURCE: These figures were compiled from DOD procurement statistics. Refer to Department of Defense, Washington Headquarters Service, 100 Companies Receiving The Largest Dollar Volume of Prime Contract Awards, Publication P01, and Prime Contract Awards, Publication P03, for applicable years, (Washington, D.C.: Government Printing Office).

During the past 25 years, on the average, the concentration of defense contractors shows that the top five companies have been receiving about 20 percent of the total defense business (dollars). The top 25 and top 100 firms have been receiving about 50 percent and 70 percent respectively. This concentration, by itself, is not unusual. In all of U.S. industry, the top 500 companies control 70 percent, and 111 firms control more than half of the total U.S. sales. Thus, at the aggregate level, defense is not an especially highly concentrated industry.¹⁵ The point of departure is the trend of concentration. In the defense industry, as shown, the trend is quite consistent; however, in the civilian sector there has been a marked increase in the concentration ratio since World War II.

¹⁵

Gansler, The Defense Industry, p. 36.

The increased trend in concentration within the civilian sector would seem to support the natural evolution of market share (Social Darwinism) in a free market. In the defense industry, however, this trend has not developed. In fact, there has been a slight decrease in the share of the market held by the largest firms over the past three decades, as shown in Table 8. Perhaps this decline suggests that the defense industry operates in a market that does not follow the same conventional trends expected in the general private sector.

Congress has expressed concern because a few large defense contractors consistently receive the bulk of the defense procurement dollars. An example of this congressional attitude can be found in the legislative history surrounding CICA. In the report that summarized the views of the House Committee on Government Operations pertaining to the Competition in Contracting Act of 1984 (H.R. 5184), it was pointed out that, "Despite the efforts of Congress to the contrary, a few dominant firms have gained an increasing share (emphasis added) of government contracts, thus seriously affecting the government's ability to efficiently and economically acquire its goods and services."¹⁶

The data in Table 8 do not support the previously mentioned contention, at least in terms of the DOD contracts. If the trend referred to by the House Committee on Government Operations involved only the most recent years (1981-1985), then

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U.S., Congress, House, Committee on Government Operations, Competition in Contracting Act of 1984, H. Rept 98-1157, 98th Cong., 2d sess., October 10, 1984, p. 14.

the statement has more credence. As Table 7 illustrated, in the most recent years there has been a slight increase in the market share held by the largest defense contractors.

The defense industry, although highly concentrated in terms of the dominance of the market by a few large contractors, is fragmented in terms of product specialization by the less dominant contractors. For example, many of the smaller defense contractors do not think of themselves as being in the "manufacturing business," but rather as being in (for example) the "laser-guided, short-range, anti-tank missile business."¹⁷

This specialization in products that have very little application apart from a military environment limits the opportunities of the small firms to adapt their products for other consumer oriented commercial applications. Thus, even though there may be some lessening of the impact of the barriers to market entry for smaller firms, based on a reduced need for capital investment, there are still other entry barriers associated with the actual opportunities to participate in the defense industry.

The next section will focus upon the factor that is perhaps the most influential in dictating what levels of competitive awards are likely to be experienced in defense procurements. As will be shown, major hard goods (weapon systems) dominated spending for the DOD procurements.

¹⁷

Gansler, The Defense Industry, p. 165.

THE PRODUCTS

The levels of competition are greatly influenced by the particular goods and services traded. Obviously, many of the non-major hard goods the DOD acquires are the same commercial products that other customers buy. In these instances, the levels of competition experienced by the DOD, as the buyer, are probably about the same as those levels of competition experienced by individuals and firms in the private sector. On the other hand, many of the most expensive and complex systems acquired by the DOD are weapon systems; therefore, competition is a market condition experienced by only one buyer--the DOD.

A 1985 project prepared by the Logistics Management Institute, for the purpose of helping the DOD implement a series of competitive performance information reports, pointed out that any assessment of competitive performance must take into account what is being acquired and the rate of competition that is "normal" for that type of purchase.¹⁸ The report suggested that one purchasing activity may record a high rate of competition, because most of the items it buys are generally subject to competition. Another activity may show a relatively low rate of competition, because the items it buys are generally not subject to competition.¹⁹ The nature of the product being acquired, therefore, would seem to have a strong influence on the degree of competition experienced during the acquisition process.

¹⁸ Donna J.S. Peterson and Myron G. Myers, Reports To Promote Competition (Bethesda, MD: Logistics Management Institute, [December 1985]), p. 1-2.

¹⁹ Ibid.

To influence an aggregate change in the level of competitive awards experienced in the DOD procurements, the change would have to impact those products that account for the bulk of the buying activity. Table 9 below illustrates a breakdown of the goods and services the DOD has acquired over the past four decades, based on the percentage of total award dollars that were spent on each grouping. To condense the data into some manageable form, totals were arranged by decade, and then, decade averages were calculated. The figures for the 1980s represent the averages for the years 1980 through 1985. Decade averages for the 1960s and 1970s represent data collected for each year, in those respective decades. The figures for the 1950s represent the averages for the years 1955 through 1959.

As Table 9 below illustrates, a change in the dollar volume of competitive awards would involve more competition for the major hard goods (weapon systems and related items) bought by the DOD. The assumption made here is that the other types of products (non-major hard goods) are, for the most part, commercial type products and services available to the DOD at approximately the same aggregate levels of competition that other buyers experience. In other words, the DOD is not the sole buyer of these non-major hard goods, and, thus, the monopsony that surrounds the major weapon systems is absent for these other goods and services.

The three definitions provided below will help in the interpretation of the data in Table 9.

Major Hard Goods - Include aircraft, missile and space systems, ships, tanks, automotive vehicles, weapons, ammunition, electronics and communication equipment. Also included are the assemblies and spare parts for these major hard goods, when the planned use of such items is known at the time of purchase.

Miscellaneous Hard Goods - Include building supplies, transportation equipment, production equipment, construction equipment, medical and dental supplies and equipment, photographic equipment and supplies, material handling equipment, and all other supplies and equipment not listed in other groupings.

Small Business - is defined by the Small Business Administration (SBA) in the Federal Register (Title 13, Chapter 1, Part 121) and also in the Federal Acquisition Regulation (FAR) 19.101. Generally, a small business is one that is independently owned and operated, is not dominant in its field of operations, and with its affiliates does not employ more than a specified number of employees (usually not more than 500, 750, or 1,000, depending on the type of product or service called for in the contract). For construction and some service industries, the criterion is a specified annual dollar volume of sales or receipts, rather than the number of employees.

The above definition for major hard goods is consistent with the definition used for that term, throughout this research. It should be noted that while spare parts are included in the definition, very often their purchase would not be included (coded) as a major hard good. This omission is because most acquisitions of spare parts are done apart from the acquisition of the end items they support, and frequently the buying activity can not identify specific spare parts to the specific end items. In these cases, procurement data for spare parts are usually collected under DOD Claimant Program C-9(e), (see Appendix 1) and are included in the Miscellaneous Hard Goods data in Table 9.

Table 9
DOD PROCUREMENTS BY COMMODITY

Commodity	% of Total DOD Award Dollars	% Awarded to Small Business
<u>Major Hard Goods</u>		
1950s	62	5
1960s	68	6
1970s	64	7
1980s	66	7
<u>Misc. Hard Goods</u>		
1950s	5	37
1960s	5	36
1970s	4	36
1980s	4	38
<u>Fuels & Lubricants</u>		
1950s	4	23
1960s	3	23
1970s	5	32
1980s	7	34
<u>Textiles</u>		
1950s	1	62
1960s	2	61
1970s	1	66
1980s	1	78
<u>Subsistence</u>		
1950s	3	53
1960s	3	54
1970s	3	47
1980s	1	41
<u>Construction</u>		
1950s	7	68
1960s	4	59
1970s	5	62
1980s	6	68
<u>Services</u>		
1950s	12	16
1960s	7	25
1970s	9	21
1980s	8	25

SOURCE: These figures were compiled from DOD procurement statistics. Refer to Department of Defense, Washington Headquarters Service, Prime Contract Awards, Publication P03, for applicable years, (Washington, D.C.: GPO).

The data in Table 9 highlight interesting aspects about the defense procurements. First, the vast majority of the DOD procurement dollars flow to the producers of the major hard goods. Aggregate awards for any other category of goods and services pale in comparison to the dominant share of the total associated with major hard goods.

Table 9 also shows that the small businesses' share of the major hard goods market is very small (about 10 percent on average). It is likely that some of this share involves assemblies and spare parts that support the major hard goods. Small businesses are not in the position to be producers of major weapon systems, and if they were, they would no longer be considered small businesses. The defense industry, for the most part, is a capital intensive industry dominated by the large manufacturers of major weapon systems. For this reason, the small business sector can only compete at the prime contract level for limited shares of the total defense contract dollar. To illustrate that the small business sector receives only a small share of the total volume of the DOD procurement dollars and that their share seems to be almost fixed, we can review the data in Table 10. The figures in this table were compiled in the same manner as described for the decade figures in the previous table, except the small purchase awards made to small business firms are included in the data compilations. Thus, the data in Table 10 represents the total dollar volume of small business awards relative to all (large and small purchases) DOD procurements.

Table 10

PERCENTAGE OF DOD PROCUREMENTS (by dollars)
AWARDED TO SMALL BUSINESS

Decade	% Awarded To Small Business
1950s	19.3%
1960s	18.0%
1970s	19.0%
1980s	19.5

SOURCE: These figures were compiled from DOD procurement statistics. Refer to Department of Defense, Washington Headquarters Service, Prime Contract Awards, Publication P03, for applicable years, (Washington, D.C.: Government Printing Office).

As with CICA and its goal of fostering more competitive awards in federal government procurements, Congress also has enacted legislation that was meant to assist the small business sector in being more viable government contractors. Specifically, Congress passed the Small Business Act (Public Law 83-163), in 1953, to "aid, counsel, assist, and protect" small business and "ensure that a fair portion of the total purchases and contracts for goods and services for the government be placed with small business enterprise."²¹ In the case of the defense market, the data in Table 10 seems to indicate that even with the assistance of legislation, the small business sector has not increased its share of the defense procurement dollar. Obviously, this huge sector of our economy is competitive. Perhaps the reason for the almost unchanged position of small business, relative to its share of total defense procurements, is related to the nature of the defense industry itself and to the nature of the goods and services acquired by the DOD.

²¹

Small Business Act, 15 U.S.C. 631-647; see also 41 U.S.C. 252(b) and 10 U.S.C. 2301.

The same large defense contractors who receive the bulk of the total defense procurement spending each year are essentially the same contractors who are producing the majority of the major hard goods (weapon systems). Unless CICA is able to influence these contractors and their products, it is questionable whether the DOD would notice an aggregate change in its level of competitive awards. For example, successfully stimulating competition among the suppliers of textiles or subsistence would probably have only a very minimal effect on the aggregate levels of competitive dollar awards in the DOD. Since these commodities account for such a small share of the total award dollars made by the DOD, large increases in the volume of competition in any individual grouping would have minimal effects on the aggregate levels of competitive awards. This is true, to one degree or another, for any of the other categories of goods and services shown in Table 9, except major hard goods. While major hard goods have accounted for about 65 percent of the total award dollars over the past 30 years, no other commodity group or services can claim more than a 9 percent average decade share (excluding the 1950s average for services of 12 percent).

Thus, it appears that for CICA to have a significant influence on the aggregate level of competitive dollar awards in the DOD procurements, it would have to impact the few large contractors who produce the major hard goods. However, given the market structure in the defense industry, it is the large defense contractors and the major hard goods they produce that are most affected by the existing market imperfections and barriers. CICA might be able to influence levels of competitive awards for non-

major hard goods because these commodities seem to be less susceptible to the unique features of the defense industry. It seems unlikely, however, that the law would be able to have the same effect on competition for major hard goods.

The influence of CICA seems tied to its success in stimulating competition in the market for major hard goods. Recent efforts to stimulate competition in the defense industry via artificial inducements, such as leader-follower awards and other forms of dual sourcing, may promote competition on a case-by-case basis. In the aggregate, however, the influence of even these efforts may be overshadowed by the market's own unique structure and natural operation.

If potential new suppliers of major hard goods were lured by the possibility of getting into the defense business because of the legislative mandate under CICA for more competition, the law still does not change all the other market imperfections and barriers that continue to keep suppliers away from the defense business. On the other hand, suppliers of non-major hard goods are not constrained by the imperfections of the defense market and the many barriers to entry and exit. Frequently, these suppliers are dealing in products that are traded in both the defense market and non-defense markets, and as such, they are catering to more than one buyer. When the prospects for more sales in the defense market are enhanced because of mandated increases in competition, these suppliers could respond by seeking that defense business. Thus, under CICA more competition for non-major hard goods could result, while an increase in competition for major hard goods would appear to be questionable.

SUMMARY

Under CICA, when the DOD goes to the private sector to acquire its needed goods and services, there is a presumption that competitive forces are both present and operative, in much the same manner as one would expect in a free market. While it is undoubtedly true that many facets of the defense market operate in similar ways as the traditional free market, it also is clear that in many other ways there are important differences. Key differences would include the market imperfections and barriers to entry and exit. Also important is the unavoidable fact that major weapon systems are produced by very few defense contractors, and these products have little or no marketability outside the monopsony controlled by the government.

There are a sufficient number of important differences involving both the goods and services acquired by the DOD and the markets in which it deals, to make questionable that a legislative mandate for more "full and open competition" will actually result in an increase in aggregate levels of competitive awards. Perhaps competition can be stimulated for non-major hard goods; however, these products do not dominate defense procurements. Major hard goods, which account for about 65 percent of all defense procurement expenditures, clearly dominate defense spending. These major hard goods are, for the most part, produced by the large defense contractors who are influenced most significantly by the unique characteristics of the defense market. Increases in competition for major hard goods, which

does not seem likely, would have to occur before significant changes in the overall aggregate levels of competition were experienced.

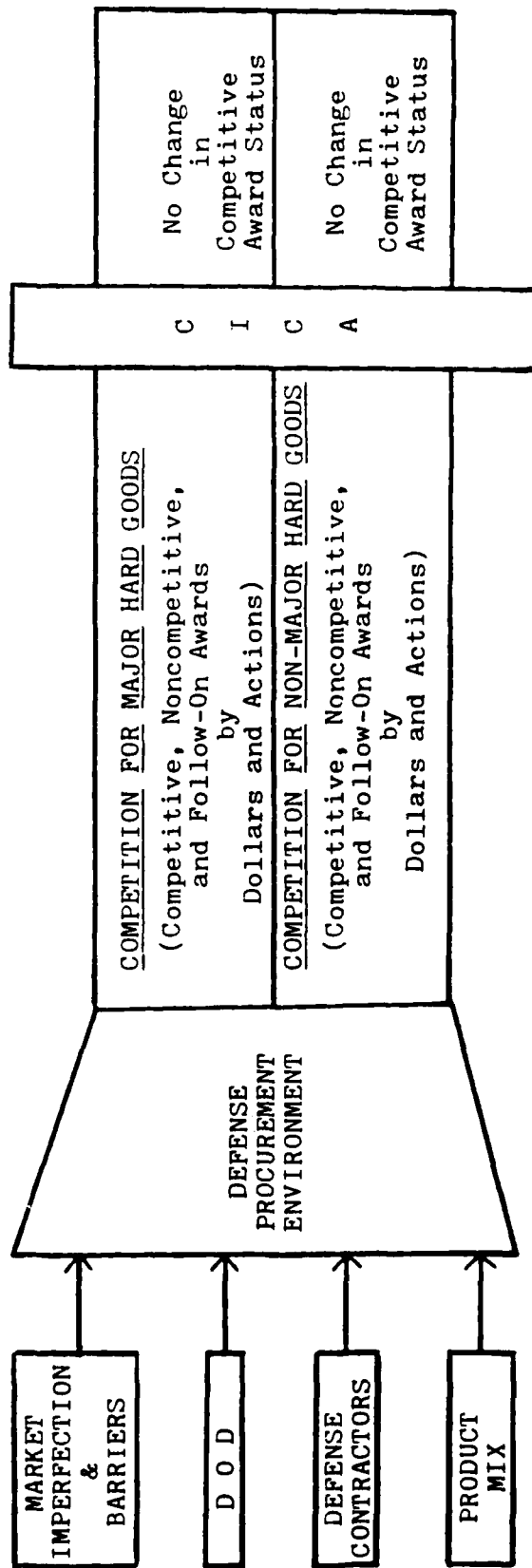
If aggregate changes in competition are demonstrated after the implementation of CICA, it would suggest that the two assumptions mentioned at the beginning of this chapter are valid. Those assumptions were:

1. That previous policy and established procedures for stimulating competition were either not sufficiently effective or they were not being properly implemented;
2. That there is pent-up demand in the private sector for more competition and potential sellers want more opportunities to compete for government contracts.

This research measured empirically what changes occurred in the percentage levels of competitive, noncompetitive, and follow-on DOD prime contract awards in terms of dollars and procurement actions for major hard goods and non-major hard goods since the implementation of CICA. The conceptual model that follows summarizes the theoretical framework of the study.

Figure 1

THE INFLUENCE OF CICA ON COMPETITIVE AWARDS IN DEFENSE PROCUREMENTS
(A Conceptual Model)



CHAPTER IV

METHODOLOGY

INTRODUCTION

This study investigated whether changes have occurred in the volume of competitive, noncompetitive, and follow-on prime contract awards made by the DOD, since the implementation of the Competition in Contracting Act of 1984. This research provides a comprehensive collection of empirical data related to this issue.

The DOD contract award data base, maintained by the Directorate for Information Operations and Reports (DIOR), Office of the Secretary of Defense, served as the foundation for this research. This data base, which is the single most comprehensive collection of data concerning contract awards made by the DOD, contains automated procurement information for all individual DOD contract awards made since fiscal year 1966. The data investigated in this study represent the entire population of the DOD prime contracts awarded during the period of fiscal years 1966-1987, inclusively. This volume of data represents defense contracts totaling approximately \$1.5 trillion and involving about five million procurement actions.

¹ These figures were compiled from DOD procurement data. Refer to Department of Defense, Washington Headquarters Service, Prime Contract Awards, Publication P03, Table 9 for applicable years (Washington, D.C.: Government Printing Office).

DESCRIPTION OF THE VARIABLES

Independent Variable: The independent variable is the implementation of CICA, which became effective on April 1, 1985.

Dependent Variables: The dependent variables are the levels (percentages) of competitive, noncompetitive, and follow-on DOD prime contract awards for major hard goods and non-major hard goods, measured in terms of both award dollars and procurement actions.

The period of fiscal years 1966-1987, inclusively, was the period covered by this study. During this period contract award data have been collected for all individual awards, and the form of competition associated with each award has also been recorded. Table 11 provides an outline of the forms or categories of competition (dependent variables) used in this study. Specific definitions for each form of competition are provided in the glossary.

Table 11

FORMS OF COMPETITION

TYPE OF AWARD (Form of Competition)	METHOD
Competitive	Formal Advertising (Sealed Bids) Price Competition Design or Technical Competition
Noncompetitive	Sole Source Modifications Catalog or Market Price Not Applicable
Follow-On	Follow-on After Price Competition Follow-on After Design or Technical Competition

Every prime contract awarded by the DOD, except small purchases, is classified directly or indirectly into one of the forms of competition outlined in Table 11. A prime contract award is defined as a legally binding agreement executed by a department or agency of the DOD to obtain supplies, services, or construction. Initial contract awards and contract modifications for dollar amounts that fall within the "small purchase" thresholds were not included in the definition of prime contract awards (see glossary for definition of small purchases). Also, prime contracts are distinguished from subcontracts, since the latter establish no legally binding relationship (privity) between the government and the subcontractor. This study did not investigate subcontracts.

The various forms of competition (the dependent variables) were measured in relation to major hard goods and non-major hard goods. These two aggregate groupings consist of specific individual categories of goods and services, which are typically referred to as DOD Claimant Programs. The generic listing of the individual DOD Claimant Programs used in this study, to collectively form the groups of major hard goods and non-major hard goods, are outlined in Table 12. Detailed definitions and specifications for each of the individual DOD Claimant Programs are provided in Appendix 1. Specific definitions for major hard goods and non-major hard goods are also provided in the glossary.

Table 12

MAJOR and NON-MAJOR HARD GOODS

GROUPING	DOD NUMBER	CLAIMANT PROGRAMS
		GENERIC PROGRAM DESCRIPTION
Major Hard Goods	A-1	Aircraft
	A-2	Missiles and Space Systems
	A-3	Ships
	A-4	Tanks and Automotive
	A-5	Weapons
	A-6	Ammunition
	A-7	Electronics & Communication Equipment
Non-Major Hard Goods	A-8	Fuels and Lubricants
	A-9	Textiles, Clothing, and Equipage
	B-2	Subsistence
	C-2	Construction
	S-1	Services
	B-1, B-3 B-9, and	
	C-9	Miscellaneous Hard Goods

SOURCE: These groupings were adapted from DOD information. See Department of Defense, Washington Headquarters Service, Directorate for Information Operations and Reports, Procurement Coding Manual, Vol. 1, Commodities and Services Reported on DD Form 350, DOD 4105.61M, MN02 (Washington, D.C.: Government Printing Office, October 1986), pp. 67-81.

The dependent variables were measured in percentages of award dollars and percentages of procurement actions. Award dollars are simply the number of dollars obligated for prime contract awards. A procurement action, or contracting action, as it is also called, is the obligation or deobligation of funds, which officially awards or changes a prime contract. A procurement action may include the award of a new prime contract, a debit or credit modification to an existing prime contract, or an order written against an indefinite delivery-type contract or basic ordering agreement.

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For purposes of this study, a procurement action must have involved a dollar amount greater than the small purchase threshold established at the time the procurement action was awarded. In other words, each individual procurement action included in this study involved the obligation or deobligation of a dollar amount greater than the established small purchase threshold.

When considering award dollars and procurement actions, it is possible that very large changes in one of these measures will not be reflected in similar changes in the other. For example, there could be a large aggregate increase in competitive procurement actions but a decrease in aggregate competitive award dollars. This situation could occur if there were many individual competitive awards (actions) for small dollar amounts but few extremely large dollar noncompetitive awards. Thus, it is important to look at both dollars and actions to determine how competition may be changing.

The three categories of competition used in this study collectively reflect the total of all the DOD prime contract awards (100%). A change in the percentage level of one category of competition will impact the percentage level of one or both of the other two categories. For example, if the percentage of competitive dollar awards were to increase for major hard goods in a given period, this increase would be offset by a decrease in noncompetitive or follow-on dollar awards for major hard goods (or a decrease in both).

HYPOTHESES

For the first time in federal procurement history CICA established a specific legislative mandate requiring competitive awards of government contracts. There should be some change (positive or negative) in the level of competitive awards for both major hard goods and non-major hard goods subsequent to CICA, if this legislation has had an influence. This expectation is based on the following assumptions:

1. That previous policy and established procedures for stimulating competition were either not sufficiently effective or they were not being properly implemented;
2. That there is pent-up demand in the private sector for more competition and potential sellers want more opportunities to compete for government contracts.

Much of the defense market seems to operate outside the conventional notion of a free market. Specific market imperfections and barriers to entry and exit influence its operation and make it unique. In addition, this monopsonistic market is influenced greatly by the composition of goods and services acquired by the DOD. The majority of the DOD expenditures are for major hard goods, which are produced and supplied by a limited number of dominant defense contractors. These features, which collectively influence both the DOD and the defense contractors, provide the basis for the hypotheses listed below.

Null Hypotheses

When comparing the DOD total prime contract awards made between fiscal years 1966 and 1984, the years of procurement activity before CICA, and fiscal years 1986 and 1987, the first two full years of procurement activity after CICA:

H01: There will be no change in the percentage level of competitive dollar awards for major hard goods.

H02: There will be no change in the percentage level of noncompetitive dollar awards for major hard goods.

H03: There will be no change in the percentage level of follow-on dollar awards for major hard goods.

H04: There will be no change in the percentage level of competitive procurement actions for major hard goods.

H05: There will be no change in the percentage level of noncompetitive procurement actions for major hard goods.

H06: There will be no change in the percentage level of follow-on procurement actions for major hard goods.

H07: There will be no change in the percentage level of competitive dollar awards for non-major goods.

H08: There will be no change in the percentage level of noncompetitive dollar awards for non-major hard goods.

H09: There will be no change in the percentage level of follow-on dollar awards for non-major hard goods.

H010: There will be no change in the percentage level of competitive procurement actions for non-major hard goods.

H011: There will be no change in the percentage level of noncompetitive procurement actions for non-major hard goods.

H012: There will be no change in the percentage level of follow-on procurement actions for non-major hard goods.

The research hypothesis corresponding to each null hypothesis shown above was that there would be a change in the respective dependent variable when comparing pre- and post-CICA measurements.

TREATING POPULATION DATA VIA STATISTICAL ANALYSIS

As mentioned, the data investigated in this study represented the entire population of the DOD prime contracts awarded during the period of fiscal years 1966-1987, inclusively. For purposes of this study, the research population of the DOD prime contracts did not include awards classified as small purchases, awards classified as Foreign Military Sales (FMS), and awards classified as intragovernmental transactions. The rationale supporting these exclusions from the research population is provided later in this chapter, during the discussion of data collection procedures.

Since the entire research population of prime contract award data was investigated, exact population parameters were disclosed by the data. Measuring actual change in the dependent variables before and after CICA could, therefore, have been accomplished by simply comparing the arithmetic means for each variable in pre- and post-CICA measurements. This procedure would have provided a measure of the actual changes in the dependent variables and an indication of whether the changes were significant in the sense of being trivial or non-trivial. Unfortunately, testing the hypotheses of this study in this manner would have provided no indication of the probability that an observed change in post-CICA measurements resulted merely by chance. Since random change is always a possibility, a simple comparison of arithmetic means could be a misleading indication of the true influence of CICA.

Clearly, some change in the dependent variables would occur from one period to the next. The changes could be the result of

any number of variables operating independently or in combination. Examples of such variables might include the general economic conditions in the country, federal funding levels for the DOD, the various stages of life cycle development of key weapon systems, behavioral or attitudinal changes of the buyers and sellers, or the given military posture of the nation, i.e., war or peace. These variables and potentially many others may influence the level of competition (the dependent variables) at any given time and provide plausible rival explanations for any observed changes. It is also possible that behavioral or attitudinal changes of the buyers and sellers might be a consequence of CICA. The purpose of this research, however, has been to investigate whether changes have occurred in the dependent variables, since the implementation of CICA. Questions concerning possible consequences of CICA (other than changes in the dependent variables) or plausible rival explanations for any observed changes in the dependent variables are potential subjects of future research.

Empirical research normally involves a comparison of some sort. The key function of a hypothesis is to distill a research question into a testable comparison. In the majority of research comparisons involving either relationships or differences, statistical analysis is used to test the stated hypothesis. In such cases, a probability level is assigned to the specific comparison and statistical analysis is then used to determine if the results are statistically significant. The null hypothesis is then rejected or accepted based upon the established

probability (statistical significance) of the observed event occurring by chance alone.

Since the entire research population of data was used in this study and exact population parameters were subsequently known, sampling and subsequent statistical inferences were not necessary. Also, statistical significance, in the purest sense, has no meaning in the absence of sampling from the population. Given these realities, however, hypothesis testing still requires some form of a testable comparison and the issue of measuring change that may have been attributable to the event in question (CICA) or to chance must still be addressed.

Although the application of statistical analysis to the known totality of population data is recognized as inappropriate in the purest methodological sense, by convention such an approach is not uncommon. In the case of this research, statistical analysis was applied to the population data to provide the researcher with "a method" to test the stated hypotheses. This approach was selected because of the need to measure the significance of any observed change in the dependent variables after the implementation of CICA. In other words, use of a statistical test was intended to provide an empirical measure of any observed change in the dependent variables occurring partly as a result of an influence of CICA or by chance alone. To accomplish this, the research population of prime contract award data was treated as if it were two randomly

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selected independent "samples" of size $n(1)=19$ (pre-CICA fiscal years 1966-1984, inclusively) and $n(2)=2$ (post-CICA fiscal years 1986 and 1987). Fiscal year 1985 data were not included in the "samples" because such data do not reflect a full fiscal year of procurement activity either before or after the implementation of CICA. Recall that CICA was implemented on April 1, 1985, and this date exactly separates the first and second halves of fiscal year 1985. The "sample units" used in the statistical analysis consisted of complete fiscal years of contract award data.

In order to apply statistical analysis to the totality of the research population data, the following assumptions concerning the fictitious samples were accepted:

1. The population data are normally distributed and the fictitious sampling distributions approach the normal distribution.
2. The arithmetic mean, the variance, and the standard deviation are appropriate descriptive statistics for the dependent variables.
3. The practical significance of any observed change in the dependent variables occurring after the implementation of CICA would be inferred from a subjective evaluation of the observed levels of statistical significance. The actual decisions to reject or fail to reject the null hypotheses would be based on an objective decision rule of observed statistical significance at the .01 level or less.

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The need for random sampling is to help ensure that each member (unit) of the population has an equal chance of being included in the research sample. The goal is to select a sample that is representative in all relevant dimensions of the population from which it is drawn. Since this research involved the entire population, the issue of the representativeness of the two fictitious samples to the population is self-evident, i.e., the population is, in fact, representative of itself.

Apart from the issue of treating the research population data as if it were two randomly selected independent samples is the recognition that there is a lack of independence among the hypotheses themselves. For example, in any given period the percentage level of competitive dollar awards for major hard goods would influence one or both of the percentage levels of noncompetitive and follow-on dollar awards for major hard goods. This same situation exists for all other combinations of related hypotheses. The total percentage value of competitive, noncompetitive, and follow-on awards for any given combination of dollars or actions with major or non-major hard goods will sum to 100 percent. This methodological weakness, while recognized and identified, was unavoidable under the circumstances and design of this study. The fact that this research investigated the existence of differences between groups rather than relationships between variables helped to mitigate the shortcoming of a lack of independence among the hypotheses.

HYPOTHESES TESTING PROCEDURE

The hypotheses in this study were tested by utilizing independent t-Tests for the equality of the pre- and post-CICA

means for each of the dependent variables.⁴ The null hypotheses were rejected when the computed significance of the t statistic was less than or equal to .01. Thus, the null hypotheses of this study were rejected only in those cases where the probability of an observed change occurring merely by chance was .01 or less.

Opinions differ among researchers concerning the establishment of predetermined levels of statistical significance and the predetermined choice of statistical tests. No one approach seems to be universally accepted, however, frequently⁵ the more structured approach is used in social research. Since the researcher adhered to the view of both predetermined statistical methodology and the choice of an explicit significance level to serve as a decision rule in hypothesis testing, such an approach was taken in this study. The actual observed significance level of each hypothesis tested is, however, reported so that the reader may evaluate the results pursuant to his or her own methodological preference.

⁴ Although it is assumed in this study that the population data are normally distributed, it can be shown that application of the t-Test would not be limited if the population were, in fact, nonnormally distributed. For a discussion of this issue see: William Mendenhall, Introduction to Probability and Statistics, 6th ed. (Boston: Duxbury Press, 1983), pp.337-340. Also, for two-group designs, such as in this study, the t-Test yields identical results to one-way analysis of variance (ANOVA), since $t^2 = F$; the square root of $F = t$.

⁵ For additional details on predetermined aspects of methodology see: R. Baker Bausell, A Practical Guide To Conducting Empirical Research (New York: Harper & Row, Publishers, 1986), pp.35-51; Fredrick Williams, Reasoning With Statistics: How To Read Quantitative Research, 3d ed. (New York: Holt, Rinehart and Winston, 1986), pp. 53-69; Earl Babbie, The Practice of Social Research, 4th ed. (Belmont, CA: Wadsworth Publishing Company, 1986), pp. 421-422.

In selecting a decision rule for rejection of the null hypotheses at the .01 level of significance, consideration was given to the risk of committing both Type I and Type II errors. The trade-off was resolved in favor of protection against Type I errors, i.e., rejecting the null hypotheses when they are true.

Incorrect rejection (Type I error) of any of the null hypotheses could be interpreted as an indictment of past DOD procurement practices concerning efforts to promote competitive contract awards. Also, incorrect rejection of the null hypotheses could be interpreted as a signal that legislative mandates, such as CICA, are effective ways to influence federal procurement practices. It could be both politically and economically imprudent to suggest that procurement practices can be influenced by legislation, based on research findings that erroneously support the existence of change after a legislative mandate. Therefore, the intent of establishing a decision rule for rejection of the null hypotheses at the conservative .01 level of significance was to minimize the risk of committing a Type I error.

While the conservative .01 level of significance protects against the risk of committing Type I errors, it simultaneously increases the risk of committing Type II errors, i.e., accepting the null hypotheses when they are false. Given this reality, the trade-off was accepted because it was felt that an erroneous research conclusion supporting a claim of no change in the dependent variables in post-CICA measurements would have less practical consequence than the converse Type I error. CICA has been enacted and implemented and like other laws it is unlikely

to be repealed, even in the light of research that would suggest its efficacy is dubious. In other words, the law would continue to govern the award of government contracts and its influence would continue in spite of spurious conclusions resulting from possible Type II errors in this research.

A two-tailed test of significance was utilized in the hypotheses tests. The research question was formulated to investigate the existence of changes (non-directional) in the dependent variables since CICA. Use of one-tailed tests assumes that there is no reason to expect observed differences in the direction opposite from what is anticipated. Also, one-tailed tests never test the statistical significance of an observed difference in the direction opposite of what is expected. Since it could not be predicted with confidence in this study just how the dependent variables might change (directional), a two-tailed test of significance was employed.

The use of statistical analysis to test the hypotheses in this study presupposed that any conclusions subsequently drawn from the analysis would be restricted to the numerically and statistically observable influences of CICA. It is recognized that the conclusions drawn from the statistical analysis are constrained by both the selection of the statistical methodology and the previously stated assumptions surrounding the application of statistical analysis to the totality of the population data. As mentioned earlier, any number of plausible rival explanations may exist to explain the observed changes in the dependent variables after the implementation of CICA.

RESEARCH DESIGN

Clearly, the data in this research are time series data and the application of an interrupted time series design could have been employed in this study. This design, however, was not selected for the research for the following reasons. First, there were an inadequate number of post-CICA measurements; fiscal years 1986 and 1987 were the only two and monthly or quarterly data were not obtained by the researcher. This lack of a sufficient number of post-CICA measurements could have cast doubt upon the reliability of the findings if an interrupted time series design had been employed.

The second reason for not employing an interrupted time series design concerned the expressed purpose of the research itself. This study was meant to investigate the existence of differences between two groups of data (pre-post CICA) rather than a cause and effect relationship between variables (CICA and the dependent variables). Statistical tests in most time series designs involve some form of regression of the data and an investigation of the resulting intercepts and slopes. The issue in such cases is the relationship between the dependent and independent variables. In this study, however, inferences about causal relationships were not intended. The internal validity strengths associated with time series designs and tests of significance for the effects of independent variables were not of

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paramount concern in this study.

It was recognized that a change in a dependent variable in post-CICA measurements could have been due to a trend which originated prior to CICA and merely continued to be observed in the post-CICA measurements. Obviously, the statistical significance disclosed from a t-Test of pre- and post-CICA means would suggest the existence of a change but would not disclose that such a change was due to a pre-CICA trend rather than the actual influence of CICA. To mitigate the shortcoming of this feature in the research design, time plots (XY graphs) were used to illustrate the trends of the data related to each hypothesis tested. This provided an indication of the nature of the observed changes in the data trends and also whether the changes involved intercepts, slopes, or both incident to the implementation of CICA.

The research design selected was a case study involving all of the DOD prime contract awards made between fiscal years 1966 and 1987, inclusively. Award data pertaining to the dependent variables (competitive, noncompetitive, and follow-on awards) were stratified over the time period and related to each of the selected categories of goods and services (DOD Claimant Programs). For each year in the time period, the total volume of spending on prime contract awards and the total volume of procurement actions for each dependent variable were broken down

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For a thorough discussion of this issue see Donald T. Campbell and Julian C. Stanley, Experimental and Quasi-Experimental Designs For Research (Boston: Houghton Mifflin Company, 1963), pp. 37-43.

by the thirteen DOD Claimant Programs and then aggregated by major hard goods and non-major hard goods.

The coverage of CICA was explicit; implementation of the legislation was not phased-in, but fixed to an established date (April 1, 1985), after which all new solicitations and subsequent awards were governed by the law. Since April 1 separated the first and second halves of fiscal year 1985, the implementation of CICA in 1985, legally, affected only those solicitations and subsequent contract awards made in the last half of that fiscal year. Therefore, fiscal year 1985 data were omitted from the hypotheses tested in this study because these data do not reflect a full year of procurement activity either before or after the intervention of CICA. Each "sample unit" in the study consisted of one full fiscal year of award data. Data measurements by fiscal year were selected because all DOD contracts are recorded in the fiscal year in which they are awarded.

Awards in fiscal years 1986 and 1987, the first two full fiscal years of procurement activity after CICA, were compared to pre-CICA awards, fiscal years 1966 through 1984. Investigation of this time period, interrupted by the implementation of CICA (the independent variable), should reflect changes that may have occurred in the levels of competition (the dependent variables) since the implementation of CICA.

The results of the hypotheses tests were used to suggest what changes in the dependent variables have occurred, since the implementation of CICA. To add some perspective to the findings, information in the form of descriptive parameters was developed to illustrate the small business vs. large business contractors'

share of the awards for each category of the dependent variables. While no hypotheses were proposed or tested in this regard, disclosure of such descriptive data provided additional insight concerning competition in defense procurements.

The parameters used to describe the research population of prime contract awards reflected that population pursuant to the definitions used in this study. The definitions of the dependent variables were held constant over the period of the study, except that the change in the threshold for small purchases changed the actual size of the population relative to fiscal years 1983 and later. This point did not impact on the findings of this research. The data for all prime contract awards in each fiscal year were collected and grouped pursuant to the definitions used in this research. This procedure, which is described in more detail in the following section of this chapter, should enhance the reliability of the findings.

DATA COLLECTION PROCEDURE

Archival data pertaining to competition in defense procurement was obtained from the Office of the Secretary of Defense, Washington Headquarters Service, Directorate for Information Operations and Reports (DIOR). This activity serves as the repository for various types of DOD information, including procurement data.

An automated data base of the DOD procurement data is maintained by DIOR. This data base contains a detailed

description of every individual procurement transaction involving the DOD prime contracts awarded since 1965, excluding awards classified as small purchases. Every individual DOD prime contract award is recorded within this data base with specific detailed information pertaining to the form of competition surrounding each award. Award data are captured by dollar volume and procurement actions.

The DOD procurement data base maintained by DIOR is managed through the use of a Hewlett Packard Model 3000, Series 70 computer. It was possible to write a program that would sort data pertaining to each individual prime contract award made during the period of this study, according to the form of competition (the dependent variables) and categories of goods and services (DOD Claimant Programs). Therefore, to obtain the data needed for this study, a program was written in COBOL, with the aid of DIOR personnel, that extracted necessary data in a manageable and usable format for this research.

Two constraints dictate the period of time under study and the level of detail in the DOD contracts that could be reviewed. First, the automated data base for the collection of the DOD procurement information was initiated in fiscal year 1966. A complete automated record of procurement data needed for this research is not available prior to fiscal year 1966. Second, detailed procurement information is collected only for procurement actions considered to be above the small purchase threshold.

Prior to fiscal year 1983, the small purchase threshold was established as purchases under \$10,000. In fiscal year 1983, the

dollar threshold for the DOD was raised from under \$10,000 to under \$25,000. Data collected for small purchase awards are basically limited to dollar volume and number of procurement actions. Data are not collected pertaining to the DOD Claimant Programs or forms of competition when small purchases are involved. Since detailed procurement information is not collected for small purchases, this study was limited to those contracts above the small purchase thresholds.

Excluding the total dollar amount of annual small purchases from consideration has the effect of excluding about 8-9 percent of the DOD total annual procurement expenditures. The 8-9 percent is the average dollar volume that small purchases represent, in terms of the total annual prime contract awards made by the DOD during the period of this study. In no year since 1966 have small purchases accounted for more than 11.1 percent or less than 6.6 percent of the DOD total annual contract spending.⁷ In terms of procurement actions, however, small purchases account for nearly all procurement activity in any given year. During the period covered by this study, small purchase procurement actions have accounted for about 98 percent of all the DOD procurement actions.⁸

As mentioned, the research population for this study consisted of all the DOD prime contract awards made during the

⁷ These figures were compiled from DOD procurement statistics. Refer to Prime Contract Awards, Publication P03, Table 16, for applicable years.

⁸ Ibid.

period of investigation. A prime contract award, by definition (see glossary), excludes small purchases. Since the scope of this research dealt only with the DOD prime contracts, excluding small purchases from consideration did not impact the method of study or the findings.

Awards for Foreign Military Sales (FMS) and intragovernmental transactions were also excluded from the research population. These exclusions were necessary because such transactions are not candidates for competition in the conventional sense. Under the terms of FMS agreements, the foreign country (buyer) can dictate the source of supply (seller). In principle, the FMS customer is also spending his country's funds, and, therefore, U.S. appropriated funds and laws governing their expenditure are not strictly involved.

Intragovernmental transactions were excluded from consideration in this study, because awards in this category are actually being made to other federal agencies, rather than to the private sector. Examples of awards in this category would include orders under mandatory General Service Administration Federal Supply Schedules, as well as awards to the Government Printing Office, Federal Prison Industries, Veterans Administration, and others.⁹

Frequently, contracts must be modified after the original contract has been executed. Modifications (changes) become

⁹ For specific details concerning intragovernmental procurements see FAR Part 8 and DOD FAR Supplement Part 8. Also see DOD FAR Supplement 4.671-5(b)(13) for details concerning the recording of procurement award data related to intragovernmental transactions.

necessary for many reasons, however, such transactions are accomplished in the absence of competition.

By definition (see glossary), competitive awards result from the solicitation of bids or offers from two or more prospective contractors. Implicit in this definition are two key features not characteristic of modifications. First, competitive awards are original contracts. Second, competitive awards imply that two or more competing potential contractors have tendered offers or bids and the buyer (the DOD) has the opportunity to select the one that is most advantageous. Modifications are not original contracts, nor do they result from the buyer's evaluation of two or more competing offers. Modifications involve only one contractor, the incumbent, and therefore, they are actually noncompetitive awards (see glossary).

It should be noted that the DOD reports modifications as competitive, noncompetitive, or follow-on awards based on the nature of the original contract. For example, if an original contract resulted from a competitive solicitation, all subsequent modifications to that original contract would be classified as competitive awards. It is possible and common, using this procedure, to have both the dollar value and number of procurement actions reported for "competitive" modifications far exceeding that reported for the original competitive contract. This practice, of course, inflates the true level of competitive awards and understates the volume of actual noncompetitive awards reported by the DOD. Since modifications are clearly noncompetitive procurement actions, all modifications were treated as noncompetitive awards for purposes of this study.

In collecting data for use in this study, it was necessary to reduce the annual fiscal year totals (dollars and actions) for competitive and follow-on awards by the number of awards classified as modifications under each of these two categories. Once the modifications were removed from original competitive and follow-on awards, the total for all modifications (dollars and actions) was added to noncompetitive awards. This data manipulation kept the research population data consistent with the definitions of the dependent variables. It should be noted that failure to consider modifications in a study such as this would be to disregard approximately forty percent of the award dollars and twenty five percent of the procurement actions involved in the DOD acquisitions over the period covered by this research.

Table 13 illustrates the model that was used to collect and format the DOD contract award data, for purposes of this research. Data in the format illustrated was collected by fiscal year for each of the individual DOD Claimant Programs, and then combined into groupings of major hard goods or non-major hard goods, as defined earlier. Information was also collected pertaining to small business awards. This additional information, as mentioned earlier, allowed subsequent identification of the extent of competition, both in terms of goods and services and by size of the defense contractors.

Once the data for each dependent variable were collected for each fiscal year and then combined into groupings of major and non-major hard goods, they were tested as previously described.

Table 13

FORMAT FOR THE COLLECTION OF DOD CONTRACT AWARD DATA

DOD Prime Contract Award Data For Fiscal Year 19__

DOD Claimant Program No. "____"	Net Value Amount (\$000)	%	Percent to Small Business	Number of Procurement Actions	%	Percent to Small Business
TOTAL	XXX	100	XXX	XXX	100	XXX
less:						
FMS	xxx	xxx	xxx	xxx	xxx	xxx
Intragovt.	xxx	xxx	xxx	xxx	xxx	xxx
TOTAL less Exclusions	XXX	100	XXX	XXX	100	XXX
COMPETITIVE	XXX	XXX	XXX	XXX	XXX	XXX
less:						
Modifications	xxx	xxx	xxx	xxx	xxx	xxx
COMPETITIVE Sub TOTAL	XXX	XXX	XXX	XXX	XXX	XXX
FOLLOW-ON	XXX	XXX	XXX	XXX	XXX	XXX
less:						
Modifications	xxx	xxx	xxx	xxx	xxx	xxx
FOLLOW-ON Sub TOTAL	XXX	XXX	XXX	XXX	XXX	XXX
NON- COMPETITIVE	XXX	XXX	XXX	XXX	XXX	XXX
less:						
Modifications	xxx	xxx	xxx	xxx	xxx	xxx
add:						
Total Mods.	xxx	xxx	xxx	xxx	xxx	xxx
NON- COMPETITIVE Sub TOTAL	XXX	XXX	XXX	XXX	XXX	XXX

COLLECTION OF PROCUREMENT DATA IN THE DOD

To understand more fully the data collection procedures used in this research, it is helpful to understand how the DOD collects raw procurement data.

The collection of the DOD contract award data is accomplished through the use of two DOD report forms. The first one is a report called the "Individual Contracting Action Report," DD Form 350. This report is prepared for each contracting action obligating or deobligating more than \$25,000.¹⁰ Prior to the Fiscal Year 1983 DOD Authorization Act, which, among other things, raised the small purchase threshold for the DOD, the DD Form 350 was used to report contracting actions over \$10,000. The other report, called the "Monthly Contracting Summary of Actions \$25,000 or Less," DD Form 1057, is used to collect and report contracting actions that do not qualify for reporting via the DD Form 350. These smaller value awards are referred to as "small purchases." Since small purchases were not investigated in this study, only data reported on the DD Form 350 were considered.

Contract awards are reported by the contracting office responsible for the contract. The procuring contracting officer (PCO) responsible for the original contract award is also responsible for the entry of procurement data on the DD Form 350 into the Federal Procurement Data System (FPDS). After the

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See DOD FAR Supplement 4.671 for specific details concerning the preparation of the DD Form 350.

initial contract award, contract administration may be assigned to the Defense Contract Administration Service (DCAS). In this case, the administrative contracting officer (ACO) is responsible to provide the procuring contracting officer (PCO) with a DD Form 350 "Reporting Copy" for each subsequent contract action (modification) over \$25,000, initiated by the ACO. Once the original contracting office (PCO) receives the "Reporting Copies" the PCO will consolidate that information into its normal data reporting function. In short, the PCO is responsible for the entry of the procurement data into the Federal Procurement Data System (FPDS).

At specified intervals, every DOD contract office forwards DD Form 350 and DD Form 1057 information to their respective Service headquarters. The Navy is the only DOD activity that has fully automated its procurement data collection function. This data automation begins at the individual contracting offices and flows to the central Navy collection office, in the Washington, D.C., area. The Army, the Air Force, and the Defense Logistics Agency (DLA) operate under partially automated systems. Regardless of the mode of transmittal of DD Form 350 and DD Form 1057 information (hard copy or automated terminals), the same basic information is submitted by each contracting office to its Service headquarters.

Each month, the Service headquarters consolidate their respective information and transmit their procurement data on magnetic tapes to the Directorate for Information Operations and Reports (DIOR), Washington Headquarters Service, Office of the

Secretary of Defense. As mentioned earlier, DIOR was the source of data used in this study.

Within DIOR, data from all DOD contracting activities are then consolidated and converted into Standard Form 279 and Standard Form 281 formats, for subsequent submission to the Federal Procurement Data Center (FPDC), an activity of GSA. The transmittal of the data is accomplished by way of magnetic tapes. On a quarterly basis, all federal agencies, including DIOR, report procurement data to the FPDC. The FPDC, acting as the focal point in the Federal Procurement Data System (FPDS), edits data it receives and maintains records of data for subsequent use by Congress, the Small Business Administration, or other activities. The FPDC also prepares and publishes periodic, mostly quarterly, collections of federal procurement data. These collections of federal procurement data are available to the public and can be found in many libraries. The media will often rely upon the FPDC for statistical procurement information.

The DOD procurement information, which is edited and consolidated by DIOR, is also submitted to the Defense Technical Information Center (DTIC), located at Cameron Station, Alexandria, Virginia. DTIC makes this information, as well as a myriad of other DOD information, available to authorized users. Generally, the DTIC authorized users include federal government activities and their contractors. DTIC also submits its DOD procurement information to the National Technical Information Service (NTIS). NTIS, in turn, makes this information available to the general public.

Over the period that encompasses this study, the DD Form 350 has undergone several revisions. Copies of the eight different versions of this form used between 1966 and 1987 are included in Appendix 2 and are numbered from one to eight, beginning with the oldest version.

On the first six versions of the DD Form 350, numbered 2-1 through 2-6, in Appendix 2, Item 15 "Contract Placement" and Item 18 "Extent of Competition in Negotiation" were used to collect information about competition. Item 15 captured information concerning formally advertised contracts via codes 2 and 3. Item 18 captured information on all other forms of competition. Except for slight word changes, the first six versions of the form were the same, in terms of reporting information about competition. However, the version identified as 2-6 in Appendix 2, which became effective in fiscal year 1981, incorporated two additional elements in Item 18: 6-Catalog or Market Prices and 7-Not Applicable. Prior to fiscal year 1981, the preponderance of award data pertaining to these two new elements was reported as "5-Other Non-competitive".

The most recent versions of the DD Form 350, identified as 2-7 and 2-8, reflect major restructuring of the forms. These revisions were necessitated because of the implementation of CICA. The specific blocks of information on these forms that are of concern for this study are the ones that replaced Item 15 and Item 18 on the previous forms. On the new forms, these blocks are C3 "Method of Contracting" and C5 "Extent of Competition." The elements of competition on these new forms are the same, but there was a slight change in instructions for their preparation.

Table 14 illustrates the volume of contract actions that have been processed and reported annually by the DOD. Each of these contract actions resulted in the generation of either a DD Form 350 or a recorded entry on a DD Form 1057. Since the DD Form 1057 is a monthly report, several contract actions can be consolidated on one report. The DD Form 350, on the other hand, is prepared for each individual contract action that exceeds the small purchase threshold.

Table 14

DOD CONTRACT ACTIONS
(in thousands)

FISCAL YEAR	1960	1965	1970	1975	1980	1985
NUMBER of ACTIONS	7,061	13,322	9,774	10,175	12,072	12,319

SOURCE: These figures were compiled from DOD procurement statistics. Refer to Department of Defense, Washington Headquarters Service, Prime Contract Awards, Publication P03, Table 16, for applicable years, (Washington, D.C.: Government Printing Office).

The vast majority of the contract actions illustrated in Table 14 involve small dollar amounts, and were reported via DD Form 1057s. During the period shown in Table 14 the volume of contract actions qualifying for reporting via the DD Form 350 (awards greater than \$25,000 or \$10,000 prior to fiscal year 1983) ranged from a high of 2.9 percent (FY 1982) to a low of 1.2

percent (FY 1964).¹¹ About 98 percent of all contract actions are excluded from reporting via the DD Form 350 because of the small dollar volume of the individual transaction.

While most of the individual contract actions do not involve reporting via the DD Form 350, the vast majority of the dollars spent are reported via this form. This is because most of the total contract dollars awarded by the DOD each year are spent on contracts of large dollar amounts. Table 15 will help to illustrate this point.

Table 15

AWARDS GREATER THAN \$25,000 (\$10,000 prior to FY 1983)
(as a percentage of total dollar awards)

FISCAL YEAR	1960	1965	1970	1975	1980	1985
PERCENT OF TOTAL AWARDS	92.8	88.7	90.0	89.0	91.3	92.3

SOURCE: These figures were compiled from DOD procurement statistics. Refer to Department of Defense, Washington Headquarters Service, Prime Contract Awards, Publication P03, Table 16, for applicable years, (Washington, D.C.: Government Printing Office).

Thus, most of the contract actions are reported via the DD Form 1057, while most of the contract dollars are reported via the DD Form 350. This distinction is important because the major emphasis within the DOD and Congress seems to focus on the volume

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These figures were compiled from DOD procurement statistics. Refer to Prime Contract Awards, Publication P03, Table 16, for applicable years, (Washington, D.C.: Government Printing Office).

of spending (dollar awards) rather than on the volume of procurement actions. On the other hand, when the concern is competition, it may be more revealing to consider procurement actions, since each procurement action could indicate another individual competitive, noncompetitive, or follow-on award. For these reasons, this research investigated both dollar awards and procurement actions.

The only study identified that provided empirical evidence suggesting the accuracy of the DOD procurement data reporting system was conducted by Don Sowle Associates, Inc., in 1980. This study, which investigated fiscal year 1979 awards, identified errors in the coding of the forms of competition in 19 percent of the actions in the 378 sample cases examined.¹² The majority of these miscodings concerned the assignment of noncompetitive codes where awards were actually follow-on awards or price competitive awards.¹³ In the case of miscodings involving price competitive awards, the study found that most miscodings involved situations where offers were solicited from at least two prospective firms, and yet, only one subsequent offer was received; hence, the action was coded as noncompetitive.¹⁴

The small size of the sample in the aforementioned study and the fact that many of the miscodings were subjective calls that

¹² Enhancement of Competition in the Department of Defense (Arlington, VA: Don Sowle Associates, Inc., [May 1980]), p. 74.

¹³ Ibid., pp. 74-78.

¹⁴ Ibid., p. 78.

could be justified based on differences of interpretation make generalizations from this study questionable. On the other hand, it would surely be naive to assume that the millions of procurement actions processed are without error. One way to rationalize the presence or absence of coding errors in the DOD procurement reporting system is to recognize that there is no other source of data to corroborate or refute the findings; the DOD is the "sole source" for original historical data pertaining to defense contract awards.

DATA ANALYSIS PROCEDURE

Once the data were collected, a full array of descriptive parameters were developed to highlight important aspects of the data. Parameters such as population means, medians, ranges, and standard deviations were calculated for each of the dependent variables by award dollars and procurement actions across each DOD Claimant Program. Similar descriptive parameters were developed for the more aggregated data representing those awards grouped by major hard goods and non-major hard goods.

As previously mentioned, the null hypotheses of this study were tested against a .01 level of statistical significance by employing the t-Test statistical technique. An F-Test was used first, however, to test the hypothesis that the two population variances (pre- and post-CICA) were equal for each respective comparison of dependent variables. The observed significance level for the F-Tests was used to determine the subsequent t-Test

format, i.e., separate-variance or pooled-variance t-Tests. If the observed significance level of an F-Test was greater than a value of .05 it was interpreted as indicating that the two population variances were equal and that the pooled-variance t-Test should subsequently be used. In the case of an observed significance level of the F-Test at .05 or less, the hypothesis of equal population variance were rejected and the subsequent separate-variance t-Test format was used.

Once the individual hypotheses were tested, the data concerning the levels of competition for individual categories of goods and services (DOD Claimant Programs) was reviewed to investigate specific commodities that seem most influenced by CICA. No attempt was made in this research to formulate and test hypotheses concerning the levels of competition for the thirteen individual DOD Claimant Programs that were divided to form the categories of major hard goods and non-major hard goods. Such an endeavor would perhaps be worthy of future research. On the other hand, the data collected for this research did allow at least a broad indication of competition at the individual DOD Claimant Program level. Therefore, the data was reviewed to help shed some light on the individual commodities that were influential in the changes that were observed in the more aggregate categories of major hard goods and non-major hard goods.

In addition to descriptive parameters, t-Tests were also performed to measure possible pre - post CICA changes in the dependent variables as they relate to each of the individual DOD Claimant Programs. Similarly, descriptive parameters and t-Test

results are provided to help illustrate pre - post CICA changes in the dependent variables as they relate to small business awards for major and non-major hard goods.

SUMMARY

The objective of this study was to determine if there have been changes in the volume of competitive, noncompetitive, and follow-on prime contract awards made by the DOD, as measured by the percentage of award dollars and procurement actions for major hard goods and non-major hard goods, since the implementation of CICA.

The implementation of CICA, which became effective on April 1, 1985, was the independent variable. The dependent variables were the percentage levels (dollars and actions) of competitive, noncompetitive, and follow-on DOD prime contract awards for major hard goods and non-major hard goods.

The null hypotheses were formulated to allow statistical testing of the premise that there have been no changes in the dependent variables since the implementation of CICA. The research population was treated as if it were two randomly selected independent samples. This procedure allowed subsequent testing of the null hypotheses via independent t-Tests for the equality of the pre- and post-CICA means. Two-tailed tests of significance, with a .01 significance level established as the decision rule, were utilized in the hypotheses tests.

The methodological approach developed for this research should provide findings that indicate if changes in the dependent variables have occurred since the implementation of CICA. The results of this research should also provide an indication of what commodities (DOD Claimant Programs) are related most to any observed changes in the levels of competitive, noncompetitive, and follow-on DOD prime contract awards.

CHAPTER V

DATA ANALYSIS AND INTERPRETATION

INTRODUCTION

This chapter is presented in several parts. Following this introduction and a short precautionary note, there is an overview of the population data base investigated in this research. The importance of modifications as a proportion of total awards is then discussed. Next, there is a discussion of the results of the statistical tests for differences between the pre- and post-CICA awards. The chapter is concluded with a summary.

Due to the volume of data associated with this research, several appendices are used to summarize these data. Throughout this chapter reference is made to these appendices and the reader is invited to review them for more detailed information.

PRECAUTIONARY NOTE

Three important caveats are identified and should be considered when one examines the results of this research. The first is the short period of time that has elapsed since the implementation of CICA and this investigation. It should be recognized that due to this limitation, the true long term influence of CICA may not be completely or accurately represented by the findings from this research. While this shortcoming and the effect of history itself may be sources of possible rival

explanations for features disclosed by the data, the reader should consider any rival explanations in light of their plausibility compared to explanations offered as a result of this study.

The second caveat concerns the aggregate analysis of procurement data in this study. Because this research focuses on aggregate data there is the potential of making spurious inferences about individual procurements. Such ecological fallacies are not only misleading but also unsupportable from the findings in this study. While the results of the aggregate analyses in this research may provide an accurate overview of the efficacy of CICA, the influence of this legislation on any individual contract award may not be represented by this study.

Finally, it is likely that more attention has been focused on the issue of competition in defense procurements since the implementation of CICA and that more care has been taken to properly and completely code the information on individual DD Form 350's. It is also likely that in post-CICA awards more individual procurements were coded as competitive vs. noncompetitive in those instances where a determination of the extent of competition was in question. One would also expect a higher likelihood in post-CICA that some procurements were solicited and subsequently awarded under the guise of competitive procurements, when, in fact, such awards were known to be noncompetitive or sole source before they were ever solicited. This type of situation becomes even more likely as individual buying commands/activities are given established goals concerning the percentage of competitive awards they are expected to

achieve; a common practice in the post-CICA period. In each of the situations described, and perhaps several others, the issue of reactivity in post-CICA awards exists as a possible internal threat to the validity of the findings in this research.

AN OVERVIEW OF THE POPULATION DATA BASE

During the period of fiscal years 1966-1987, inclusively, the DOD awarded \$1,442,505,716 in prime contract awards. This volume of spending involved 4,940,784 individual procurement actions. This aggregate volume of procurement activity constitutes the population data base for this research.

The data for each fiscal year were collected pursuant to the format outlined in Table 13, which was described in the previous chapter. These fiscal year data were then broken down by DOD Claimant Programs and grouped into categories of major hard goods or non-major hard goods, as previously outlined in Table 12. The respective percentages, by fiscal years, of competitive, noncompetitive, and follow-on awards for major and non-major hard goods were then calculated.

Appendix 3 provides a detailed compilation of the aggregate award data by fiscal years. The data in Appendix 3 are broken down in each fiscal year by dollar awards and procurement actions for both major hard goods and non-major hard goods. In addition, each of these categories are further broken down by their respective percentages of competitive, noncompetitive, and follow-on awards. The summary of award data presented in Appendix 3 is an overview of the population of the DOD prime

contract awards investigated in this study.

Appendix 4 provides data in a similar format to that of Appendix 3, except that Appendix 4 data apply only to awards made to small businesses.

A review of Appendix 3 and 4 illustrates how, in the aggregate, both dollar awards and the number of procurement actions have increased over the fiscal year period 1966-1987. The increase in dollar awards was largely due to inflation (dollar figures shown in this study are not adjusted for inflation). Inflation has also had an indirect influence on the trend in procurement actions, since the number of such actions are tied to the small purchase thresholds established at any give time. For example, from 1966 through 1982 the small purchase threshold was established at awards of \$10,000 or less. As inflation continued to erode the value of the dollar over this period and prices for goods and services increased, more and more contracts fell outside the small purchase arena and into the category of prime contract awards considered in this study. The summary of procurement actions in both Appendix 3 and 4 illustrate this point.

Thus, the growth in the level of the DOD procurement activity over the period of this study is suggested by the increasing trend in the volume of dollar awards and procurement actions, however, the actual growth levels experienced may not be accurately represented due to the effect of inflation on the aggregate data. Since the primary analyses in this study are based upon the annual percentages of awards measured in dollars

and procurement actions, rather than raw figures of dollar awards or procurement actions, the effect of inflation is mitigated.

Figures 2 through 7 on the following pages illustrate the overall trends of competitive, noncompetitive, and follow-on awards for dollars and procurement actions over the full period of this research. The number above each trend line represents the respective mean percentage over the entire period, i.e., 1966-1987. The numbers appearing below the trend line represent the respective mean percentages for pre- and post-CICA awards, i.e., 1966-1984 (pre-CICA) and 1986-1987 (post-CICA). The number appearing below the "CICA intervention line" on each figure represents the observed significance level that resulted from a t-Test of differences between the pre- and post-CICA means. It should be noted that these illustrations depict aggregate groupings of awards and not awards grouped by major hard goods and non-major hard goods. Illustrations and discussions of the data grouped by major and non-major hard goods will be presented later in this chapter. The data in the following figures were compiled pursuant to the definitions for competitive, noncompetitive, and follow-on awards, as discussed in the previous chapter and defined in the glossary.

Figure 2

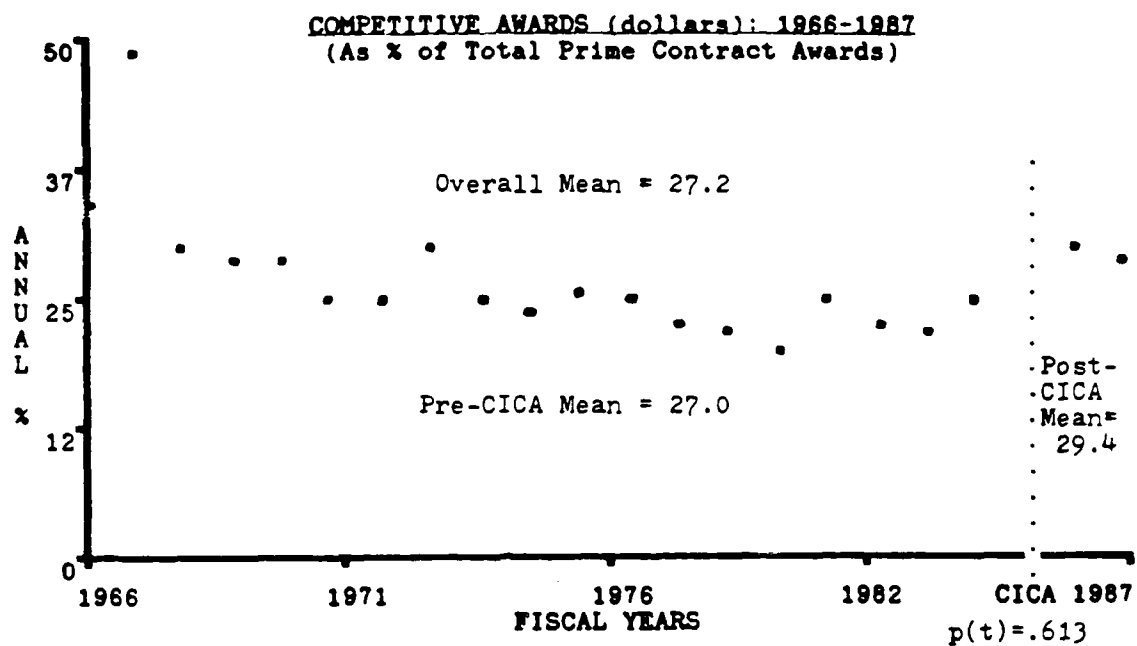


Figure 3

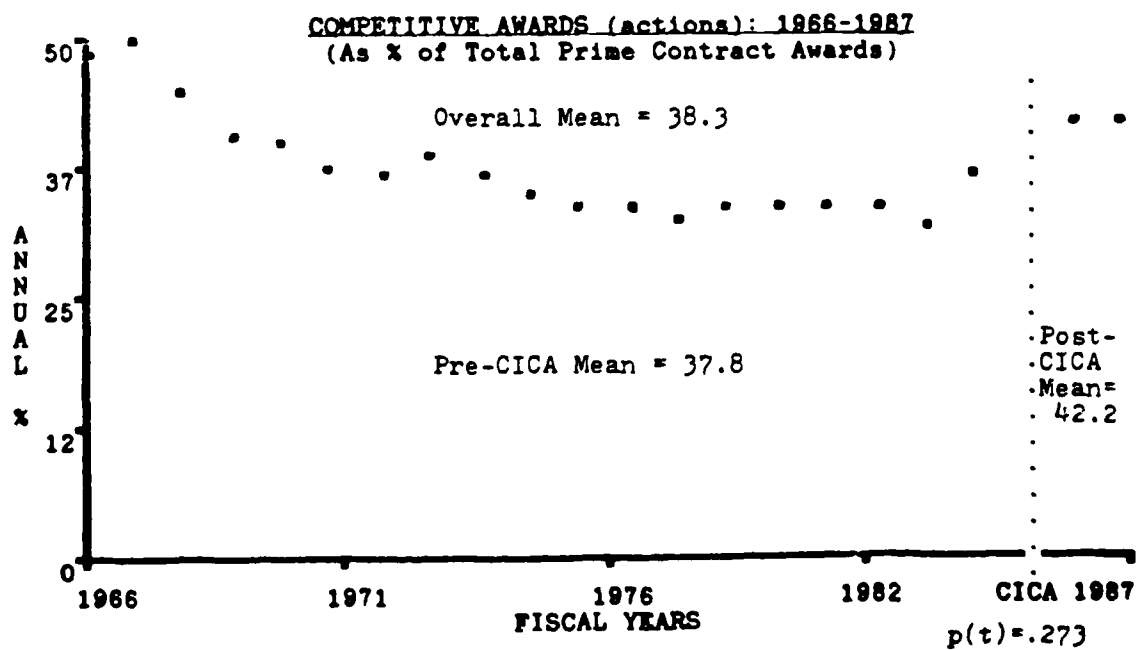


Figure 4

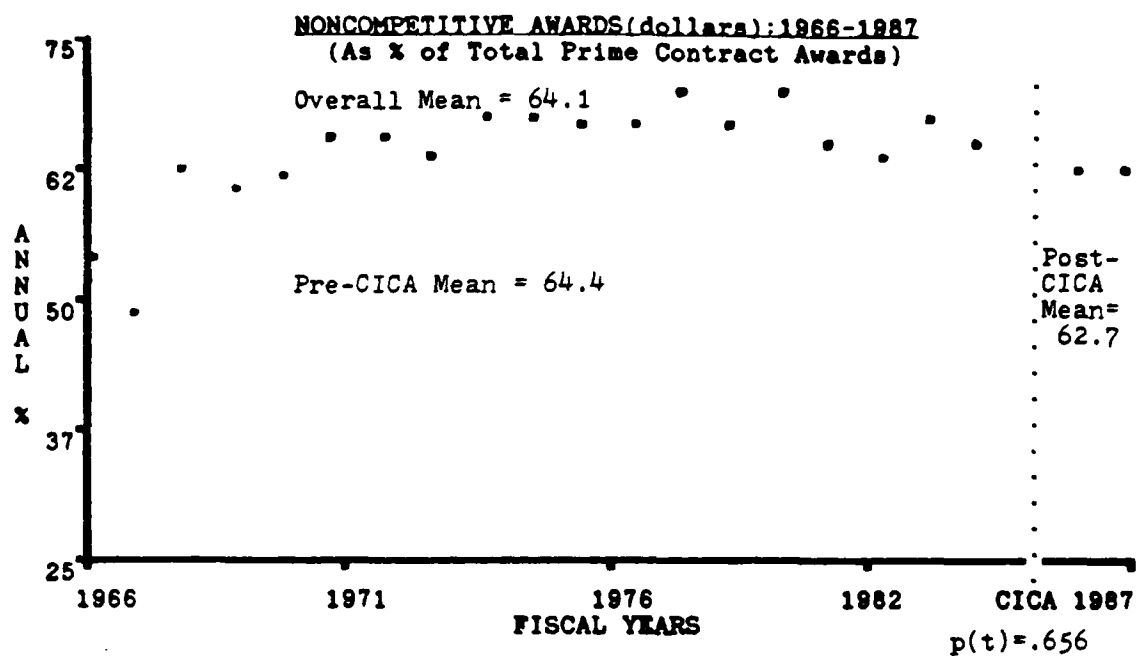


Figure 5

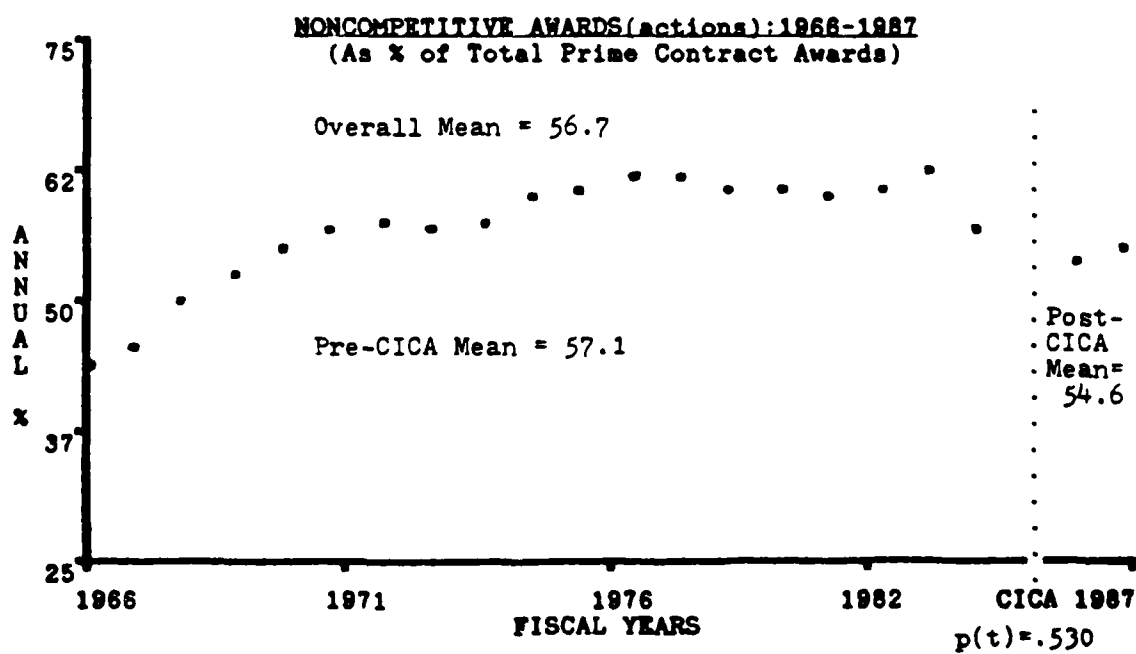


Figure 6

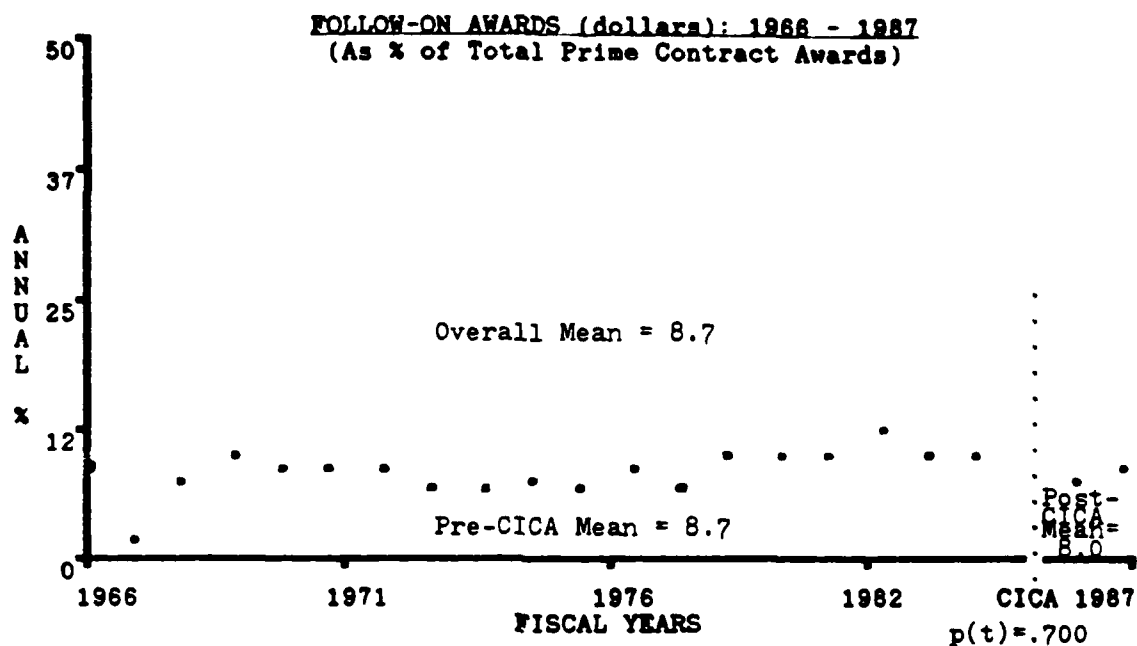
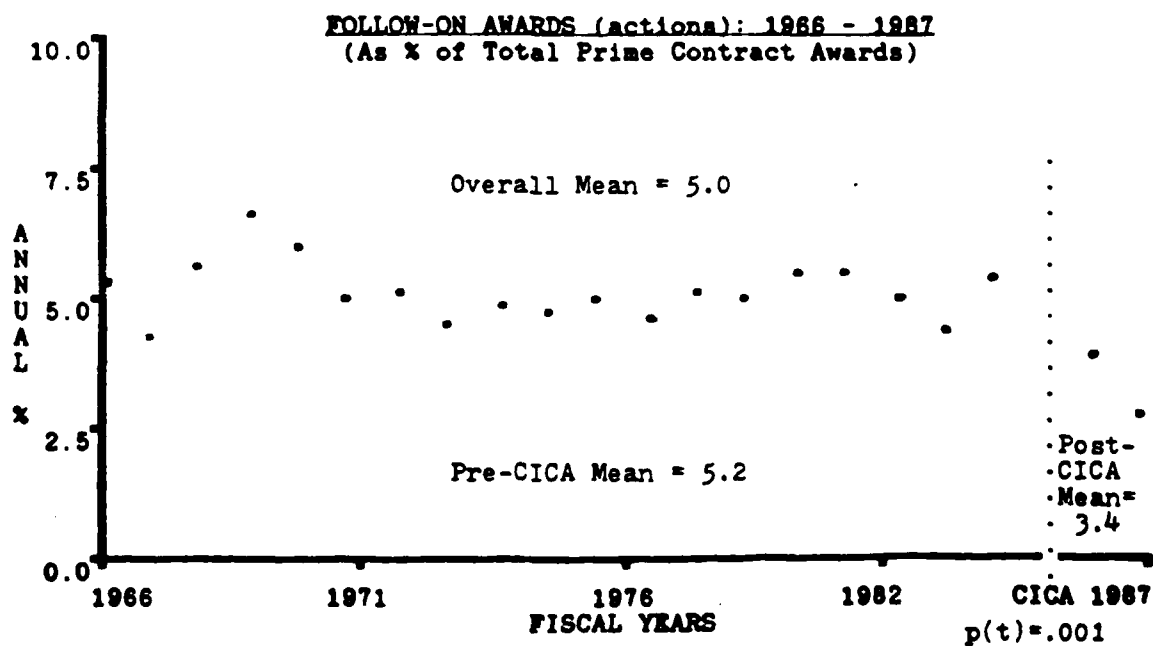


Figure 7



As shown in the foregoing illustrations, procurement actions reflect a higher mean percentage of competitive awards than dollars and dollars reflect a higher mean percentage of noncompetitive awards than procurement actions. As will be shown later, this same relationship holds for awards of major hard goods but it is reversed for awards of non-major hard goods.

Figures 2 and 3 illustrate that the trend in aggregate competitive awards for both dollars and actions began to increase in fiscal year 1984. Similarly, aggregate noncompetitive dollar awards and procurement actions began a downward trend at the same time, as depicted in Figures 4 and 5. The trend in aggregate follow-on dollar awards (Figure 6) appears rather constant over the past ten years, however, aggregate follow-on procurement actions (Figure 7) began to decline sharply in post-CICA years. A review of Appendix 3 will provide specific data for each fiscal year.

The information in the foregoing figures provides a clear indication of the magnitude (share) of competitive, noncompetitive, and follow-on awards in terms of their respective influence in defense procurements. The dominance of noncompetitive awards is unmistakable. Keep in mind, however, that all modifications are included in the definition of noncompetitive awards. The individual influence of modifications will be discussed later in this chapter.

With the exception of procurement actions for follow-on awards (Figure 7), the changes in pre- and post-CICA means, as measured by observed significance levels, were not particularly

noteworthy in any of the foregoing aggregate comparisons. This situation, as will be shown in subsequent parts of this chapter, changes markedly as the aggregate data are broken down.

The relative importance of major hard goods and non-major hard goods, in terms of their respective shares of award dollars and procurement actions, is illustrated on the following pages in Figures 8 through 11. The format and descriptive information contained in these illustrations is presented in a similar fashion to that described in the foregoing illustrations. "CICA intervention lines" are included merely for points of reference, as are observed significance levels for differences between pre- and post-CICA means. CICA was not intended to influence the mix of major vs. non-major hard goods and the rather low observed significance level for dollar awards for these two groups is due to a trend that originated in 1982, well before the implementation of CICA.

It should be noted when reviewing the following illustrations that dollar awards and procurement actions for major hard goods will show an inverse relationship to similar award data for non-major hard goods. This is true because each respective grouping is shown as a percent of total prime contract awards. Thus, for example, as dollar awards for major hard goods increase there would be a corresponding decrease in dollar awards for non-major hard goods, and vice versa. Illustrations presented later in this chapter will not have this same form of inverse relationship because they will be based on either total awards for major hard goods or total awards for non-major hard goods.

Figure 8

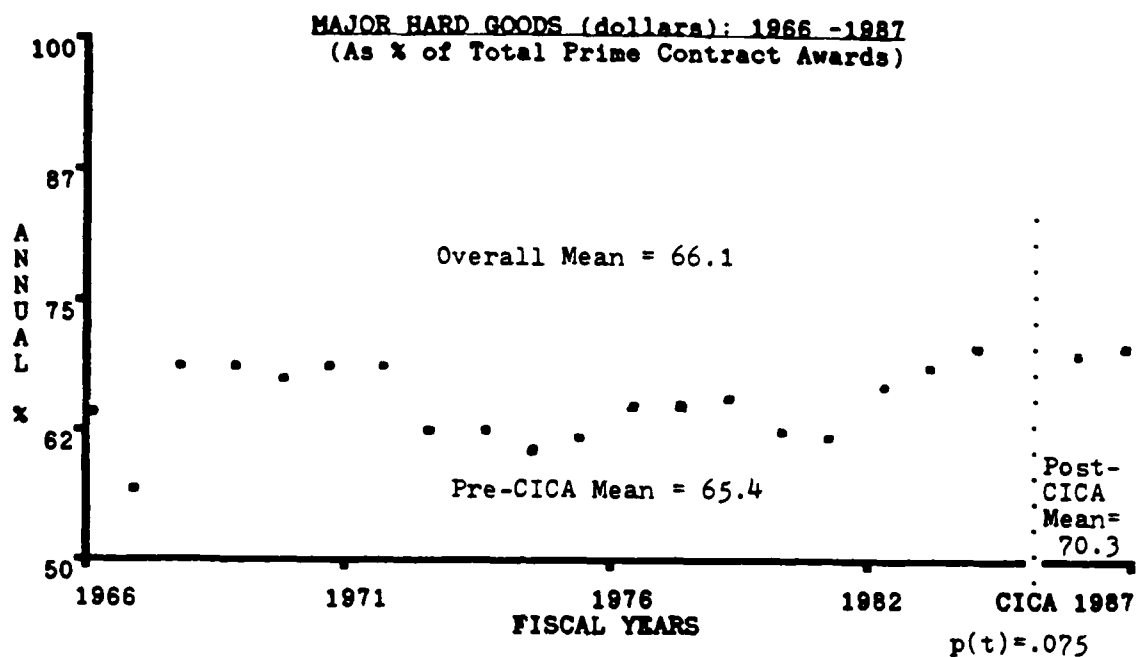


Figure 9

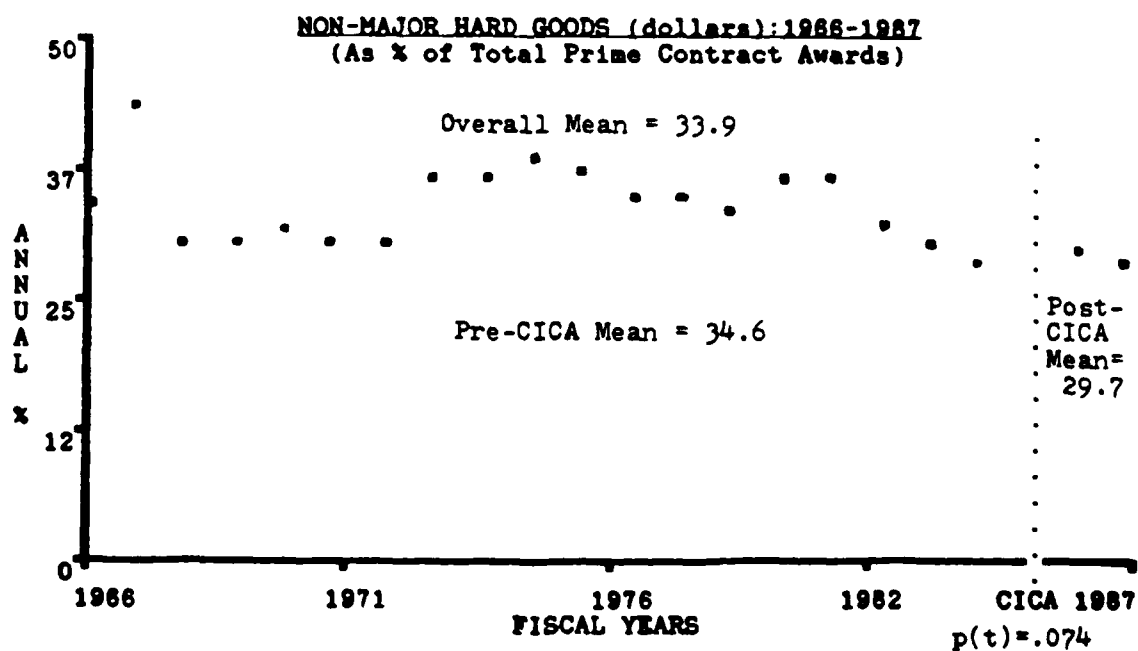


Figure 10

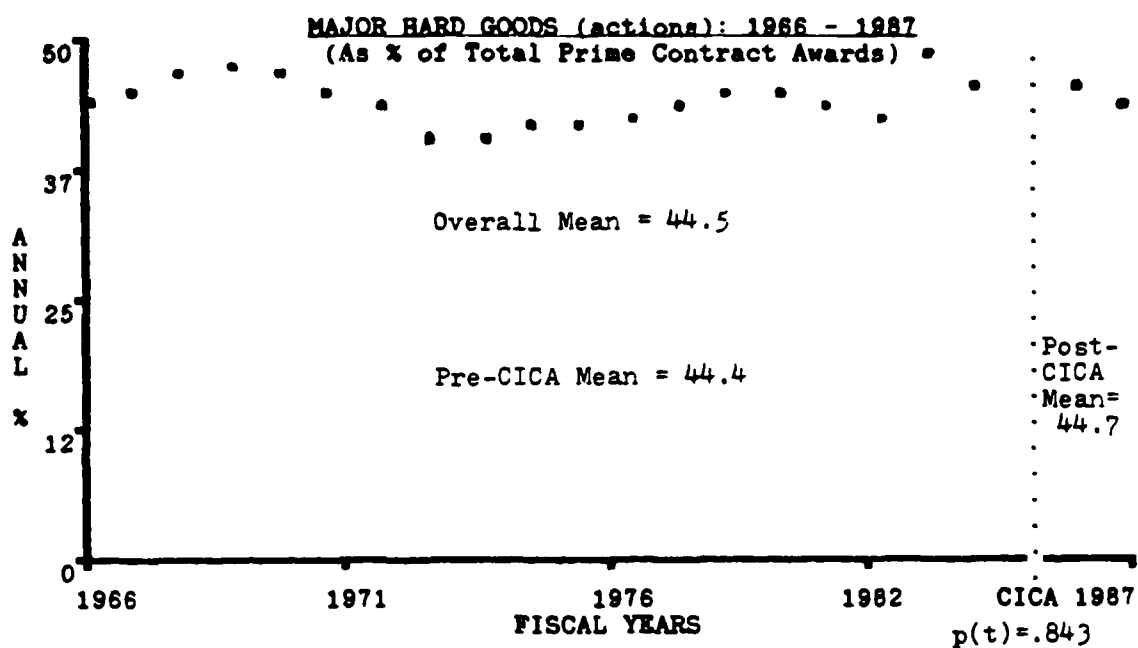
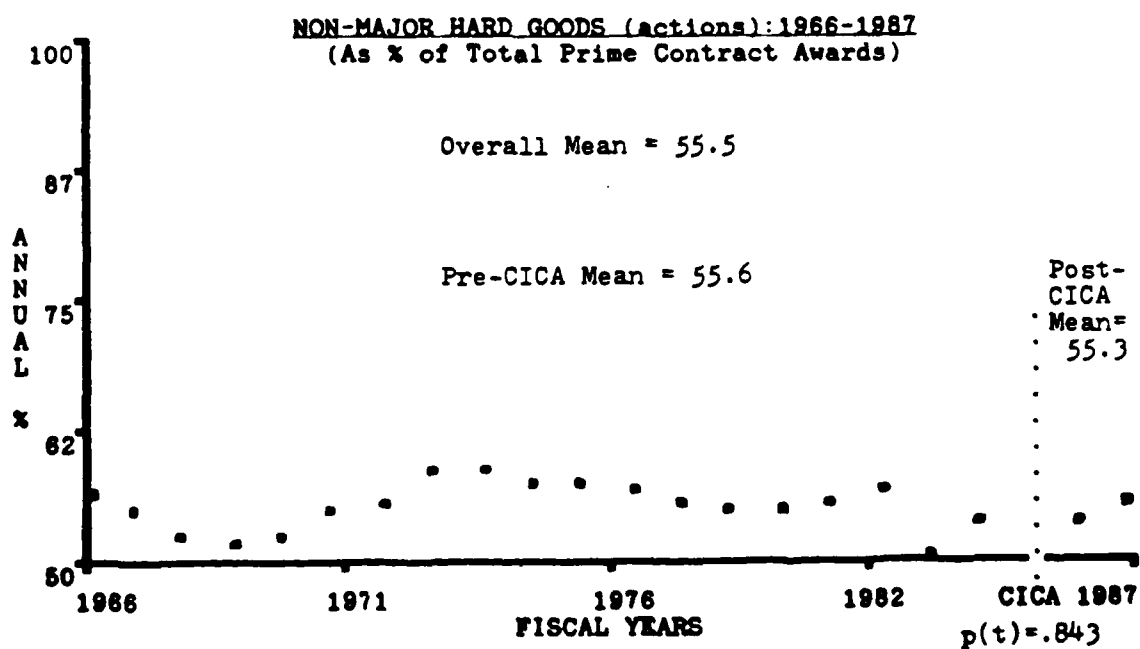


Figure 11



Clearly, dollar awards for major hard goods dominate in defense procurement. Figure 8 illustrates this point. The trend in dollar awards for major hard goods began to increase sharply in fiscal year 1982 and remained at an average of about 70 percent during the rest of the period under study. It is likely that this increase in dollar awards for major hard goods is correlated to the defense build-up under the Reagan Administration.

The proportion of procurement actions for non-major hard goods is larger than that of major hard goods, i.e., 55.5 percent vs. 44.4 percent respectively. In terms of award dollars, this relationship is reversed, i.e., 33.9 percent for non-major hard goods vs. 66.1 percent for major hard goods. This confirms, as one might expect, that awards for major hard goods are, on the average, of greater dollar value than awards for non-major hard goods.

While the trends in dollar awards have vacillated over the period, the proportion of procurement actions for major vs. non-major hard goods has been more constant. These differences in dispersion between dollar awards and procurement actions for major hard goods and non-major hard goods are summarized in Table 16, which appears on the following page. Again, the data in Table 16 represent awards over the full period of this study.

Table 16

COMPARISON OF MEASURES OF DISPERSION
FOR
DOLLAR AWARDS AND PROCUREMENT ACTIONS
(Based of %'s of Total Prime Contract Awards 1966-1987)

DESCRIPTIVE PARAMETER	DOLLAR AWARDS		PROCUREMENT ACTIONS	
	MAJOR	NON-MAJOR	MAJOR	NON-MAJOR

<u>PROPORTION OF ALL AWARDS</u>				
Mean	66.1	33.9	44.5	55.5
Range	15.7	15.7	8.1	8.1
Low	56.5	27.8	40.7	51.2
High	72.2	43.5	48.8	59.3
Std. Dev.	3.889	3.857	2.087	2.087

It is worth noting that as the proportion of dollar awards have vacillated over the period, the respective change in the proportions of procurement actions have been less pronounced. This comparative stability seems to suggest that changes in procurement actions, rather than dollar awards, might be the better indicator of changes in the levels of competitive, noncompetitive, and follow-on awards.

The small business sector of our economy has a much less significant role in defense procurements when compared to prime contract awards received by large business. There is also less variability in the aggregate numbers of dollar awards and procurement actions associated with small business awards. These points are illustrated in Table 17. Note that these data reflect only prime contract awards. At the subcontract level the small business sector has a far greater share of defense work than at the prime contract level.

Table 17
COMPARISON OF MEASURES OF DISPERSION
FOR
CONTRACT AWARDS TO SMALL BUSINESS
(Based of %'s of Total Prime Contract Awards 1966-1987)

DESCRIPTIVE PARAMETER	DOLLAR AWARDS		PROCUREMENT ACTIONS	
	MAJOR	NON-MAJOR	MAJOR	NON-MAJOR
<u>PROPORTION OF ALL AWARDS</u>				
Mean	4.6	11.0	10.7	23.9
Range	5.9	9.3	5.3	4.0
Low	3.0	9.1	8.3	22.0
High	8.9	18.4	13.6	26.0
Std. Dev.	1.131	1.880	1.496	1.096

Clearly, dollar awards to small business pale in comparison to awards received by large defense contractors. During the period of this study small business contractors received an average of 15.6 percent of the prime contract award dollars (major plus non-major hard good awards). The other 84.4 percent of the dollars went to large businesses. In Table 10, which appeared in Chapter III, it was shown that over the past four decades small business awards have accounted for about 19 percent of the total dollars spent for defense contracts. The difference between the two figures mentioned above (15.6% and 19%) is attributable to small purchase awards being included in the 19 percent figure and excluded in the 15.6 percent figure.

Perhaps the most interesting point to note from Table 17 is the stability in the means of the awards related to small business compared to the respective mean data for all prime contract awards shown in Table 16. While the standard deviation

for aggregate dollar awards in Table 16 was about 3.8, the comparative figure for dollar awards to small business was about 1.5. Similarly, the standard deviation for aggregate procurement actions in Table 16 was about 2.1 compared to a standard deviation of about 1.3 for procurement actions associated with awards to small business. This lack of variability in award data for small business, as compared to award data overall, seems to suggest that procurement programs and policies, economic and political conditions, and the myriad of other factors that have influenced defense procurements over the years have had less of an influence on small business defense contractors than on the large business defense contractors.

Appendix 5 contains a three part compilation of descriptive parameters relating to the population of award data (1966-1987). The first part is a summary of the aggregate prime contract awards. The second part outlines descriptive parameters for prime contract awards broken down by major hard goods and non-major hard goods. The final part is a summary of descriptive parameters for awards made to small businesses.

The format in each part of Appendix 5 provides a breakdown of award data by dollars and procurement actions for competitive, noncompetitive, and follow-on awards. In addition, each of these dependent variables is further broken down to show them with and without the modifications associated with each form of award. Separate data for the total of all modifications and the total noncompetitive awards, which include all modifications, are also provided.

The overall mean values of the population data (1966-1987)

are summarized in the following tables. Table 18 is a summary of overall mean values for awards broken down by major and non-major hard goods. Table 19, which appears on the next page, is a breakdown of the data related to awards made to small businesses.

Table 18

SUMMARY OF MEANS
FOR MAJOR AND NON-MAJOR HARD GOODS: 1966 - 1987
(All figures are percentages)

VARIABLE	MEAN VALUES			
	DOLLAR MAJOR	AWARDS NON-MAJOR	PROCUREMENT MAJOR	ACTIONS NON-MAJOR
COMPETITIVE (with modifications)	30.9	65.9	35.0	59.8
COMPETITIVE (modifications only)	16.6	13.3	10.6	10.4
COMPETITIVE (w/o modifications)	14.3	52.6	24.4	49.4
NONCOMPETITIVE (with modifications)	41.0	31.9	47.7	38.2
NONCOMPETITIVE (modifications only)	18.6	7.6	15.6	6.8
NONCOMPETITIVE (w/o modifications)	22.4	24.3	32.1	31.4
FOLLOW-ON (with modifications)	28.1	2.2	17.3	1.9
FOLLOW-ON (modifications only)	15.4	1.4	7.2	1.0
FOLLOW-ON (w/o modifications)	12.7	0.8	10.1	0.9
<u>TOTAL MODIFICATIONS</u>	50.6	22.3	33.4	18.2
<u>TOTAL NONCOMPETITIVE (w/ all modifications)</u>	73.0	46.6	65.5	49.7

Table 19
 SUMMARY OF MEANS
 FOR AWARDS MADE TO SMALL BUSINESS: 1966 - 1987
 (All figures are percentages)

VARIABLE	DOLLAR MAJOR	MEAN AWARDS NON-MAJOR	VALUES PROCUREMENT ACTIONS	
			MAJOR	NON-MAJOR
<u>COMPETITIVE</u> <u>(with modifications)</u>	66.3	84.5	67.5	81.9
<u>COMPETITIVE</u> <u>(modifications only)</u>	14.5	13.4	13.5	12.8
<u>COMPETITIVE</u> <u>(w/o modifications)</u>	51.8	71.1	54.0	69.1
<u>NONCOMPETITIVE</u> <u>(with modifications)</u>	28.6	14.8	27.7	17.3
<u>NONCOMPETITIVE</u> <u>(modifications only)</u>	8.8	3.9	7.2	4.0
<u>NONCOMPETITIVE</u> <u>(w/o modifications)</u>	20.0	10.9	20.6	13.2
<u>FOLLOW-ON</u> <u>(with modifications)</u>	5.0	0.6	4.8	0.8
<u>FOLLOW-ON</u> <u>(modifications only)</u>	2.2	0.4	1.6	0.4
<u>FOLLOW-ON</u> <u>(w/o modifications)</u>	2.7	0.3	3.2	0.4
<u>TOTAL MODIFICATIONS</u>	25.5	17.6	22.3	17.3
<u>TOTAL NONCOMPETITIVE</u> <u>(w/ all modifications)</u>	45.5	28.6	42.8	30.4

**Note: Figures may not add correctly due to rounding.

When comparing the mean values of aggregate awards for major and non-major hard goods (Table 18) and similar awards made to small business (Table 19), the small business group of awards reflects a far greater proportion of competitive awards and a much smaller proportion of noncompetitive awards. From these tables it can also be seen how much more significant follow-on dollar awards for major hard goods are in the aggregate data compared to the small business data. The small business group of awards also reflects a lower proportion of modifications. These observations are probably in line with what most people familiar with defense procurement would expect without having seen the data.

It is interesting to note from Tables 19 that modifications to original competitive awards (Competitive [modifications only]) made to small businesses are at about the same mean percentage as similar modifications in the more aggregate data in Table 18. This finding is interesting because the percentage of original competitive awards (Competitive [w/o modifications]) in the more aggregate data is considerably less, especially dollars, than in the small business data. This indicates that original competitive awards to large defense contractors are being modified to a far greater extent than original competitive awards to the small business contractors.

In the next section of this chapter the influence of modifications on the award data will be described. An understanding of how modifications have influenced the post-CICA data is important to the understanding of the subsequent tests for differences between pre- and post-CICA awards.

THE IMPORTANCE OF MODIFICATIONS

The distinction between original contracts and subsequent modifications to those original contracts is important in the context of this research. Recall that for purposes of this research the definition of noncompetitive awards included all modifications, even when such modifications involved contracts that were originally competitive or follow-on awards. Since modifications have constituted an average of 41.0 percent of the award dollars and 24.9 percent of the procurement actions annually over the 22 years investigated in this research, the handling of such awards could influence the outcome of any subsequent findings. For this reason, the data in Appendix 5, as well as data in Appendices 6 through 8 (to be discussed later), are provided with modifications shown separately and also combined with total noncompetitive awards. This approach will allow the reader to assess the influence of modifications in any subsequent discussions of competitive, noncompetitive, and follow-on awards.

Table 20 below provides a summary of the mean values for competitive, noncompetitive, and follow-on awards with and without modifications. For each respective category of awards (competitive, noncompetitive, and follow-on) the sum of the means shown for "modifications only" and means "w/o modifications" will equal the "with modifications" mean. For example, in Table 20 the 42.6 percent mean for competitive dollar awards with modifications is the sum of the means for competitive dollar awards, modifications only (15.4%) and competitive dollar awards,

w/o modifications (27.2%). The mean for total modifications is the sum of the "modifications only" means associated with each category of award. The mean for total noncompetitive awards is the sum of the noncompetitive (w/o modifications) mean and the mean for total modifications.

Table 20
SUMMARY OF MEANS
TOTAL PRIME CONTRACT AWARDS: 1966 - 1987

VARIABLE	MEAN VALUES	
	DOLLAR AWARDS	PROCUREMENT ACTIONS
<u>COMPETITIVE (with modifications)</u>	42.6	48.7
<u>COMPETITIVE (modifications only)</u>	15.4	10.4
<u>COMPETITIVE (w/o modifications)</u>	27.2	38.3
<u>NONCOMPETITIVE (with modifications)</u>	37.9	42.4
<u>NONCOMPETITIVE (modifications only)</u>	14.8	10.7
<u>NONCOMPETITIVE (w/o modifications)</u>	23.1	31.8
<u>FOLLOW-ON (with modifications)</u>	19.5	31.8
<u>FOLLOW-ON (modifications only)</u>	10.8	3.7
<u>FOLLOW-ON (w/o modifications)</u>	8.7	5.0
<u>TOTAL MODIFICATIONS</u>	41.0	24.9
<u>TOTAL NONCOMPETITIVE (including all modifications)</u>	64.1	56.7

As Table 20 shows, the volume of "modifications only" associated with original competitive awards (both dollars and procurement actions) is very similar to the volume of "modifications only" associated with original noncompetitive awards, i.e., 15.4 and 10.4 percents compared to 14.8 and 10.7 percents, respectively. This approximate parity in the aggregate volume of modifications associated with competitive and noncompetitive awards is shown more clearly in Table 21 below. This table shows modifications as a percentage of the respective totals of competitive, noncompetitive, and follow-on awards over the full period covered by this research.

Table 21

MODIFICATIONS
(As a % of each category of awards: 1966 - 1987)

CATEGORY OF AWARDS	DOLLAR AWARDS	PROCUREMENT ACTIONS
Competitive	36%	21%
Noncompetitive	39%	25%
Follow-On	55%	43%

The conventional wisdom held by many people is that original noncompetitive contracts are modified to a far greater extent than original competitive awards. In the aggregate, the data in this research refute that position. Table 21 also clearly shows that modifications to original follow-on awards constitute a significantly larger respective share than modification to either original competitive or noncompetitive contracts.

When the aggregate data are broken down by major and non-major hard goods a more complete picture of modifications becomes available. Table 22 outlines modifications as a percentage of each category of awards for both major and non-major hard goods.

Table 22

MODIFICATIONS FOR MAJOR & NON-MAJOR HARD GOODS
(As a % of each category of awards: 1966 - 1987)

CATEGORY OF AWARDS	DOLLAR AWARDS		PROCUREMENT ACTIONS	
	MAJOR	NON-MAJOR	MAJOR	NON-MAJOR
Competitive	54%	20%	30%	17%
Noncompetitive	45%	24%	33%	18%
Follow-on	55%	64%	42%	53%

As Table 22 illustrates, the proportion of modifications to competitive and noncompetitive awards among the groups of both major and non-major hard goods are similar. However, a comparison of modifications between the groups clearly shows that awards for major hard goods have been modified to a far greater extent than awards for non-major hard goods. The greater proportion of modifications for major hard goods is not surprising based on the more complex nature of the goods and services involved in this group. What is surprising is that the proportion of modifications to follow-on awards of non-major hard goods (both dollars and actions) is greater than that for major hard goods.

Modifications associated with small business awards present a much different profile from that shown in the data outlined above. Table 23 below is a summary of modification data for small business awards.

Table 23

MODIFICATIONS FOR SMALL BUSINESS AWARDS
(As a % of each category of awards: 1966 - 1987)

CATEGORY OF AWARDS	DOLLAR AWARDS		PROCUREMENT ACTIONS	
	MAJOR	NON-MAJOR	MAJOR	NON-MAJOR
Competitive	22%	16%	20%	16%
Noncompetitive	31%	26%	26%	23%
Follow-on	44%	67%	33%	50%

In every category of awards made to small business for major hard goods the proportion of modifications are less than in the more aggregate award data shown in Table 22. In other words, as a group, major hard good awards to small business are modified to a lesser extent than major hard good awards overall. This situation is also true of competitive awards made to small business for non-major hard goods. However, noncompetitive awards made to small business for non-major hard goods are modified to a greater extent than are similar awards represented in the more aggregate data shown in Table 22. The proportions of modification for follow-on awards made to small business for non-major hard goods are about the same as shown in Table 22 for the more aggregate award data.

Recall from the previous chapter that CICA became effective on April 1, 1985. The requirements of CICA were not phased-in, but were fixed to this date. After April 1, 1985, all new solicitations and subsequent contract awards were covered by the provisions mandated by CICA. On the other hand, contracts in

existence as of April 1, 1985, and those solicitations that were already in process as of that date, were not bound by the provisions of CICA. Thus, in post-CICA award data for 1986 and 1987 there are actually two groups of award data that can be distinguished; the data pertaining to post-CICA awards governed by pre-CICA provisions ("pre" post-CICA) and the data pertaining to post-CICA awards governed by CICA ("post" post-CICA). Data for fiscal year 1985 can not be distinguished in this manner because awards made in that year but prior to April 1, 1985, (pre-CICA awards) appear in the data base the same as fiscal year 1985 awards governed by pre-CICA provisions but made on or after April 1, 1985. ("pre" post-CICA). Thus, only those awards made in fiscal years 1986 or later are sure to be classified as post-CICA awards when aggregate fiscal year data are involved.

Over time the number of post-CICA contracts governed by pre-CICA provisions will disappear, however, for a few years this type of award will still be evident in aggregate post-CICA award data. Table 24 below illustrates how the two groups of post-CICA awards have changed during the period 1986 - 1987. Note that the number of "pre", post-CICA awards have decreased and the number of "post" post-CICA awards have increased. Also note that by 1987 about 75 percent of both dollar awards and procurement actions fell in the "post" post-CICA group. At the current rate of increase, it is likely that over 95 percent of all awards will fall in the "post" post-CICA category by 1990.

Table 24
THE CHANGING PROFILE OF POST-CICA AWARD DATA

YEAR	TOTAL AWARDS DOLLARS/ACTIONS	DOLLAR AWARDS		PROCUREMENT ACTIONS	
		"PRE"	"POST"	"PRE"	"POST"
1986	\$137,542,840 238,688	55%	45%	37%	63%
1987	\$135,458,767 236,276	29%	71%	24%	76%

NOTE:

"Pre" = post-CICA awards not governed by CICA
 "Post" = post-CICA awards governed by CICA

While there is clearly a decline in "pre" post-CICA and an increase in "post" post-CICA awards, there is also an important reversal in the composition of awards in each of these groups. In the "pre" groups (dollars and actions) the numbers of original contracts have decreased sharply, while the number of modifications, as a proportion of the total awards, have increased. This is predictable, since fewer and fewer "new" contracts are awarded under pre-CICA provision but the "pre" post-CICA contracts that are still active continue to be modified. Thus, when total awards in the "pre" post-CICA groups are considered, the proportion of modifications to total awards increases each year. The proportion of modifications pertaining to the "post" post-CICA awards (dollars and actions) have also increased each year but the reason for the increases are not the same as mentioned for the "pre" post-CICA awards.

In 1985, the first awards under the provisions of CICA ("post" post-CICA) were recorded. These awards were primarily new (original) contracts and few modifications were made to these new contracts in that first year. In 1986, more new contracts were awarded under the provisions of CICA and more modifications, as a proportion of total "post" post-CICA awards, were also recorded. As the pool of "new" awards increased the pool of contracts susceptible to modifications also increased. By the end of fiscal year 1987 there was a far greater pool of original "post" post-CICA awards susceptible to modifications than in 1985. Thus, during these first few years of "post" post-CICA awards there has been both an increase in the number of total awards, as well as an increase in modifications as a proportion of these total awards.

Obviously, modifications follow original contract awards. The mean data for modifications in "post" post-CICA awards will lag behind that of original awards until sufficient time has elapsed for these two groups (original awards and modifications) to come into their natural balance. What that balance or relationship might be for "post" post-CICA data is unknown but it is probable that it will be similar to the relationship between original contracts/modifications experienced in the 19 years (1966-1984) prior to CICA. Table 25, which appears on the following page, illustrates a comparison of mean data for pre- and post-CICA modifications.

Table 25

THE CHANGING PROFILE OF MODIFICATIONS
(All figures are mean %'s of the total awards in each group)

YEAR	<u>PROPORTION OF MODIFICATIONS TO TOTAL AWARDS</u>			
	<u>MAJOR HARD</u> DOLLARS	<u>GOODS</u> ACTIONS	<u>NON-MAJOR HARD</u> DOLLARS	<u>GOODS</u> ACTIONS

PRE-CICA AWARDS				
1966- 1984	50	33	22	17
POST-CICA AWARDS				
1986				
"Pre"	76	59	51	43
"Post"	25	20	13	16
1987				
"Pre"	90	69	57	40
"Post"	39	27	22	24

Table 25 illustrates how modifications in both the "pre" and "post" post-CICA groups of awards are generally increasing. It can also be seen that by 1987 the means for modifications in "post" post-CICA awards were approaching the means for modifications experienced in the aggregate pre-CICA awards. Sometime in the next few years the annual means for "pre" post-CICA modifications will reach 100 percent. This will occur when no new contracts are awarded under the pre-CICA provisions. On the other hand, it is likely in future years that the proportion of modifications in "post" post-CICA award data will remain at

about the same levels as those experienced in 1987, with the exception that mean values for dollar awards in this grouping should increase slightly. This expectation is based upon the respective means for modifications experienced in aggregate pre-CICA awards.

Recognition of the fact that modifications are generally increasing as a proportion of total awards in post-CICA data is important. This fact alone could cause noncompetitive awards (which include all modifications) to show a similar increase. Conversely, post-CICA data for competitive and follow-on awards (w/o modifications) could reflect a decrease due solely to the increased proportion of modifications to total awards. These phenomena, in fact, do appear to a greater or lesser extent in post-CICA data for competitive, noncompetitive, and follow-on awards, when these data are disaggregated by "pre" and "post" post-CICA groupings. When the disaggregated post-CICA data are aggregated without distinctions between "pre" and "post" post-CICA awards, the influence of modifications on the competitive, noncompetitive, and follow-on awards becomes less obvious, however, it is still noticeable. Table 26, which appears on the following page, provides an overview of post-CICA awards by fiscal year. Note the influence of modifications in the aggregate post-CICA data. Also, note how modifications have generally increased in each category of awards from 1986 to 1987.

Table 26

AN OVERVIEW OF POST-CICA AWARDS BY FISCAL YEAR
(All figures are %'s)

VARIABLE & YEARS	MAJOR HARD GOODS		NON-MAJOR HARD GOODS	
	DOLLARS	ACTIONS	DOLLARS	ACTIONS
COMPETITIVE (with modifications)				
1986	39.9	48.3	75.1	68.0
1987	43.8	51.6	73.4	68.8
COMPETITIVE (modifications only)				
1986	22.1	15.9	17.6	17.9
1987	25.4	18.3	19.1	19.7
COMPETITIVE (w/o modifications)				
1986	17.8	32.4	57.5	50.1
1987	18.4	33.3	54.3	49.1
NONCOMPETITIVE (with modifications)				
1986	29.4	38.0	23.7	30.6
1987	31.3	35.7	25.3	29.9
NONCOMPETITIVE (modifications only)				
1986	14.8	12.7	8.2	7.5
1987	17.1	12.1	9.8	7.5
NONCOMPETITIVE (w/o modifications)				
1986	14.6	25.3	15.5	23.1
1987	14.2	23.6	15.5	22.4
FOLLOW-ON (with modifications)				
1986	30.6	13.7	1.2	1.4
1987	24.8	12.7	1.4	1.2
FOLLOW-ON (modifications only)				
1986	20.0	5.8	0.7	0.8
1987	13.0	6.9	1.0	0.8
FOLLOW-ON (w/o modifications)				
1986	10.6	7.9	0.5	0.6
1987	11.8	5.8	0.4	0.4
TOTAL MODIFICATIONS				
1986	57.0	34.4	26.5	26.2
1987	55.6	37.3	29.8	28.1
TOTAL NONCOMPETITIVE (w/ all modifications)				
1986	71.6	59.7	42.0	49.3
1987	69.8	60.9	45.3	50.5

From Table 26 it can be seen that total modifications have increased in post-CICA data for every category listed except dollar awards for major hard goods. Similarly, total noncompetitive awards have increased in every category except dollar awards for major hard goods.

Table 26 also shows that modifications associated with original competitive awards constitute a greater proportion of total awards than modifications associated with original noncompetitive awards. In a like fashion, the proportion of modifications associated with original noncompetitive awards is generally greater than those associated with original follow-on awards.

A further review of each category of awards listed in Table 26 shows that once modifications are removed from a category of awards there is generally less annual variability in the data than before. In other words, the difference between the 1986 and 1987 means in each category of awards is generally less once modifications are removed from original awards.

As the results of the tests for differences between pre- and post-CICA means are discussed in the following pages, more will be said about the influence of modifications. It is noteworthy, however, to recognize that modifications are a very significant portion of total awards and their inclusion or exclusion from any particular category of awards will influence subsequent findings.

TESTS FOR DIFFERENCES BETWEEN PRE- AND POST-CICA AWARDS

METHODOLOGICAL OVERVIEW

The null hypotheses tested in this research compared the means of the various forms of competition (dependent variables) for all DOD prime contract awards made between fiscal years 1966 and 1984 (pre-CICA) with those awards made in fiscal years 1986 and 1987 (post-CICA). This research population of prime contract awards was treated as if it were two randomly selected independent "samples" of size $n(1)=19$ (pre-CICA fiscal years 1966-1984, inclusively) and $n(2)=2$ (post-CICA fiscal years 1986 and 1987). Fiscal year 1985 data were not included in the "samples". The dependent variables (competitive, noncompetitive, and follow-on awards) were measured by dollar awards and procurement actions for both major and non-major hard goods. Definitions for each of the dependent variables, as well as definitions for major and non-major hard goods, are provided in the glossary.

Independent t-Tests for the equality of pre- and post-CICA means were utilized to test each of the null hypotheses stated in the previous chapter (refer to page 130). The null hypotheses of no differences between pre- and post-CICA means were rejected only in those cases where the probability of an observed change occurring merely by chance was .01 or less. An F-Test was used first in each comparison to check for equality in the variances of pre- and post-CICA data. The observed significance level that resulted from the F-Test was used to determine the appropriate format for the subsequent t-Tests.

When the observed significance level of an F-Test was greater than .05, it was interpreted as an indication that the variances between the two populations of data (pre- and post-CICA) were equal and that pooled-variance t-Tests should subsequently be utilized. When the observed significance level of the F-Test was .05 or less, the hypothesis of equal population variance was rejected and the separate-variance t-Test format was used. As can be seen in the appendices pertaining to the t-Test results, rarely were significance levels of .05 or less observed in the F-Tests.

In each of the t-Tests associated with the hypotheses tested in this research, award data for fiscal year 1985 were excluded. As previously discussed, such data do not reflect a full fiscal year of procurement activity either before or after the implementation of CICA on April 1, 1985. Thus, the group of post-CICA awards considered in this study consists of the DOD prime contracts awarded in 1986 and 1987. Also, the post-CICA data includes all post-CICA awards ("pre" and "post" post-CICA), since the stated null hypotheses were to be tested against the total prime contract awards in pre- and post-CICA periods. So that comparisons can be made, however, the results of t-Tests conducted using only "post" post-CICA data will also be discussed.

DESCRIPTION OF THE APPENDICES

Appendix 6 contains a five part summary of the results of the statistical tests for differences between pre- and post-CICA means. The first part (Appendix 6-1) provides a summary of the

t-Test results for the overall population of awards without a distinction between major and non-major hard goods. The next two parts of Appendix 6 outline the results of statistical tests for differences between groups with distinctions made between major hard goods (Appendix 6-2) and non-major hard goods (Appendix 6-3). The results of the t-Tests shown in these two parts of Appendix 6 form the basis for rejecting or failing to reject the null hypotheses established in this research. The final two parts of Appendix 6 represent a summary of the results of statistical tests for awards made to small business. These results are broken down by major hard goods (Appendix 6-4) and non-major hard goods (Appendix 6-5). Each of the five parts of Appendix 6 provide a breakdown of the dependent variables with and without modifications.

The data concerning competitive, noncompetitive, and follow-on awards broken down by major and non-major hard goods (Appendix 6-2 and 6-3, respectively) is further disaggregated in Appendices 7 and 8. Appendix 7 provides a compilation of descriptive parameters for each of the thirteen DOD Claimant Programs that collectively form the groups of major and non-major hard goods. Appendix 8 provides an outline of the results of t-Tests conducted on pre- and post-CICA competitive, noncompetitive, and follow-on awards for each of the thirteen DOD Claimant Programs. The data for individual DOD Claimant Programs in Appendices 7 and 8 are helpful in explaining the more aggregate data summarized in Appendix 6.

AN OVERVIEW OF AGGREGATE CHANGES

Earlier in this chapter, Figures 2 through 7 illustrated the overall trends of competitive, noncompetitive, and follow-on awards for both dollars and procurement actions over the full period of this research. Each illustration also depicted the observed significance level that resulted from a t-Test of differences between the respective pre- and post-CICA means. It was shown that with the exception of procurement actions for follow-on awards (Figure 7), the changes in pre- and post-CICA means were not particularly noteworthy based on the observed significance levels. A review of Appendix 6-1 will provide more specific details concerning pre- and post-CICA changes in the aggregate data. Note that this information is not broken down by major and non-major hard goods.

Perhaps one of the most noteworthy observations that can be made from the aggregate data summarized in Appendix 6-1 concerns the change in modifications associated with pre- and post-CICA awards. Earlier it was mentioned that modifications, as a proportion of total post-CICA awards, had generally increased each fiscal year in the post-CICA period. While this is true, the increase in and of itself is misleading without comparing the increase to pre-CICA data. A comparison of pre- and post-CICA award data illustrates that post-CICA modifications of original competitive contracts increased sharply compared to the pre-CICA levels of such modifications. On the other hand, the level of post-CICA modifications of original noncompetitive and follow-on contracts compared to the pre-CICA levels is not significantly

different. Table 27 illustrates this point. Note the distinction in Table 27 between noncompetitive awards and total noncompetitive awards, the latter of which includes all modifications regardless of the category of the original contract.

Table 27
PRE- AND POST-CICA MODIFICATIONS: AN OVERVIEW

VARIABLE	MEAN		t-TEST	
	Pre	Post	t-Value	p(t)
COMPETITIVE (mods. only)				
Dollars	14.6	22.2	-4.59	.000*
Actions	9.5	18.1	-8.51	.000*
NONCOMPETITIVE (mods. only)				
Dollars	15.0	13.9	0.76	.459
Actions	11.0	9.7	1.15	.263
FOLLOW-ON (mods. only)				
Dollars	10.5	11.9	-0.41	.683
Actions	3.8	3.3	1.07	.297
TOTAL MODIFICATIONS				
Dollars	40.1	48.0	-2.44	.025
Actions	24.3	31.1	-4.82	.000*

* Significant @ .01

NOTE:

N=19 in Pre-CICA (1966-1984)

N=2 in Post-CICA (1986-1987)

Table 27 suggests that the increase in post-CICA total modifications is due primarily to the increase in modifications associated with original competitive awards. This point can be illustrated more clearly by showing the modifications associated

with each form of awards as a proportion of total modifications, rather than as a proportion of total awards. Table 28 provides this breakdown.

Table 28

MODIFICATIONS BY CATEGORY OF AWARDS
AS PROPORTIONS OF TOTAL MODIFICATIONS
(All figures are percentages)

VARIABLE	DOLLAR AWARDS		PROCUREMENT ACTIONS	
	Pre	Post	Pre	Post
COMPETITIVE (mods. only)	36.4	46.2	39.1	58.2
% Increase in Post-CICA		27%		49%
NONCOMPETITIVE (mods. only)	37.4	29.0	45.3	31.2
% Decrease in Post-CICA		-22%		-31%
FOLLOW-ON (mods. only)	26.2	24.8	15.6	10.6
% Decrease in Post-CICA		-6%		-32%

The significant increase in modifications associated with original competitive awards (both dollars and actions) in the post-CICA data seems to suggest a tendency to modify original competitive contracts to a greater extent than original noncompetitive contracts in the post-CICA period. This tendency in post-CICA awards might be explained if one remembers that modifications are recorded on the DD Form 350, and hence recorded in the DOD procurement data base, based upon the nature of the original contract award, i.e., competitive, noncompetitive, or follow-on. Thus, a modification to an original competitive contract is recorded as a competitive award, while a modification to an original noncompetitive contract is recorded

as a noncompetitive award, and so on. With procurement activities being evaluated, in part, based upon their ability to award more and more competitive contracts under the mandate of CICA, it is advantageous to modify an original competitive contract. On the other hand, a modification to an original noncompetitive contract is disadvantageous in terms of achieving established goals for competitive awards. Perhaps procurement officials are more inclined in the post-CICA period to modify original competitive contracts, since such modifications are recorded as competitive awards. The extent to which this practice may be occurring is unknown.

Another point is worth noting in regard to the foregoing discussion and the data in Table 27. The volume of modifications associated with competitive contracts could increase in post-CICA data due solely to an increase in the volume of original competitive contracts in this period. If this were the case, however, the mean data for competitive awards (w/o modifications) would reflect a substantial increase in post-CICA. A review of Appendix 6-1 shows that this is not the case. Aggregate competitive awards (w/o modifications) had pre- and post-CICA means of 27.0 vs. 29.4 percent respectively for dollars and 37.8 vs. 42.2 percent respectively for procurement actions. The observed significance levels for the t-Tests of equality of these means were .613 for the dollar awards and .273 for the procurement actions.

Appendix 6-1 also shows a substantial decrease in noncompetitive awards (w/ modifications) in the post-CICA data

for both dollars and procurement actions. The awards for modifications associated with these noncompetitive contracts show very little change compared to the levels experienced in the pre-CICA data. What is not obvious is the fact that for the mean levels of pre- and post-CICA noncompetitive (modifications only) awards to remain about the same in the wake of a decrease in original noncompetitive (w/ modifications) awards in post-CICA data, the proportion of post-CICA modifications to original noncompetitive awards would have to increase. This is true because there were fewer original noncompetitive awards in the post-CICA period and thereby, fewer such original contracts to modify. Table 29 helps to clarify this point. This table shows modifications as a proportion of the total awards in each award category, rather than as individual proportions of total modifications, as was shown in Table 28.

Table 29

MODIFICATIONS AS PROPORTIONS OF EACH CATEGORY OF AWARDS
(All figures are percentages)

VARIABLE	DOLLAR AWARDS		PROCUREMENT ACTIONS	
	Pre	Post	Pre	Post
COMPETITIVE				
(mods. only)	35.0	43.1	20.1	30.1
% Increase in Post-CICA		23%		50%
NONCOMPETITIVE				
(mods. only)	38.2	48.4	25.4	29.2
% Increase in Post-CICA		27%		15%
FOLLOW-ON				
(mods. only)	55.0	59.8	42.2	50.0
% Increase in Post-CICA		9%		19%

From Table 29 it is clear that modifications, as a proportion of each category of awards, have increased in every category of the post-CICA data. It is also clear from Tables 28 and 29 that modifications associated with original competitive awards have experienced the most significant increase.

This research will demonstrate that the influence of modifications in post-CICA awards has had a very pronounced impact on observed differences between pre- and post-CICA award data. In addition, it will be shown that an analysis of "post" post-CICA data that does not make a clear distinction between original awards and modifications can easily result in a flawed comparison when such data are compared to pre-CICA awards.

In the following section of this chapter the findings related to the differences between pre- and post-CICA awards for major hard goods will be discussed. Following that section, the findings related to the differences between pre- and post-CICA awards for non-major hard goods are described. It should be noted that in each of these next two sections the award data are described as separate groups of data, i.e., total awards for major hard goods constitutes the base in one case and total awards for non-major hard goods constitutes the base in the second instance. Thus, the total population of prime contract award data are broken down into these two respective groups.

DIFFERENCES IN AWARDS FOR MAJOR HARD GOODS

It was theorized in this research that the unique features of the defense market and the unique nature of the major hard goods acquired by the DOD would preclude CICA from having a significant influence on the mix of competitive, noncompetitive, and follow-on contract awards for these commodities. To test this theory, null hypotheses were developed that suggested that no change in the percentage levels of the dependent variables (competitive, noncompetitive, and follow-on awards) would be experienced between the pre- and post-CICA periods.

The results of the hypotheses tests, as they relate to awards for major hard goods, are summarized in detail in Appendix 6-2. Table 30, which appears on the following page, outlines the data in Appendix 6-2 by dependent variable and also serves as a summary of the results of the hypotheses tests conducted on award data related to major hard goods. Note that the data in Table 30 refer to the dependent variables as they are defined in this research, i.e., competitive and follow-on awards excluding modifications and noncompetitive awards including all modifications. The mean values are percentages of the total awards for major hard goods over the respective pre- and post-CICA periods. As such, the mean values for the dependent variables measured in terms of either dollars or procurement actions will sum to 100 percent in each of the pre- and post-CICA periods.

Table 30
PRE- AND POST-CICA AWARDS FOR MAJOR HARD GOODS

DEPENDENT VARIABLE	MEAN		t-TEST	
	Pre	Post	t-Value	p(t)
COMPETITIVE				
Dollars	13.8	18.1	-1.18	.254
Actions	23.3	32.9	-3.31	.004*
NONCOMPETITIVE				
Dollars	73.5	70.7	1.08	.292
Actions	66.2	60.2	2.05	.054
FOLLOW-ON				
Dollars	12.7	11.2	0.64	.527
Actions	10.5	6.9	4.63	.000*

* Significant @ .01

NOTE:

N=19 in Pre-CICA (1966-1984)

N=2 in Post-CICA (1986-1987)

Based on the data in this research, there is not sufficient evidence to indicate statistically significant differences in any of the pre- and post-CICA comparisons of the dependent variables measured in terms of dollar awards for major hard goods. Therefore, the null hypotheses associated with these comparisons (H01, H02, and H03, as stated on page 130 in the previous chapter) can not be rejected. Conversely, there is sufficient evidence to indicate statistically significant differences and subsequent rejection of the null hypotheses associated with the pre- and post-CICA comparisons of competitive and follow-on

awards measured in terms of procurement actions for major hard goods (H04 and H06, as stated on page 130). The comparison of data for noncompetitive awards for major hard goods measured in terms of procurement actions was not statistically significant at the .01 level and the associated null hypothesis (H05) could not be rejected, however, the observed .054 level of significance is certainly noteworthy.

The practical significance of the findings detailed in Appendix 6-2 and outlined in Table 30 seem to support a conclusion that dollar awards related to major hard goods have not been influenced by CICA to the same extent as procurement actions, when both are related to the dependent variables in this study. One could conclude with near certainty that the observed changes in the dependent variables related to procurement actions for major hard goods did not occur by chance and that they were related to the implementation of CICA. On the other hand, in terms of dollar awards, the probability of mere random variation accounting for differences in pre- and post-CICA data is very high, i.e., about 25 percent for competitive and noncompetitive awards and about 50 percent for follow-on awards.

Figures 12 through 17, which appear on the following pages, illustrate the trends of competitive, noncompetitive, and follow-on awards for major hard goods over the full period of this research. On each of these figures the pre- and post-CICA means are shown, as well as the observed level of significance that resulted from the t-Test conducted in each case.

Figure 12

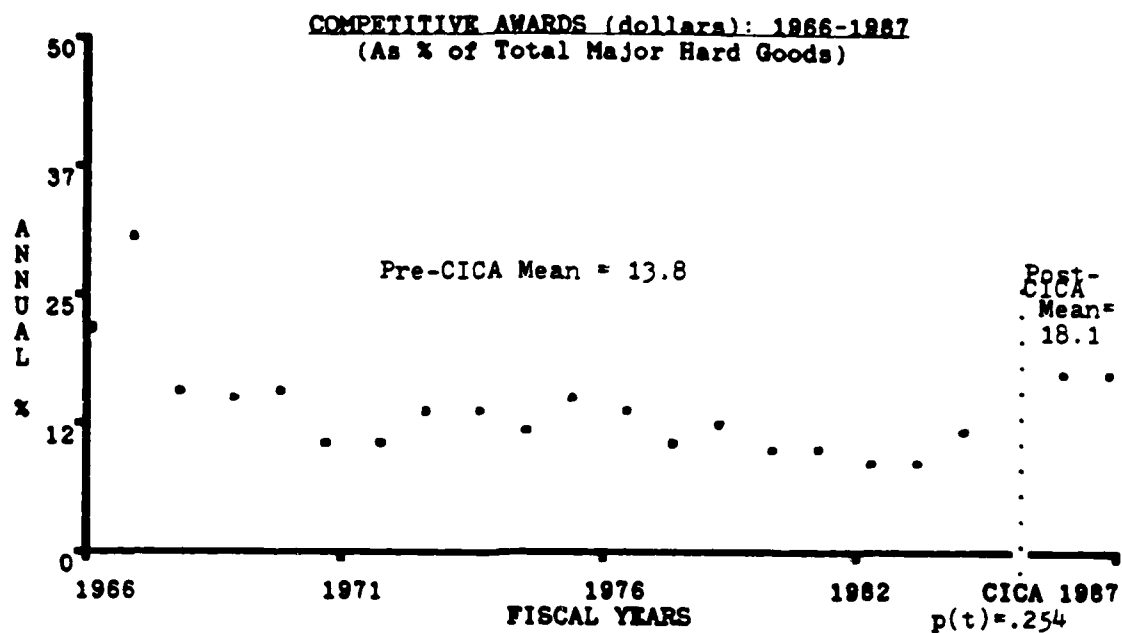


Figure 13

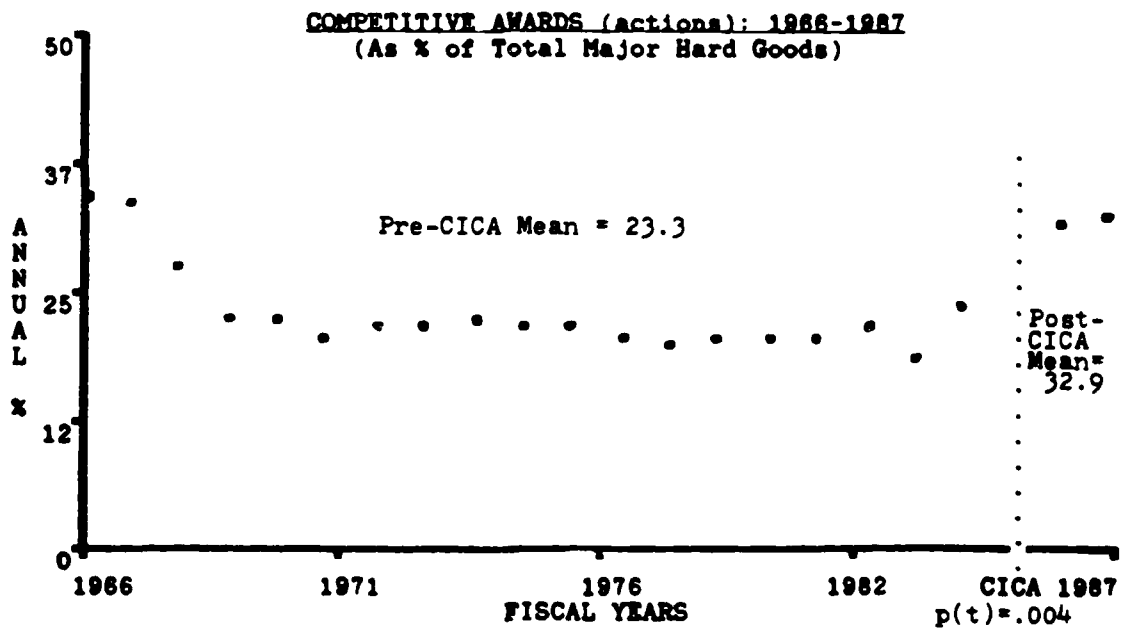


Figure 14

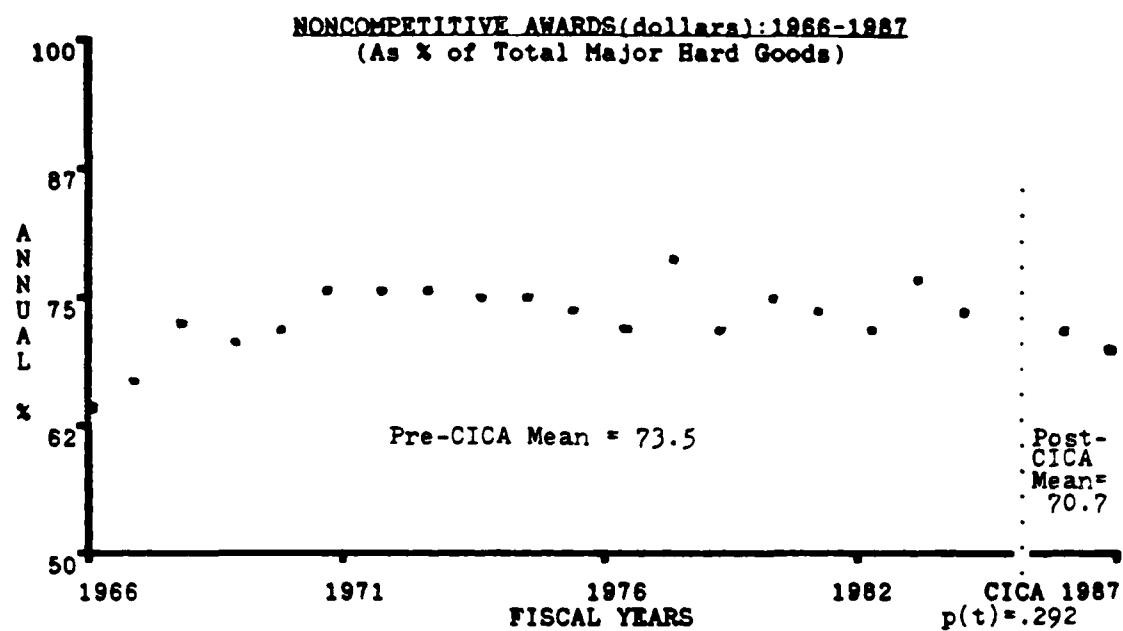


Figure 15

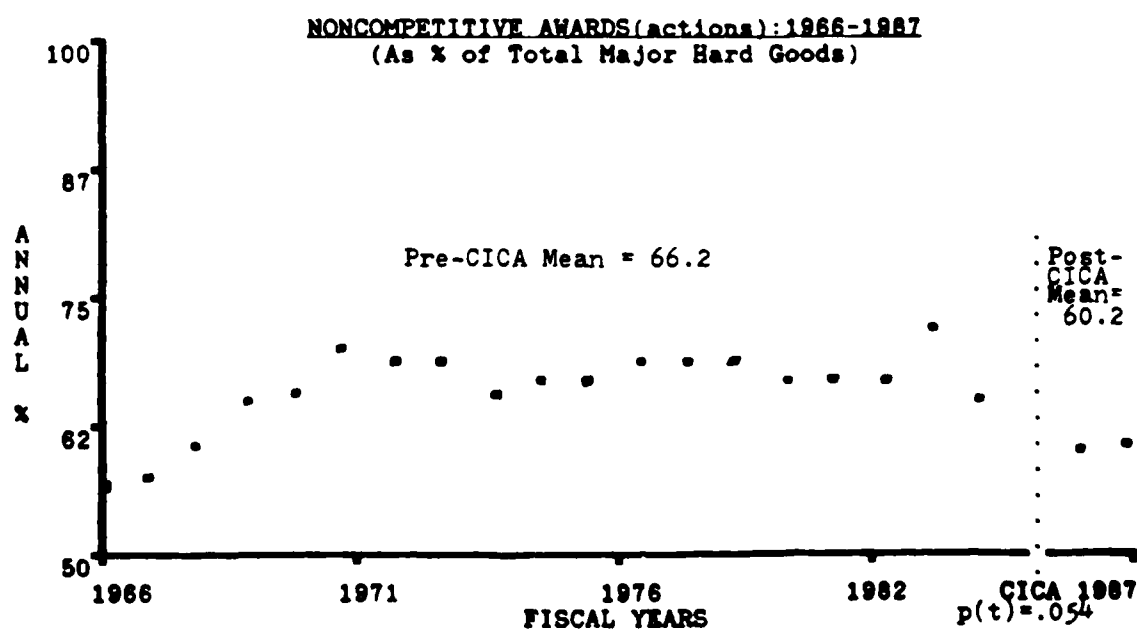


Figure 16

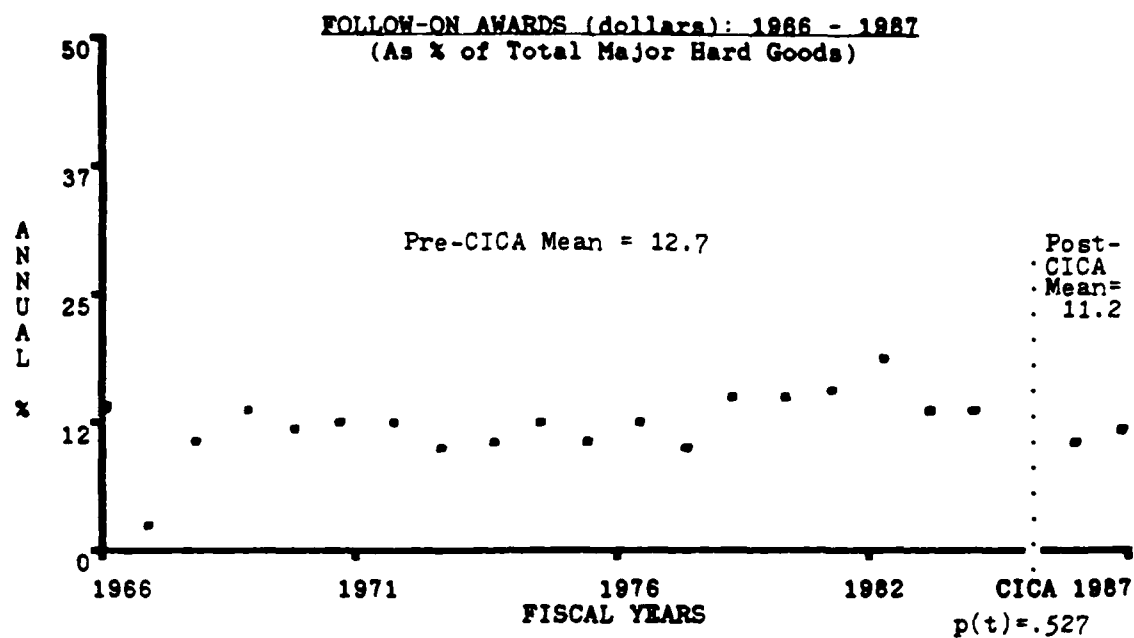
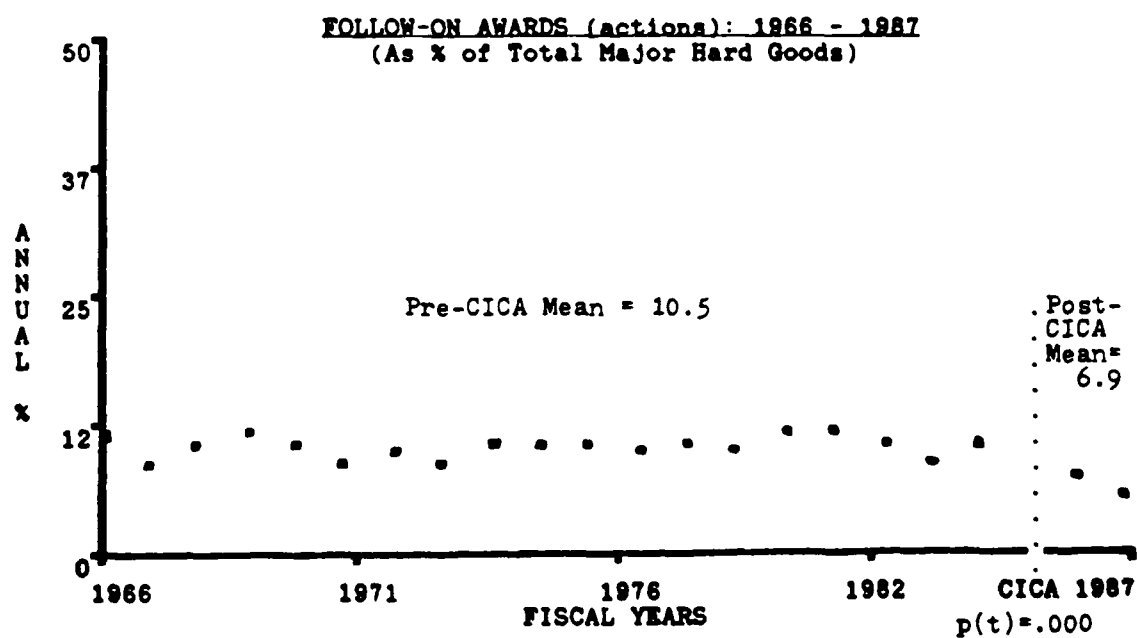


Figure 17



From the data trends in the foregoing illustrations it is clear that dollar awards provide generally more erratic behavior than procurement actions. This point will become even more pronounced later, when the trends in award data for non-major hard goods are illustrated. The more erratic behavior in the trends for dollar awards illustrates why post-CICA changes in these categories could have been changes resulting merely from random variation.

As mentioned earlier, the greater stability in award data from year to year for procurement actions suggests that this measure of the dependent variables is a more reliable measure than dollar awards. Assuming this is true, the practical significance of the observed changes in post-CICA data strongly supports a conclusion that CICA has had an influence on each of the dependent variables as they relate to major hard goods.

On each of the foregoing illustrations the most recent trend in the data appears to have originated in fiscal years 1982 or 1983. Since these data represent awards prior to the implementation of CICA in fiscal year 1985, one might conclude that the trend currently observed would have existed with or without the influence of CICA. To what extent this might be true is unknown, however, if the "post" post-CICA data are removed for the aggregate post-CICA data and then plotted separately, as in the foregoing figures, the influence of CICA becomes much more noticeable. The point that CICA actually has influenced the dependent variables associated with major hard goods can be more clearly illustrated by observing the changes in data trends when

post-CICA awards are limited to those awards that were made pursuant to the provisions of CICA, i.e., "post" post-CICA awards. Figures 18 through 23, which appear on the following pages, depict only "post" post-CICA awards in the post-CICA data, i.e., "pre" post-CICA awards are excluded. Note that in each illustration, except the one for follow-on dollar awards, the observed significance level that resulted from a t-Test of pre- and "post" post-CICA means was .000. In other words, it is virtually certain that these observed changes were not due to chance.

It should also be noted in the following illustrations that the trends that were originated in the data in fiscal years 1982 or 1983 are clearly not continued in the "post" post-CICA data. Again, with the exception of follow-on dollar awards, the trend lines in the "post" post-CICA data display both different slopes and different intercepts compared to the most recent pre-CICA trends. In subsequent paragraphs the reasons for the dramatic shift in the slope of the "post" post-CICA trend lines will be discussed.

Since "post" post-CICA data can be isolated for fiscal year 1985 awards, a data point is shown on each of the following figures to represent awards for that year. Recall that it was the "pre" post-CICA data that could not be separated from the fiscal year 1985 awards because these awards appeared in the data base the same as fiscal year 1985 pre-CICA awards. So that the fiscal year 1985 "post" post-CICA awards can be reflected on the following illustrations, the "CICA intervention lines" fall just before the fiscal year 1985 data points.

Figure 18

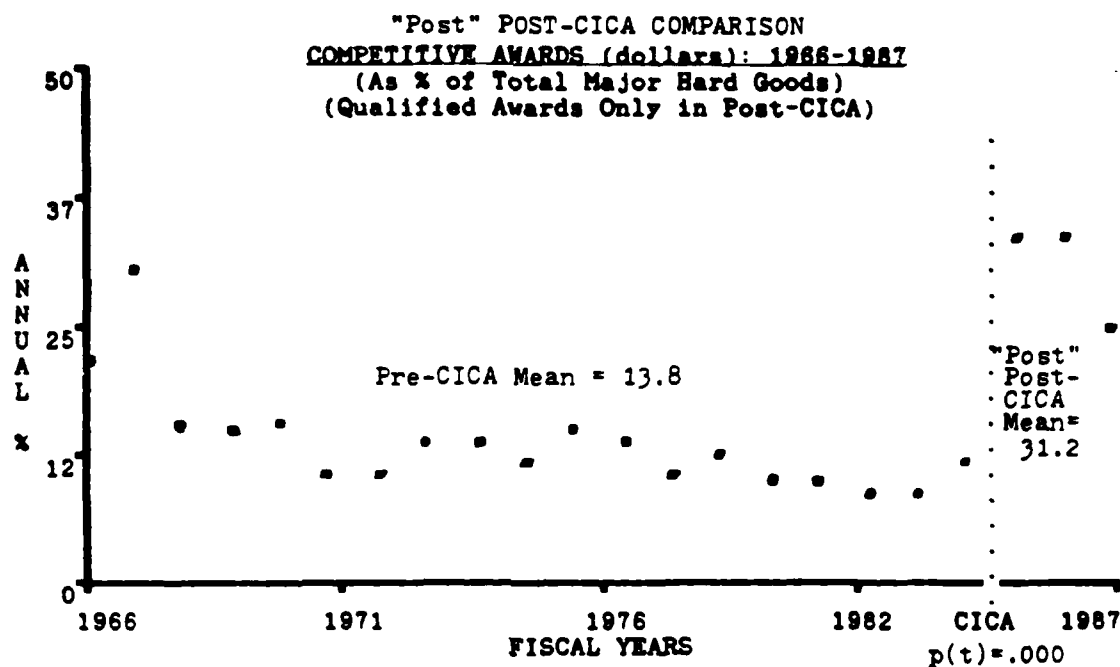


Figure 19

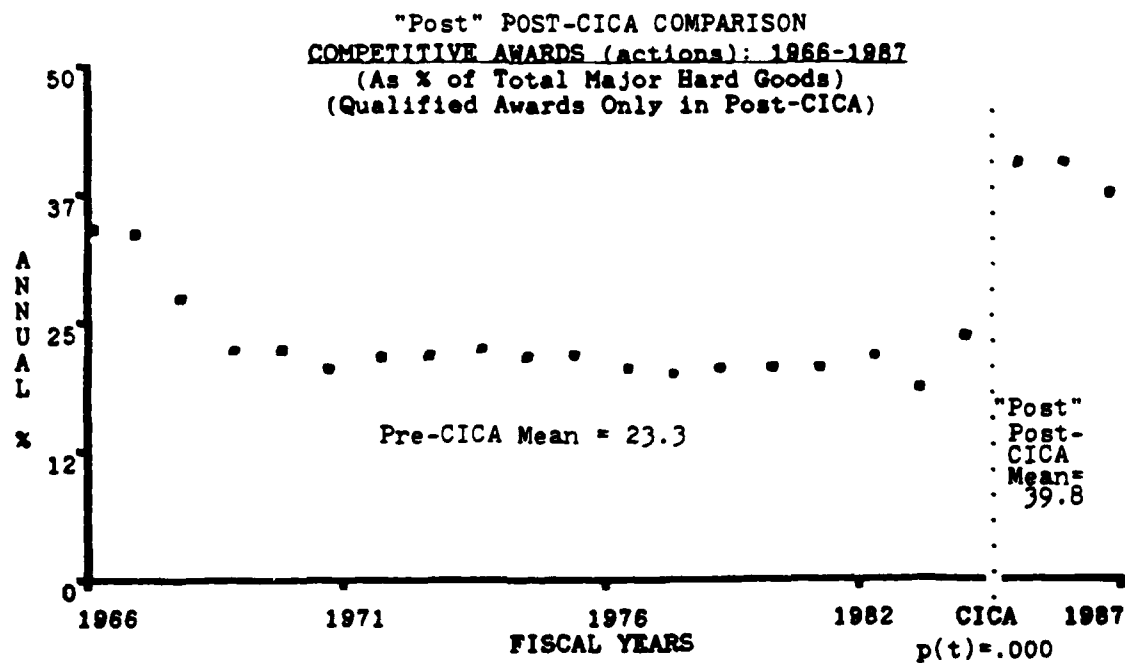


Figure 20

"Post" POST-CICA COMPARISON
NONCOMPETITIVE AWARDS(dollars):1966-1987
 (As % of Total Major Hard Goods)
 (Qualified Awards Only in Post-CICA)

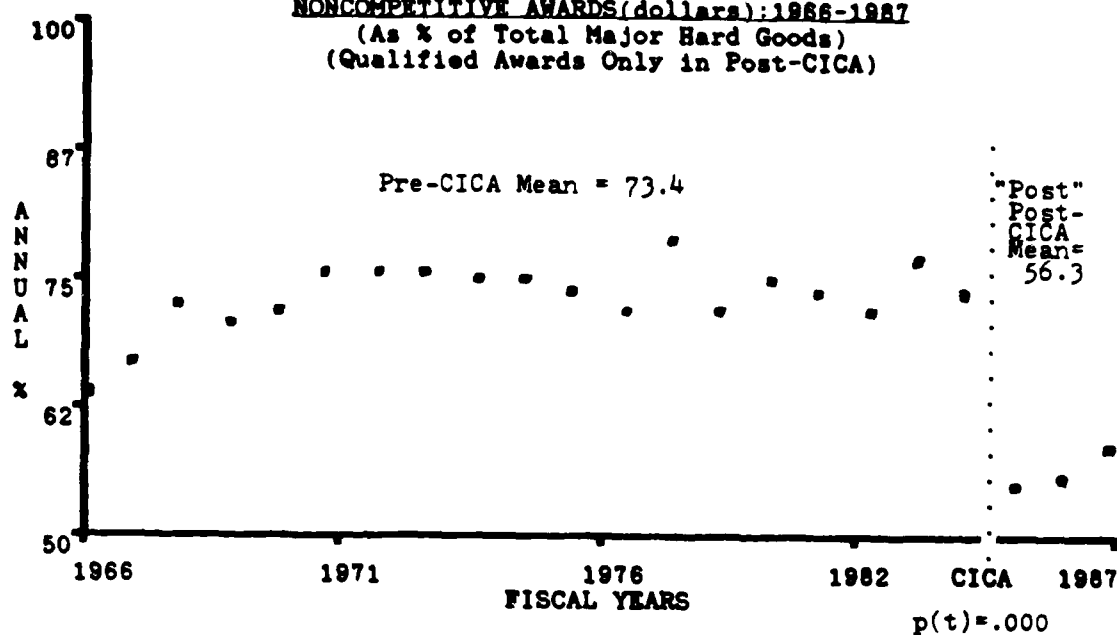


Figure 21

"Post" POST-CICA COMPARISON
NONCOMPETITIVE AWARDS(actions):1966-1987
 (As % of Total Major Hard Goods)
 (Qualified Awards Only in Post-CICA)

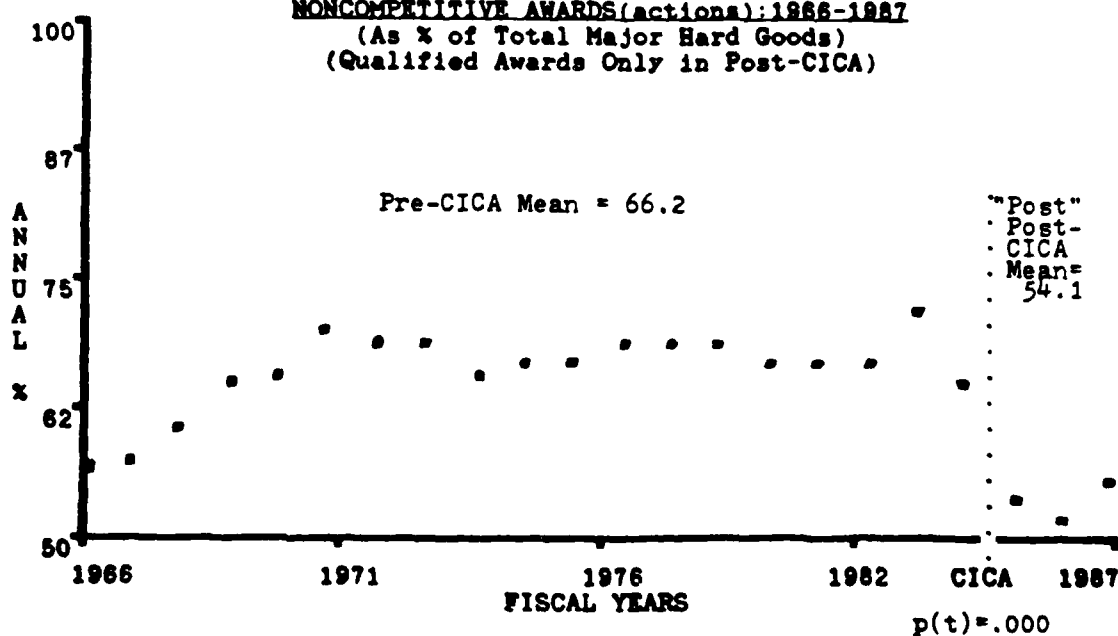


Figure 22

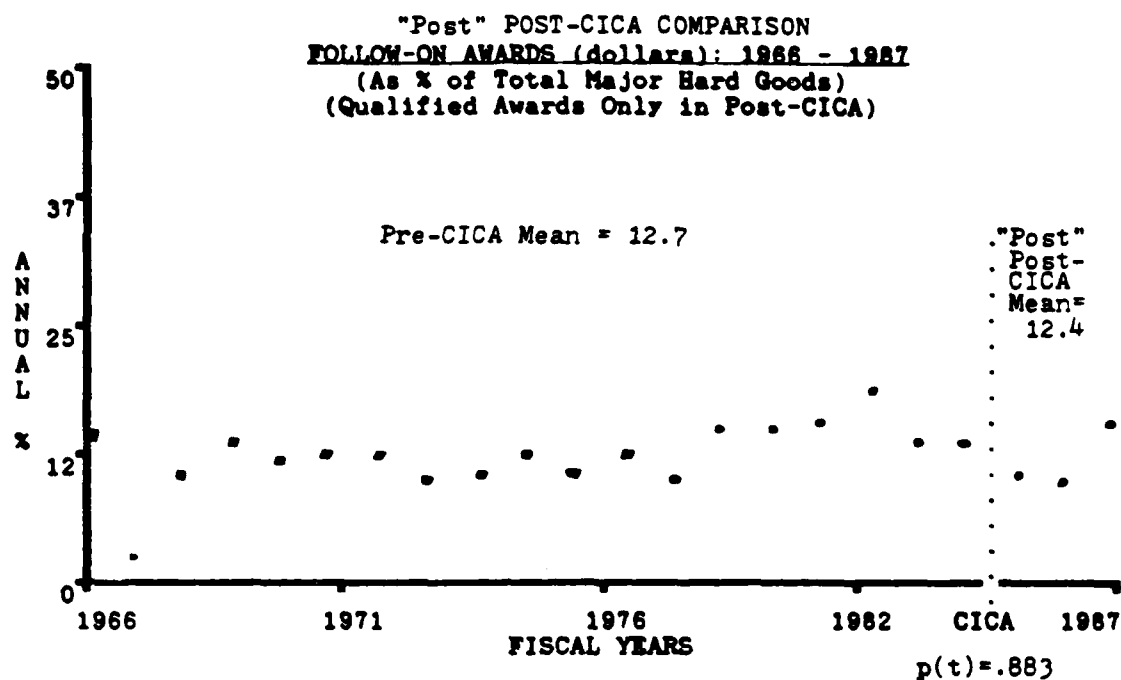
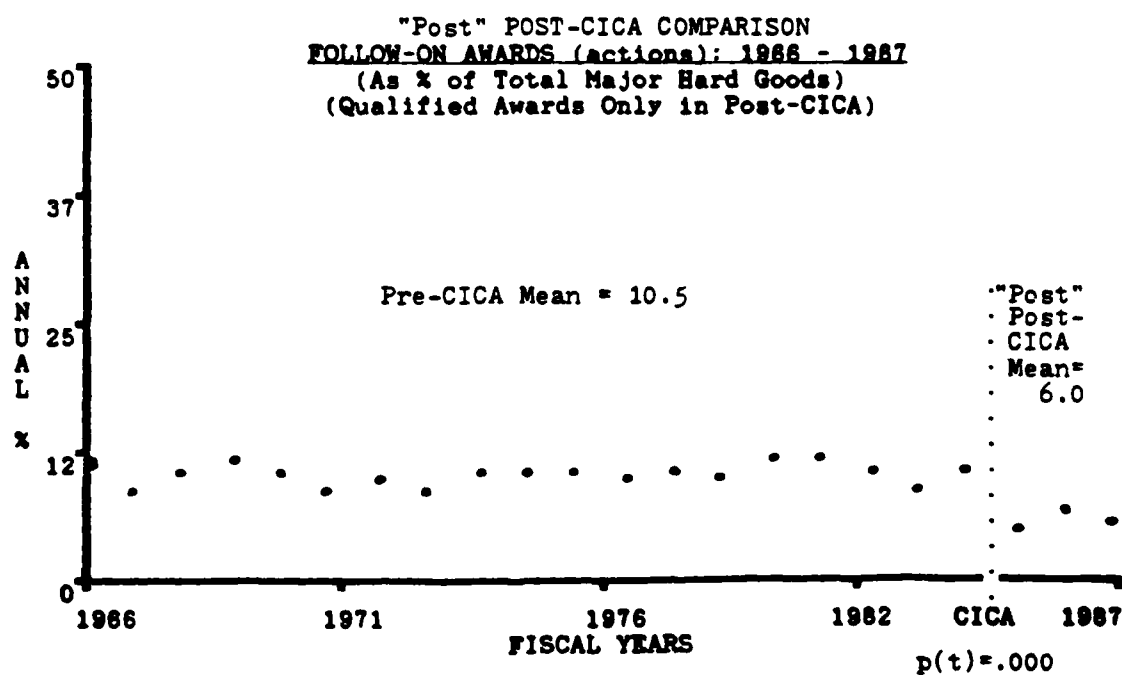


Figure 23



In addition to illustrating the influence of CICA on the "post" post-CICA awards, the foregoing figures also show what seems to be a regression of the post-CICA data to the pre-CICA means. While insufficient time has elapsed since the implementation of CICA to determine if this phenomenon is actually occurring, the current trends are suggestive. It is likely that the regression of the "post" post-CICA means can be explained due to the increased influence of modifications in post-CICA award data. As the proportion of modifications grow relative to total awards, the volume of noncompetitive awards will also grow. There is a lack of independence in the dependent variables and that lack of independence seems most noticeable in competitive and noncompetitive awards (almost an inverse relationship). Thus, as noncompetitive awards grow due to increased modifications, the volume of competitive awards is likely to fall. When modifications and original contract awards reach their natural balance in the "post" post-CICA award data, the regression toward the pre-CICA means should stabilize. As mentioned earlier, what the post-CICA balance between original contracts and modifications might be is unknown but it seems likely that it would approximate the relationship experienced in the 19 years of pre-CICA data.

Observing post-CICA changes in the award data for major hard goods by first examining the aggregate post-CICA awards and then examining only the "post" post-CICA awards helps to highlight what appear to be two important aspects about post-CICA awards. First, the influence of CICA on those awards that were made

pursuant to the provisions of CICA (the "post" post-CICA awards) is clearly evident. Competitive awards in the post-CICA period are significantly increased compared to similar awards in the pre-CICA period. Also, there are significantly fewer noncompetitive awards in the post-CICA period compared to the pre-CICA period. Follow-on awards measured in terms of dollars are not significantly different in post-CICA but similar awards measured in terms of procurement actions are significantly lower.

The second point to consider involves the long term influence of CICA on major hard good awards. It appears from the data that competitive awards will continue at increased levels relative to pre-CICA and that there will be fewer noncompetitive and follow-on awards compared to the pre-CICA experience. As time passes and more original "post" post-CICA contracts are modified, the trends in "post" post-CICA award data will more closely approximate those trends shown in Figures 12 through 17 for the aggregate post-CICA awards. In other words, the influence of CICA will continue to be evident but the degree of disparity between pre- and post-CICA data will decrease over time. Based on this assumption, it is felt that the pre- and post-CICA comparisons illustrated in Figures 12 through 17 are more reliable indicators of the actual CICA influence than are Figures 18 through 23. In short, because of the increased influence of modifications in each additional year of "post" post-CICA data, the means and trends illustrated in Figures 18 through 23 are distorted. This issue will be illustrated and discussed again in subsequent parts of this chapter dealing with awards for non-major hard goods.

The award data for DOD Claimant Programs summarized in Appendices 7 and 8 can be used to help explain what commodity groups have experienced the most significant changes since the implementation of CICA. The proportion of awards associated with each DOD Claimant Program are shown in Table 31.

Table 31

PROPORTIONS FOR EACH DOD CLAIMANT PROGRAM
(All figures are mean percentages: 1966-1987)
Number in parenthesis indicates respective ranking

CLAIMANT PROGRAM	PROPORTION OF ALL AWARDS		PROPORTION OF AWARDS FOR MAJOR/NON-MAJOR HARD GOODS	
	DOLLARS	ACTIONS	DOLLARS	ACTIONS
<u>MAJOR HARD GOODS</u>				
AIRCRAFT	20.7 (1)	15.7 (2)	31.1 (1)	35.2 (1)
MISSILES	13.4 (2)	4.4 (8)	20.1 (3)	10.0 (4)
SHIPS	7.8 (5)	5.8 (7)	11.9 (4)	13.1 (3)
TANKS	3.6 (10)	2.5 (9)	5.5 (6)	5.7 (5)
WEAPONS	1.6 (12)	1.5 (10)	2.4 (7)	3.4 (6)
AMMUNITION	5.5 (8)	1.4 (11)	8.7 (5)	3.1 (7)
ELECTRONICS	13.4 (3)	13.2 (4)	20.2 (2)	29.7 (2)
*Total	66.0 (1)	44.5 (2)	100.0	100.0
<u>NON-MAJOR HARD GOODS</u>				
FUELS	6.9 (7)	1.4 (12)	19.9 (3)	2.6 (5)
TEXTILES	1.5 (13)	1.2 (13)	4.2 (6)	2.0 (6)
SUBSISTENCE	2.4 (11)	11.3 (5)	6.9 (5)	20.3 (3)
CONSTRUCTION	7.4 (6)	9.8 (6)	22.2 (2)	17.7 (4)
MISCELLANEOUS	4.9 (9)	15.0 (3)	14.4 (4)	27.1 (2)
SERVICES	10.8 (4)	16.9 (1)	32.2 (1)	30.5 (1)
*Total	44.0 (2)	55.6 (1)	100.0	100.0

*NOTE: Figures may not total correctly due to rounding

Clearly, aircraft dominate awards for major hard goods and between aircraft and electronics one could account for over 50 percent of all of the awards for major hard goods. In terms of non-major hard goods, services are the dominant category for both dollar awards and procurement actions. Note that services rank first among all of the commodity categories in terms of procurement actions but only fourth in terms of dollar awards.

Pre- and post-CICA comparisons of the proportions of awards for each DOD Claimant Program are presented in Appendix 8. It should be noted that in the post-CICA period there have been some significant changes in the proportions of awards attributable to some of these commodity groupings. For example, in the major hard goods commodities, a notable change was observed in the proportion of award dollars attributable to ammunition (nearly a 50% decrease from the pre-CICA mean level). In terms of procurement actions, notable changes have occurred in the proportion of awards for aircraft (down 14%) and electronics (up 20%).

From Appendix 7 it can be seen that there is some disparity in the volume of competitive, noncompetitive, and follow-on awards associated with the various DOD Claimant Programs. A review of Table 32, which appears on the following page, summarizes data from Appendix 7 and highlights this disparity in terms of awards for major hard goods. The data outlined in Table 32 represent mean values over the full period of the study.

Table 32

A COMPARISON OF MAJOR HARD GOODS BY COMMODITY
(All figures are mean percentages: 1966 - 1987)

CLAIMANT PROGRAM	COMPETITIVE		NONCOMPETITIVE		FOLLOW-ON	
	DOLLARS	ACTIONS	DOLLARS	ACTIONS	DOLLARS	ACTIONS
AIRCRAFT	9.6	18.0	68.8	60.2	21.6	21.9
MISSILES	6.2	12.3	79.8	79.0	14.3	8.8
SHIPS	25.9	29.1	70.1	70.1	4.0	0.8
TANKS	26.0	57.5	68.8	41.2	4.6	1.3
WEAPONS	22.1	38.7	76.0	60.2	1.9	0.7
AMMUNITION	22.6	26.9	74.4	71.3	3.0	1.8
ELECTRONICS	16.5	26.1	74.7	69.5	8.8	4.4

*NOTE: Figures may not add correctly due to rounding

It is interesting to note from Table 32 that few competitive awards have been experienced for aircraft and missiles compared to the other commodities. On the other hand, these two commodities account for most of the follow-on awards. The volume of noncompetitive awards for each commodity are roughly the same, i.e., about 73 percent for dollar awards and about 68 percent for procurement actions.

A review of Appendix 8 will disclose that only two of the pre- vs. post-CICA dollar award comparisons of dependent variables related to the individual major hard good commodities were significantly different. Only the post-CICA changes for missiles (competitive awards) and tanks (follow-on awards) showed statistical significance at the .01 level. None of the major hard goods commodities showed statistically significant differences in noncompetitive dollar awards, however, the .021 level of significance observed for missiles is noteworthy. The

individual commodity comparisons shown in Appendix 8 further illustrate what the more aggregate comparisons in Table 30 demonstrated, i.e., that dollar awards for major hard goods have not been significantly influenced by CICA.

When procurement actions are used to measure changes in post-CICA data for major hard goods, several statistically significant changes are evident in the related individual commodity groupings (see Appendix 8). Most notable are the increases in competitive awards for aircraft and electronics, the two commodity groups that collectively account for more than 50 percent of the major hard good procurement actions. Both were significant at the .000 level. Also significant at the .000 level were competitive awards for missiles. Recall from Table 32 that the volumes of competitive awards for aircraft and missiles, measured in terms of procurement actions over the full period of this research, were the lowest of any major hard goods commodity. In the post-CICA period, however, these two commodity groupings each experienced increases of over 65 percent in the volume of competitive awards compared to pre-CICA levels.

Contrary to what some might expect, competitive awards measured in terms of both dollars and procurement actions decreased in the post-CICA period for tanks and weapons. Although these changes were not particularly significant, the decrease in competitive awards after the implementation of CICA is unusual.

Pre- and post-CICA comparisons of the dependent variables were also conducted for awards made to small businesses. The

results of the statistical tests for differences between these two groups, as they relate to major hard goods, are summarized in Appendix 6-4. Table 33 below outlines these findings.

Table 33
PRE- AND POST-CICA AWARDS TO SMALL BUSINESS
FOR MAJOR HARD GOODS

DEPENDENT VARIABLE	MEAN		t-TEST	
	Pre	Post	t-Value	p(t)

COMPETITIVE				
Dollars	51.8	54.5	-0.61	.550
Actions	53.4	58.4	-1.43	.170
NONCOMPETITIVE				
Dollars	45.3	44.6	0.17	.867
Actions	43.2	40.2	0.95	.356
FOLLOW-ON				
Dollars	2.9	1.1	2.08	.003*
Actions	3.4	1.5	5.96	.000*

* Significant @ .01

NOTE:

N=19 in Pre-CICA (1966-1984)

N=2 in Post-CICA (1986-1987)

Major hard goods awards to small business have not demonstrated particularly noteworthy changes in the levels of competitive or noncompetitive awards since the implementation of CICA. Follow-on awards do show significant decreases from pre-CICA levels, however, the volume of follow-on awards relative to total awards to small business is so small as to make this change rather unimportant.

Compared to the aggregate awards for major hard goods, as outlined in Table 30, the major hard goods awarded to small business are far more likely to be competitive awards. Approximately 50 percent of the small business awards, both dollars and procurement actions, are competitive compared to only about 15 percent of the dollars and 25 percent of the procurement actions for aggregate major hard goods. Small business awards account for only about 6-8 percent of the total dollar awards for major hard goods and about 25-30 percent of the procurement actions for these commodities; the balance in both cases is attributable to awards to large businesses. One could conclude, therefore, that when the aggregate data for major hard goods is broken down between small and large businesses, awards to small business are far more likely to be competitive. The opposite can be said of noncompetitive awards, i.e., small business awards are less likely than large business awards to be noncompetitive. Both of these relationships are probably predictable based on the greater number of small business vs. large business in defense contracting.

The discussion will now turn from awards for major hard goods to the awards for non-major hard goods. As will be shown, CICA has had far less of an influence on the mix of competitive, noncompetitive, and follow-on awards for non-major hard goods compared to awards for major hard goods. In fact, CICA may not have had any influence on the dependent variables associated with awards for non-major hard goods.

DIFFERENCES IN AWARDS FOR NON-MAJOR HARD GOODS

The hypotheses concerning the dependent variables associated with awards for non-major hard goods were similar to those hypotheses related to awards for major hard goods. In both cases, it was theorized that CICA would not result in statistically significant differences in post-CICA levels of the dependent variables compared to the observed levels prior to CICA. Thus, the null hypotheses tested concerning non-major hard goods suggested that no change would be experienced in the percentage levels of the dependent variables between the pre- and post-CICA periods. The results of these hypotheses tests are summarized in detail in Appendix 6-3 and outlined in general in Table 34 below.

Table 34
PRE- AND POST-CICA AWARDS FOR NON-MAJOR HARD GOODS

DEPENDENT VARIABLE	MEAN		t-TEST	
	Pre	Post	t-Value	p(t)

COMPETITIVE				
Dollars	52.0	55.9	-0.60	.555
Actions	49.4	49.6	-0.05	.963
NONCOMPETITIVE				
Dollars	47.2	43.7	0.54	.595
Actions	49.7	49.9	-0.04	.972
FOLLOW-ON				
Dollars	0.8	0.4	1.06	.304
Actions	0.9	0.5	1.50	.150

NOTE:

N=19 in Pre-CICA (1966-1984)

N=2 in Post-CICA (1986-1987)

Based on the findings in this research, there is not sufficient evidence to indicate statistically significant differences in any of the pre- and post-CICA comparisons of dependent variables associated with non-major hard goods. Therefore, the null hypotheses associated with these comparisons (H07 through H012, as stated on page 130) can not be rejected.

Unlike the differences found in awards for major hard goods, none of the comparisons of the dependent variables involving non-major hard goods demonstrated particularly noteworthy post-CICA changes. As evident in Appendix 6-3, there were statistically significant differences (.001 for dollars and .000 for actions) in modifications associated with original competitive awards, however, when the original competitive awards (w/o mods.) were tested there were no significant differences in pre- and post-CICA means.

Total modifications associated with non-major hard goods demonstrated statistically significant differences in both dollar awards (.010) and procurement actions (.000). In both categories, significant increases were observed in the post-CICA data. These increases in the total modifications helped to offset noteworthy decreases in noncompetitive awards (w/o modifications), so that total noncompetitive awards (including all modifications) showed very little change in post-CICA.

Figures 24 through 29, which appear on the following pages, illustrate the trends of competitive, noncompetitive, and follow-on awards for non-major hard goods.

Figure 24

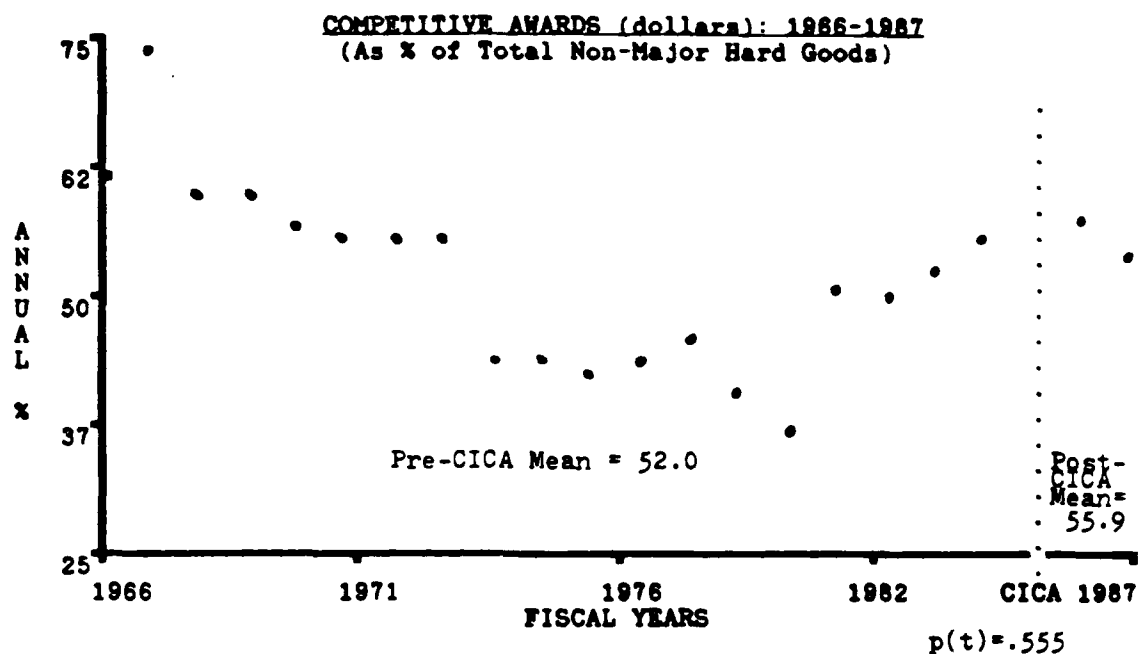


Figure 25

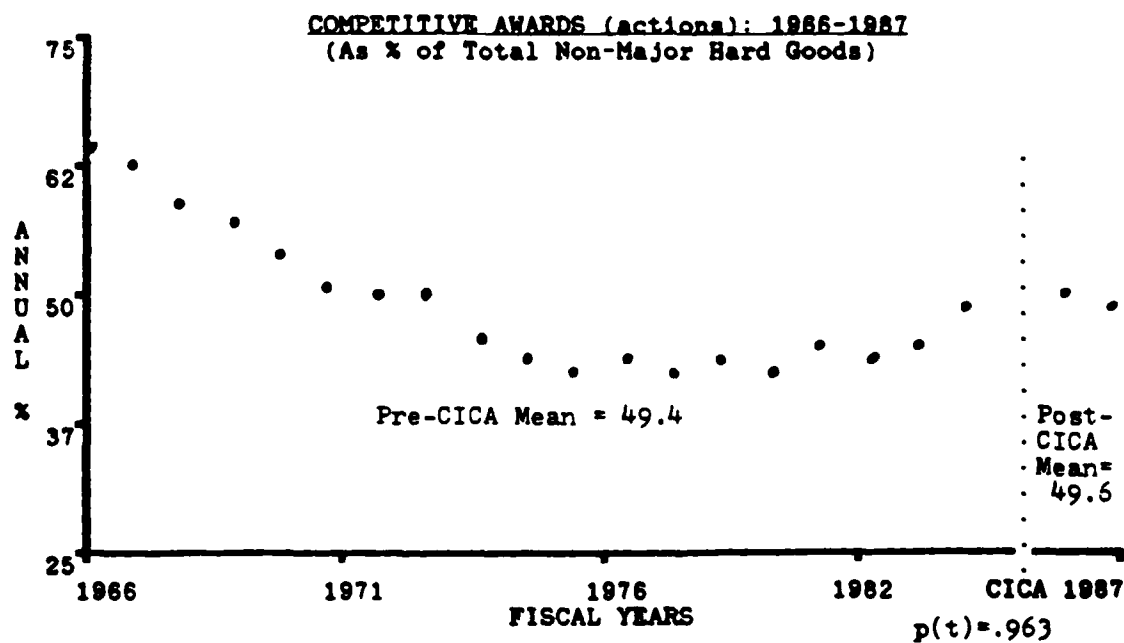


Figure 26

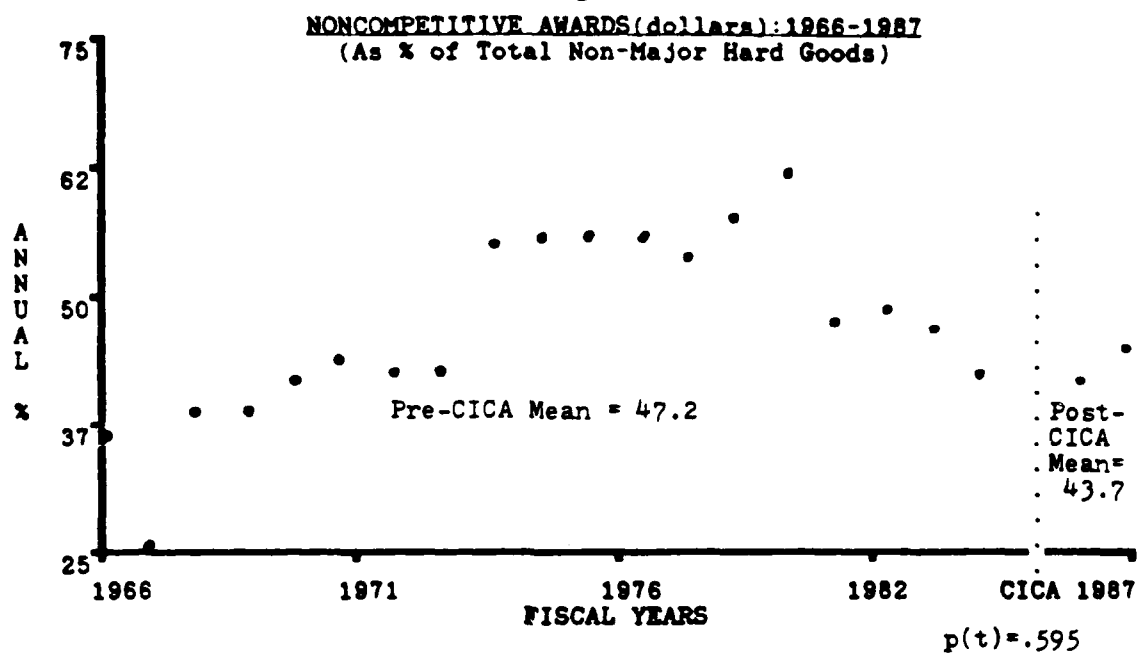


Figure 27

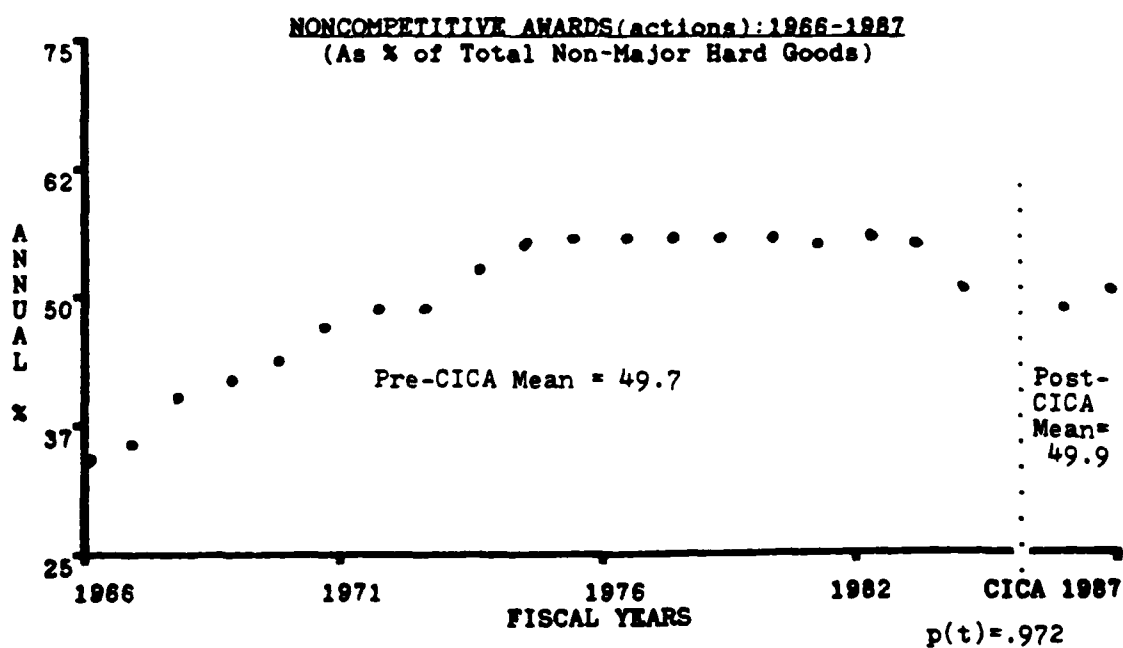


Figure 28

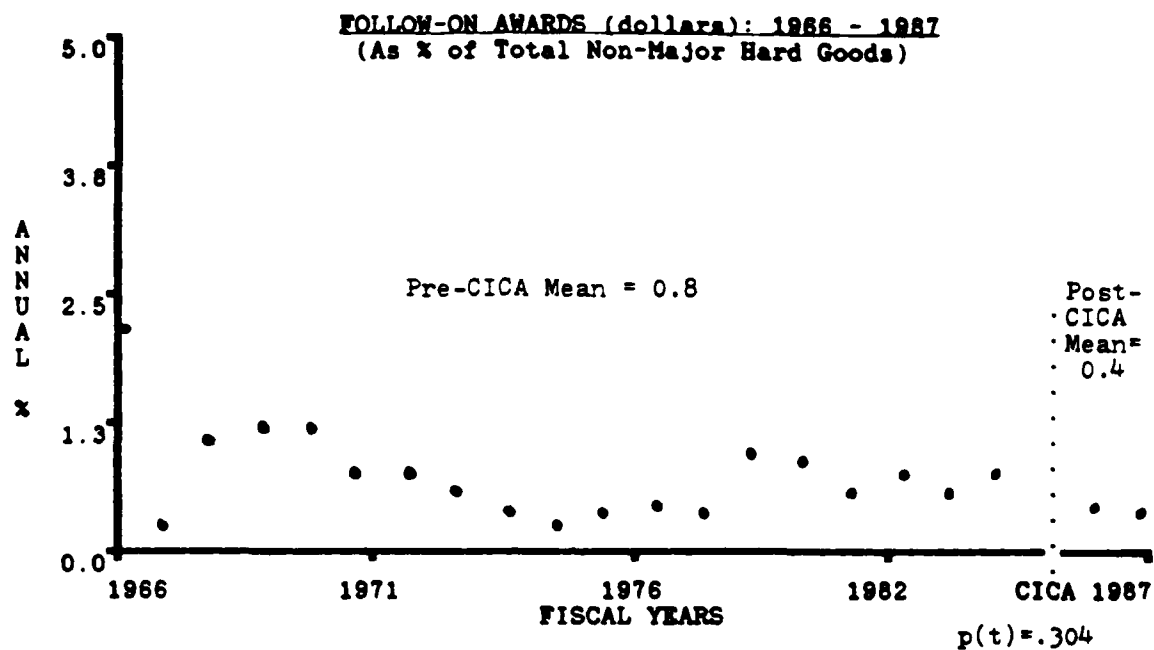
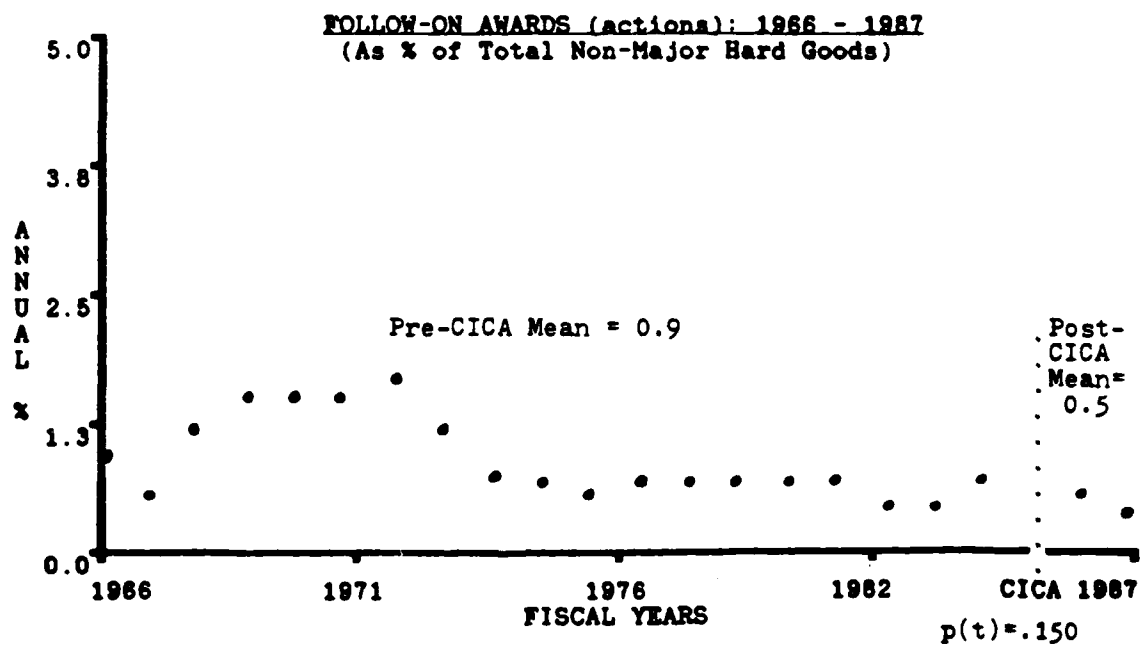


Figure 29



Perhaps the first point to note regarding awards for non-major hard goods is the fact that follow-on awards play an almost insignificant role. On the average, less than one percent of the total awards for non-major hard goods (dollars and procurement actions) involve follow-on awards. Thus, even if a significant change were to have been observed in follow-on awards, it would be rather unimportant in the context of overall awards for non-major hard goods.

The far more erratic trends in dollar awards compared to procurement actions are clearly demonstrated in the foregoing figures. While this same situation was observed in award data for major hard goods, the erratic pattern in dollar awards is much more pronounced in awards for non-major hard goods. While no investigation was conducted to explain the phenomenon of erratic trends in dollar awards, a cursory review of the trends seems to suggest that they may be tied to the terms of presidential administrations. For example, looking at Figures 24 and 26 for competitive and noncompetitive dollar awards, one can see trends between fiscal years 1969-1973 (Nixon Administration), 1974-1976 (Ford Administration), 1977-1980 (Carter Administration), and 1981-1987 (Reagan Administration). Perhaps politics, which are known to influence levels of defense spending, also have an influence on the volume of dollars spent via competitive and noncompetitive awards.

The stability in the trends of award data associated with procurement actions again suggests that this measure of the dependent variables might be a more reliable measure than dollar awards.

As was noted in the earlier illustrations related to major hard goods, there was an upward trend in competitive awards and a downward trend in noncompetitive awards beginning around fiscal years 1982/1983. A similar trend is also noted for non-major hard goods. However, unlike awards for major hard goods, the trends in awards for non-major hard goods are not continued in the post-CICA data. In other words, competitive awards decrease and noncompetitive awards increase in the post-CICA period. This, of course, is contrary to what many people would have expected. Note, however, that the probability is high that the post-CICA changes were due merely to random variations in the data.

It is clear from the foregoing figures that the same levels of awards for each of the dependent variables in the post-CICA period were also experienced in the pre-CICA data. This, of course, helps to illustrate why there is a lack of statistical significance in the comparisons of dependent variables measured in terms of non-major hard goods.

Removing the "post" post-CICA data from the aggregate post-CICA data and then plotting them separately against the pre-CICA awards helps to illustrate how the trends change when only the "post" post-CICA data are considered. Recall that the increasing influence of modifications, as a proportion of total awards in the initial years of "post" post-CICA data, tends to distort both the means and the trends in that data. This point is clearly evident in Figures 30 through 35, which appear on the following pages.

Figure 30

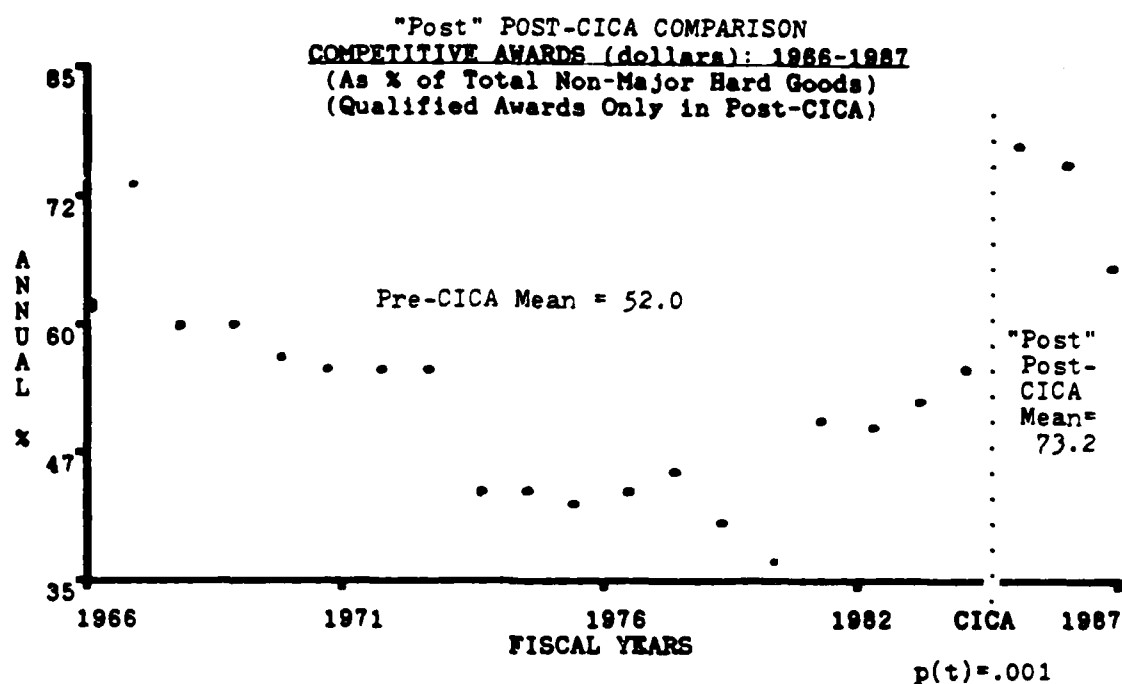


Figure 31

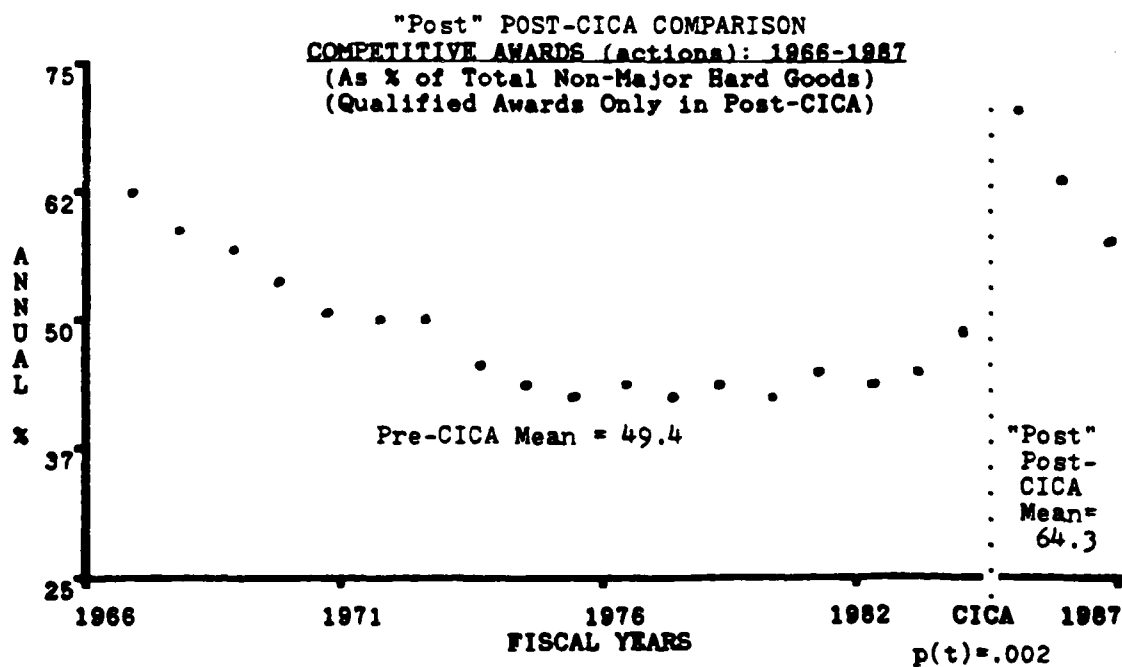


Figure 32

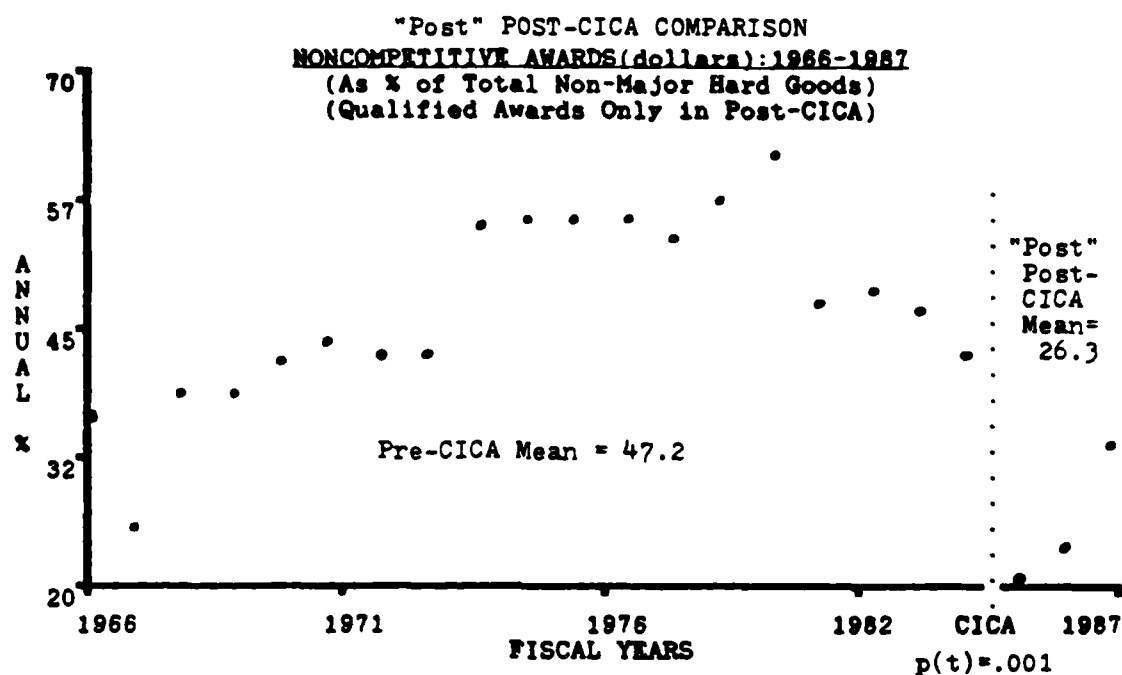


Figure 33

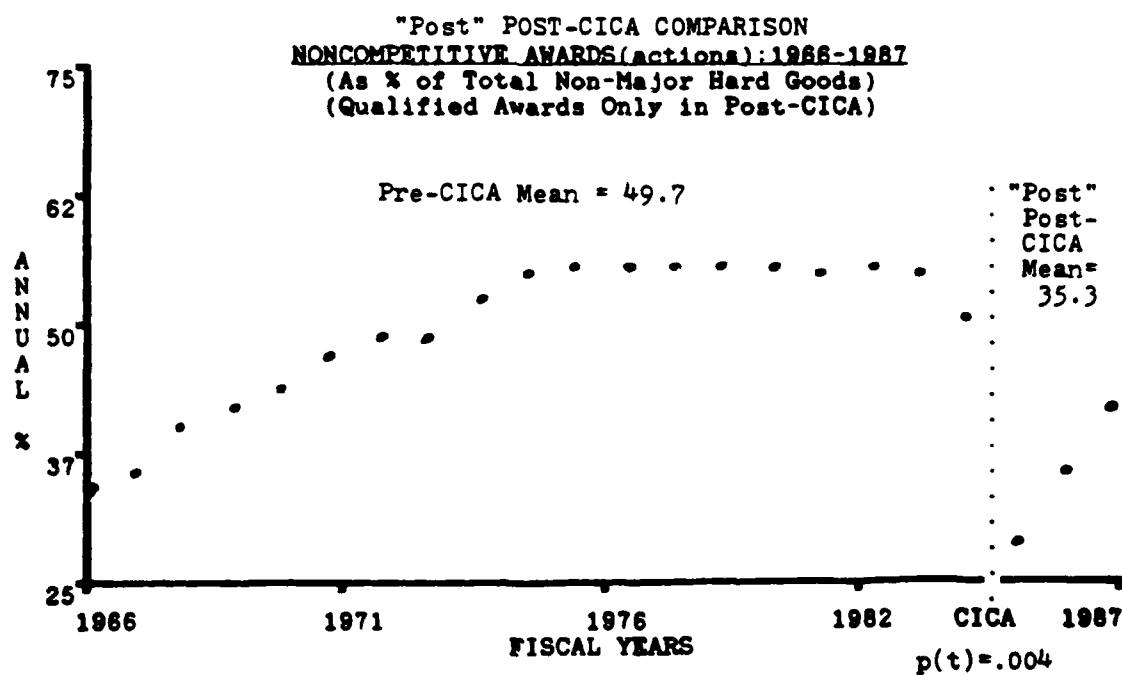


Figure 34

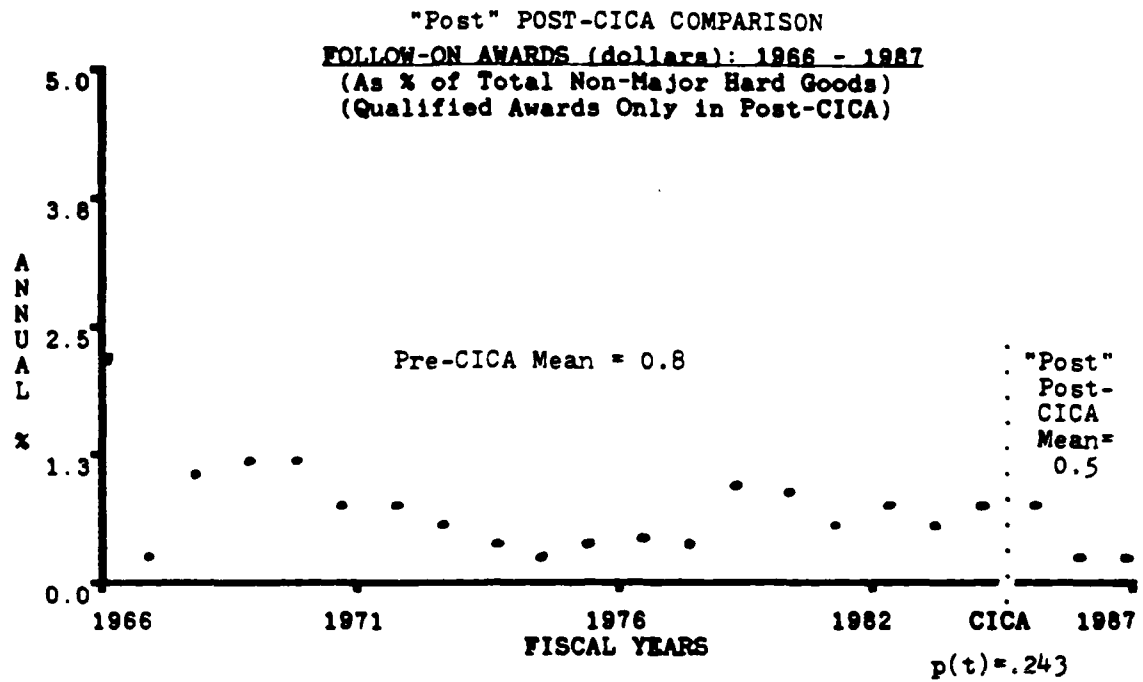
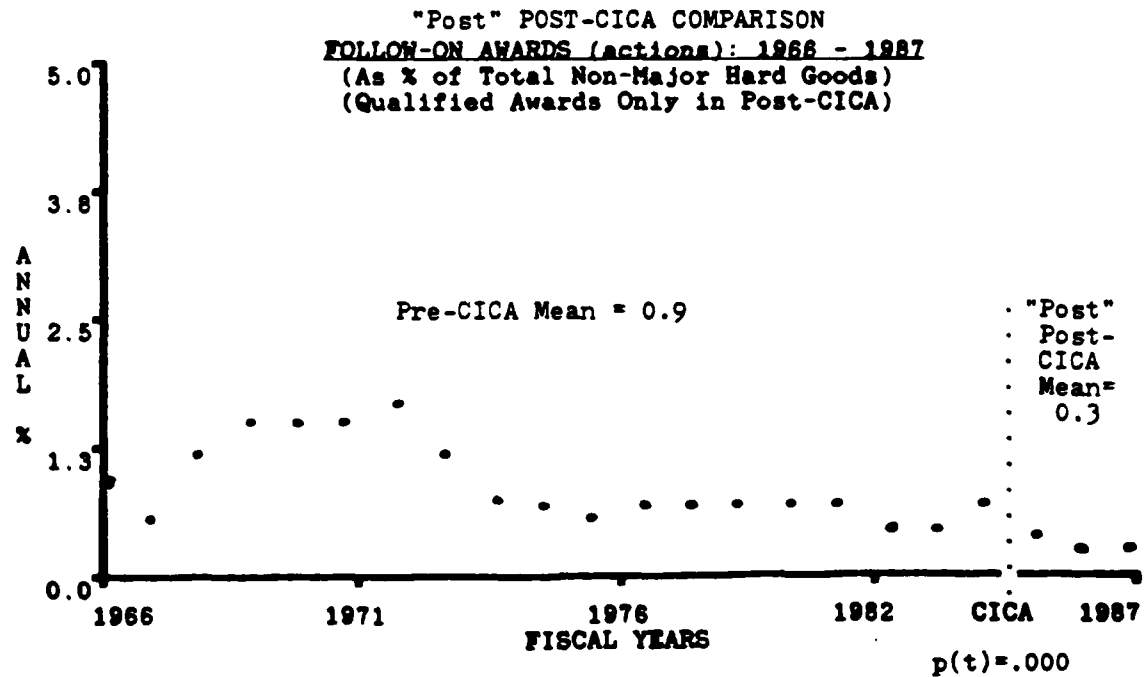


Figure 35



Isolating the "post" post-CICA data illustrates that CICA had a statistically significant influence on each measurement of the dependent variables, except follow-on dollar awards. However, just as in the similar illustrations for major hard goods, the "post" post-CICA means and trends can be misleading.

The regression of the "post" post-CICA means toward the pre-CICA levels for competitive and noncompetitive awards is fundamentally explained because of the increased influence of modifications, as a proportion of total awards in the "post" post-CICA data. When competitive and noncompetitive "post" post-CICA awards are examined without separating the modifications associated with each of these forms of award, the respective means for each of these variables are nearly identical for each year in the post-CICA period. When modifications are separated from these variables and their means are recalculated, the regression of the means toward the pre-CICA levels becomes apparent. Table 35, which appears on the following page, illustrates this point. This table provides a summary by fiscal year of the "post" post-CICA award data related to procurement actions for non-major hard goods. While only the data for procurement actions are outlined in Table 35, the basic phenomenon depicted exists for any comparison of "post" post-CICA award data, i.e., an increasing proportion of modifications in each additional year of "post" post-CICA data.

Table 35

"POST" POST-CICA AWARDS FOR NON-MAJOR HARD GOODS
(All figures are mean values for procurement actions)

VARIABLE	PRE-CICA	"POST" POST-CICA		
		1985	1986	1987
<u>COMPETITIVE</u> <u>(w/ mods.)</u>	58.6	75.1	75.2	75.2
<u>COMPETITIVE</u> <u>(mods. only)</u>	9.3	4.2	11.1	17.2
<u>COMPETITIVE</u> <u>(w/o mods.)</u>	49.4	70.9	64.1	58.0
<u>NONCOMPETITIVE</u> <u>(w/ mods.)</u>	39.4	24.3	24.1	23.8
<u>NONCOMPETITIVE</u> <u>(mods. only)</u>	6.7	2.6	4.9	6.5
<u>NONCOMPETITIVE</u> <u>(w/o mods.)</u>	32.7	21.7	19.2	17.3
<u>TOTAL</u> <u>MODIFICATIONS</u>	17.0	7.0	16.3	24.4
<u>TOTAL</u> <u>NONCOMPETITIVE</u> <u>(including all mods)</u>	49.7	28.7	35.5	41.7

NOTE:

N=19 in Pre-CICA (1966-1984)

N=3 in Post-CICA (1985-1987)

* Figures will not total to 100% due to absence of follow-on award data.

The "post" post-CICA data primarily reflects original contracts in fiscal year 1985. By 1987, however, modifications constitute a significant proportion of total awards. With each additional year of "post" post-CICA data, the proportion of total awards attributable to original contracts decrease as the proportion of modifications increase. The net effect is a

distortion in the mean values when "post" post-CICA data are considered. This distortion in the overall "post" post-CICA mean values will gradually decrease over time as the relationships between original awards and modifications stabilize.

Clearly, the increased proportion of modifications in each additional year of the "post" post-CICA data impacts the overall post-CICA (1985-1987) mean values of the variables. While this is also true of the more aggregate post-CICA data ("pre" and "post" post-CICA combined), the impact is not as profound. This is because the modifications attributable to "pre" post-CICA awards, which are inflated as a group, help to compensate for the lack of modifications in the initial "post" post-CICA awards. Refer back to Table 25 for an illustration of this point.

Because of the situation described above, it is felt that Figures 24 through 29 provide a more accurate account of the influence of CICA on the dependent variables measured in terms of non-major hard goods. This opinion was also stated concerning the data related to awards for major hard goods (Table 30) and the corresponding Figures 12 through 17.

It is recognized that the position stated above is debatable. One could argue that only the "post" post-CICA data are relevant in comparing post-CICA awards against pre-CICA awards. While this may be true, the actual comparison is flawed because the initial "post" post-CICA data are not truly comparable to the pre-CICA data.

The first year of pre-CICA data (1966) begins with a "normal" relationship between original awards and modifications.

Normal in this sense refers to a pool of existing original contracts from fiscal year 1966 and earlier that were candidates for modifications. In each year in the pre-CICA period this "normal" relationship between original contracts and modifications existed. When the initial "post" post-CICA data are considered, however, there is disparity in the "normal" relationship between original contracts and modifications. In fiscal year 1985, the first year in the post-CICA period, the only "post" post-CICA awards susceptible to modifications were those contracts awarded in the last six months of that fiscal year, i.e., from April 1, 1985 through September 30, 1985. In fiscal year 1986 the pool of original "post" post-CICA contracts susceptible to modifications grew by all the original contracts awarded in that year. Again, in fiscal year 1987, the pool of original "post" post-CICA contracts susceptible to modifications grew again. Thus, in each additional year of "post" post-CICA data, the proportion of modifications to total awards grew and as it grew the proportion of other categories of awards had to change. By fiscal year 1987, the relationship between original contracts and modifications in the "post" post-CICA data was probably approaching a "normal" state. However, overall mean values for the full post-CICA period, based on "post" post-CICA data, would be distorted if they were used to make comparisons with pre-CICA data. The regression of the "post" post-CICA means in Figures 18 through 23, for major hard goods, and Figures 30 through 35, for non-major hard goods, illustrate this point.

The proportion of awards for non-major hard goods attributable to each DOD Claimant Program were summarized in

Table 31, which was presented earlier. In that table it was shown that services ranked first among all DOD Claimant Programs in terms of overall procurement actions. The next highest ranking non-major hard goods commodity grouping was miscellaneous hard goods, which ranked third. In terms of total award dollars, services ranked fourth and construction ranked sixth among all DOD Claimant Programs. Non-major hard goods, as an aggregate group, accounted for 34 percent of the dollar awards and nearly 56 percent of the procurement actions investigated in this study.

From Appendix 7 it can be seen that there is a wide disparity in the volume of competitive and noncompetitive awards associated with the various DOD Claimant Programs in the non-major hard goods grouping. Table 36 below illustrates this point. The data in this table represent mean values over the full period of this study.

Table 36

A COMPARISON OF NON-MAJOR HARD GOODS BY COMMODITY
(All figures are mean percentages: 1966 - 1987)

CLAIMANT PROGRAM	COMPETITIVE		NONCOMPETITIVE		FOLLOW-ON	
	DOLLARS	ACTIONS	DOLLARS	ACTIONS	DOLLARS	ACTIONS
FUELS	63.9	62.3	36.1	37.5	0.0	0.2
TEXTILES	81.1	74.9	18.6	24.6	0.3	0.5
SUBSISTENCE	69.0	59.3	30.9	40.7	0.1	0.1
CONSTRUCTION	73.6	62.9	26.2	36.9	0.1	0.2
MISCELLANEOUS	49.1	52.3	49.1	46.9	1.8	0.8
SERVICES	28.2	29.2	70.4	68.8	1.4	2.0

*NOTE: Figures may not add correctly due to rounding

Table 36 helps to illustrate a point mentioned earlier concerning the almost insignificant role of follow-on awards for non-major hard goods. While follow-on awards accounted for more than ten percent of all awards for major hard goods, they account for less than one percent of awards for non-major hard goods.

Services, which accounted for the largest share of awards for non-major hard goods, both dollars and actions (see Table 31), have the lowest percentage of competitive awards of any non-major hard goods commodity grouping. Textiles, which account for the smallest share of awards for non-major hard goods, both dollars and actions, have the highest percentage of competitive awards of any individual commodity grouping. A similar situation was observed in awards for major hard goods. Aircraft, missiles, and electronics, which accounted for the largest share of awards for major hard goods, had the lowest percentage of competitive awards of any major hard goods commodity groupings. As discussed in the following paragraphs, these key relationships in individual DOD Claimant Programs help to explain observed differences in the pre- and post-CICA means for major and non-major hard goods.

In Table 30 it was shown that a statistically significant (.004) difference in pre- and post-CICA competitive means was observed for procurement actions related to awards for major hard goods. The difference was an increase in competitive procurement actions in the post-CICA data. A review of Appendix 8 will show that statistically significant (.000 to .004) differences were also observed in competitive procurement actions for aircraft,

missiles, and electronics. The differences in each of these cases were increases in the post-CICA data for competitive procurement actions. The dominant influence of the post-CICA changes in these three individual commodity groupings resulted in the statistically significant change noted in the aggregate major hard goods data.

Table 34, which was presented earlier, illustrated that there were no significant differences between pre- and post-CICA means for the dependent variables associated with awards for non-major hard goods. Appendix 8 also reflects the lack of any statistically significant differences in data related to competitive and noncompetitive awards for the individual DOD Claimant Programs associated with non-major hard goods. It is interesting to note, however, that services, the dominant category in the non-major hard goods grouping, experienced the most significant change (.049 for procurement actions) in any competitive award comparison between the individual non-major hard goods commodities. This noteworthy increase in competitive procurement actions associated with services was not, however, strong enough to result in a noteworthy change in the aggregate level of competitive procurement actions for non-major hard goods. It is also interesting that textiles, which over the full period of this research have demonstrated the highest percentage of competitive awards among any of the individual DOD Claimant Programs, actually experienced a decrease in competitive awards (dollars and actions) in the post-CICA period. There was also a post-CICA decrease in the percentage of competitive awards (dollars and actions) for subsistence.

The lack of significant changes mentioned for individual commodity groupings associated with non-major hard goods should be viewed in the context of significant changes in some of the respective pre- and post- CICA proportions of awards for these commodities. For example, from Appendix 8 it can be seen that the means for the proportion of post-CICA procurement actions attributable to services and construction increased significantly over pre-CICA levels, i.e., an increase of about 40 and 30 percent respectively. Conversely, the proportion of procurement actions associated with subsistence awards fell in the post-CICA period by over 50 percent.

The results of the statistical tests for differences between pre- and post-CICA means related to small business awards for non-major hard goods are detailed in Appendix 6-5. Table 37, which appears on the following page, outlines those results. Like the small business awards for major hard goods, the small business awards for non-major hard goods have not demonstrated particularly noteworthy changes in the post-CICA period. It is, however, interesting to note that the mean values of both dollar awards and procurement actions for competitive awards of non-major hard goods to small business decreased in the post-CICA period. There was also a corresponding increase in levels of noncompetitive awards in the post-CICA period. Although these changes were not significant, they are nevertheless noteworthy because they suggest that CICA may have had a negative influence in terms of fostering more competitive awards among small business contractors.

Table 37
PRE- AND POST-CICA AWARDS TO SMALL BUSINESS
FOR NON-MAJOR HARD GOODS

DEPENDENT VARIABLE	MEAN		t-TEST	
	Pre	Post	t-Value	p(t)
COMPETITIVE				
Dollars	71.3	69.3	0.43	.669
Actions	70.0	62.7	1.50	.151
NONCOMPETITIVE				
Dollars	28.5	30.6	-0.47	.646
Actions	29.5	37.1	-1.53	.143
FOLLOW-ON				
Dollars	0.3	0.1	2.09	.050
Actions	0.4	0.2	2.27	.035

NOTE:

N=19 in Pre-CICA (1966-1984)

N=2 in Post-CICA (1986-1987)

*Figures may not add correctly due to rounding

Small business awards for non-major hard goods have demonstrated a larger proportion of competitive awards than small business awards for major hard goods. This is also true in the aggregate data for major and non-major hard goods. The probable explanation for this situation involves the generally less complex and less costly nature of non-major hard goods and the greater number of available suppliers for these goods and services. It is not surprising to see that comparatively, more competitive awards are made for non-major hard goods than for major hard goods.

Small business awards have accounted for about 33 percent of the dollars spent on non-major hard goods and about 45 percent of the procurement actions for these commodities over the full period of this research. The balance in both cases constitutes the volume of awards for non-major hard goods that have gone to large defense contractors. When the data in Table 34, for aggregate awards of non-major hard goods, are compared with the small business data in Table 37, it is clear that small business awards for non-major hard goods are more likely to be competitive than similar awards to large businesses. The opposite is true of noncompetitive awards for non-major hard goods, i.e., small business awards are less likely than large business awards to be noncompetitive. As mentioned earlier, this same situation was evident with awards for major hard goods.

One final point is worth noting regarding small business awards. Except for dollar awards for non-major hard goods, the mean values of small business awards (major and non-major hard goods), as proportions of total prime contract awards, increased in the post-CICA period. These increases could be a signal that the small business sector has been more successful in competing with the large defense contractors in post-CICA data. This, however, is only speculation, since other explanations could account for the changes. In post-CICA data, for example, there could have been more breakouts of subcontracted small business items from large business prime contracts and then subsequent award of prime contracts to the small business for these items.

SUMMARY

The null hypotheses tested in this research involved a comparison of the pre- and post-CICA mean percentage levels of the dependent variables. The dependent variables were the percentage levels of competitive, noncompetitive, and follow-on DOD prime contract awards for major and non-major hard goods, measured in terms of both dollar awards and procurement actions. The pre-CICA period was defined as fiscal years 1966 through 1984, inclusively. The post-CICA period was fiscal years 1986 and 1987. All DOD prime contracts awarded in these periods were included in the research. Fiscal year 1985 data were not included in the comparisons because contract awards in that year do not represent a full fiscal year of procurement activity either before or after the implementation of CICA on April 1, 1984. The decision rule for rejection of the null hypotheses was an observed statistical significance of .01 or less.

Of the twelve null hypotheses tested in this study, only two were rejected. The first involved competitive procurement actions for major hard goods. The pre-CICA mean percentage for these awards was 23.3 percent of all procurement actions. The post-CICA mean was 32.9 percent. The observed significance level was .004, which indicated that the probability of the observed increase in the post-CICA data occurring merely by chance was almost nil. The second case of a rejected null hypothesis involved follow-on procurement actions for awards of major hard goods. The pre- and post-CICA means were 10.5 and 6.9

percent, respectively. The observed significance level was .000, which indicated that there was virtually no chance that the observed decrease occurred merely as a result of random variation. Although not statistically significant at the .01 level, the observed decrease in the post-CICA mean for procurement actions associated with noncompetitive awards for major hard goods was noteworthy. In this case, the pre- and post-CICA means were 66.2 and 60.2 percent, respectively, and the observed significance level was .054.

There were no cases of post-CICA changes in the dependent variables, measured in terms of dollar awards, in which particularly noteworthy differences were observed. The most statistically significant change associated with dollar awards involved competitive awards for major hard goods. In this case, the observed change in the pre- and post-CICA means (13.8 and 18.1 percent, respectively) resulted in a statistical significance of .254.

The data associated with dollar awards showed much more variability over the period of the study than did the data associated with procurement actions. The greater stability in the data related to procurement actions suggests that this measure of the dependent variables is a more reliable measure of change than dollar awards. Based on this assumption, there is sufficient evidence in the data related to procurement actions to conclude that CICA has had an important influence on awards for major hard goods. Competitive awards have increased while noncompetitive and follow-on awards have decreased in the post-CICA period. Increases in the post-CICA levels of competitive

awards for aircraft, missiles, and electronics generally explain the aggregate changes in post-CICA awards for major hard goods. The means of the dependent variables associated exclusively with small business awards for major hard goods also changed in the post-CICA data but the extent of the changes were not as significant as the changes related to awards made to large businesses.

The influence of CICA on awards for non-major hard goods was almost negligible, based on the findings in this research. There were virtually no changes in the pre- and post-CICA means for competitive and noncompetitive awards of non-major hard goods, measured in terms of procurement actions. While some change was noted for follow-on awards of non-major hard goods, follow-on awards collectively constitute less than one percent of the awards for these commodities.

Services, as an individual commodity grouping, accounted for the largest share of awards for non-major hard goods over the full period of this study, i.e., more than 30 percent. Services also experienced a noteworthy increase in the level of competitive awards in the post-CICA data. This increase, however, was partially offset by decreases in competitive awards for textiles and subsistence.

Small business awards for non-major hard goods were not significantly changed in the post-CICA period. It is noteworthy, however, that competitive awards in this category decreased slightly and noncompetitive awards increased in the post-CICA period.

An important finding from this research involved the significance of modifications in DOD procurements and the strong influence modifications have had on the volume of competitive, noncompetitive, and follow-on awards. The manner in which modifications are treated in any analysis of award data can greatly influence the subsequent findings. This is particularly true in pre- and post-CICA comparisons of award data, since modifications as a proportion of total awards have increased approximately 30 percent in the post-CICA period.

It is important to recognize that comparisons of pre-CICA award data with "post" post-CICA data can result in distorted findings. The comparisons are flawed because the initial years of "post" post-CICA data clearly demonstrate regressions toward the pre-CICA means. These phenomena are artifacts of the data rather than actual changes in the levels of the dependent variables. The regressions toward the pre-CICA means that are observed in the "post" post-CICA data are functions of the increasing proportions of modifications relative to total awards in each of the initial years of post-CICA data. Thus, modifications as a proportion of total awards are understated in fiscal years 1985 and 1986 (perhaps even 1987) and this causes competitive awards to be overstated and noncompetitive awards to be understated in these same years.

CHAPTER VI

SUMMARY AND CONCLUSIONS

SUMMARY

THE PURPOSE OF THE RESEARCH

Since the 1960s and the procurement initiatives instituted by the then Secretary of Defense Robert McNamara, many attempts have been made to reform the DOD procurement system. The problems identified in these reform initiatives have varied from cost overruns involving major weapon systems to overpriced spare parts. Frequently, situations involving fraud, waste, and abuse have been the catalyst behind the reform efforts. The current procurement scandals involving collusion and inside trading of procurement information are examples of situations that will result in additional moves to reform the defense procurement system.

If one could link each of the above mentioned issues to some common ground and then assume (simplistically) that there was really one central issue that was pervasive, the central focus would likely involve the issue of competition, or the lack of competition, in defense procurements. Clearly, the subject of competition, either directly or indirectly, has been the focus of most of the major procurement reform efforts initiated over the past 30 years.

Perhaps the most obvious and the most direct reform initiative to have addressed the issue of competition in defense procurement has been the Competition in Contracting Act of 1984. CICA, as the law is commonly called, was implemented on April 1, 1985, and it impacted the procurement activities of every agency in the federal government. The quintessential purpose of CICA was to promote the award of more competitive contracts and reduce the number of noncompetitive contract awards. Since the DOD accounts for about 80 percent of all federal procurements, CICA effectively was enacted to impact upon defense procurements. The legislative history surrounding the enactment of CICA is clear on this point.

The purpose of this research has been to comprehensively investigate the issue of competition in defense procurement. Specifically, this study attempted to determine if there have been changes in the volume of competitive, noncompetitive, and follow-on prime contract awards made by the DOD, since the implementation of CICA.

The results of this research are important because they provide an empirical measure of competition in defense contracting over the past 22 years and perhaps the first empirical data concerning the efficacy of CICA. In addition, this study provides an indication of which commodities and services have been influenced the most by CICA, as well as which defense contractors, i.e., large or small, may have been influenced.

METHODOLOGY

The research design used was a case study of archival data involving all of the DOD prime contract awards made between fiscal years 1966 and 1987, inclusively. Award data classified as small purchases were not considered in this research. The dependent variables were the levels (percentages) of competitive, noncompetitive, and follow-on DOD prime contract awards for major and non-major hard goods, measured in terms of both dollar awards and procurement actions. The independent variable was the implementation of the Competition in Contracting Act of 1984 (CICA), which became effective on April 1, 1985.

Award data pertaining to the dependent variables were stratified over the time period and related to each of 13 categories of goods and services (DOD Claimant Programs) acquired by the DOD. For each of the 22 years in the period of this study, the total volume of spending on prime contract awards and the total volume of procurement actions for each dependent variable were broken down by the DOD Claimant Programs and then aggregated into groups of major and non-major hard goods. Similar procedures were used to stratify prime contract awards made to small businesses.

It was theorized that the unique features of the defense market and the nature of the goods and services acquired by the DOD would preclude CICA from having a significant influence on defense procurements. Each of the twelve null hypotheses that were tested in this study were formulated to suggest that no statistically significant change would be observed when comparing

pre- and post-CICA measurements of the dependent variables. The pre-CICA period was defined as all prime contract awards made between fiscal years 1966 and 1984, inclusively. The post-CICA period was defined as all prime contract awards made in fiscal years 1986 and 1987. Fiscal year 1985 award data were not included in the hypotheses tests because these awards did not represent a full fiscal year of procurement activity either before or after the implementation of CICA.

To test the hypotheses, the entire research population of prime contract award data was treated as if it were two randomly selected independent "samples" of size $n(1)=19$ (pre-CICA fiscal years 1966-1984, inclusively) and $n(2)=2$ (post-CICA fiscal years 1986 and 1987). The "sample units" used in the statistical analysis consisted of complete fiscal years of contract award data. Each hypothesis was tested by utilizing independent t-Tests for the equality of the pre- and post-CICA means for each of the dependent variables. The null hypotheses were rejected when the computed significance of the t statistic was less than or equal to .01.

In addition to the t-Tests for differences between pre- and post-CICA measurements of the dependent variables, time plots (XY graphs) were constructed to illustrate trends in the data. The time plots were also used to illustrate specific aspects of the post-CICA data that could distort conclusions about the efficacy of CICA.

The major findings from this research are outlined and described in the following section.

MAJOR FINDINGS

The findings of this research, as they relate to the hypotheses that were tested, are summarized in Table 38.

Table 38

SUMMARY OF THE MAJOR FINDINGS

NULL HYPOTHESES (No Pre/Post-CICA % Change)	STATISTICAL SIGNIFICANCE (Observed at .01 or less)	
	REJECTED	NOT REJECTED
<u>MAJOR HARD GOODS</u>		
DOLLAR AWARDS		
H01: Competitive Awards		X
H02: Noncompetitive Awards		X
H03: Follow-on Awards		X
PROCUREMENT ACTIONS		
H04: Competitive Awards	X	
H05: Noncompetitive Awards		X
H06: Follow-on Awards	X	
 <u>NON-MAJOR HARD GOODS</u>		
DOLLAR AWARDS		
H07: Competitive Awards		X
H08: Noncompetitive Awards		X
H09: Follow-on Awards		X
PROCUREMENT ACTIONS		
H010: Competitive Awards		X
H011: Noncompetitive Awards		X
H012: Follow-on Awards		X

An examination of the aggregate award data for each dependent variable, both with and without distinctions made between major and non-major hard goods, did not disclose a single case of an observed statistically significant difference (.01 or less) between pre- and post-CICA measurements, when dollar awards were used to measure the variables. Consequently, all of the

null hypotheses involving measurements of the dependent variables using dollar awards failed to be rejected.

When the dollar award data were disaggregated by individual commodity groups, only two statistically significant changes in the post-CICA data were observed. These changes involved an increase in competitive dollar awards for missiles and space systems and an increase in follow-on dollar awards for the tank and automotive commodities. In terms of dollar awards to small businesses, the only observed post-CICA change that was statistically significant involved a decrease in follow-on awards for major hard goods.

The data seemed to suggest that procurement actions, rather than dollar awards, are a better measurement of the dependent variables. The data related to procurement actions were generally more stable over the period than data related to dollar awards. Because of the greater stability in the procurement action data, the influence of CICA seemed to be more noticeable. Conversely, because of the more erratic trends and random variation in the dollar award data, the post-CICA changes measured in terms of dollars were less likely to demonstrate statistical significance.

When procurement actions were used to measure the dependent variables, the influence of CICA on awards for major hard goods was clearly observed. A statistically significant increase in competitive awards and a decrease in follow-on awards in the post-CICA period was observed. Although the change was not significant at the .01 level, the observed post-CICA decrease in the noncompetitive awards for major hard goods was significant at

the .054 level, and, therefore, the change is noteworthy.

In view of the foregoing findings, the null hypotheses related to competitive and follow-on awards for major hard goods, measured in terms of procurement actions, were rejected. The null hypothesis related to noncompetitive awards for major hard goods, measured in terms of procurement actions, was not rejected.

Collectively, CICA has influenced awards for major hard goods and the magnitude of the changes have been noteworthy. For example, as a percentage of total awards for major hard goods measured in terms of procurement actions, competitive awards rose from a pre-CICA average of 23.3 percent to a post-CICA average of 32.9 percent. Noncompetitive pre-CICA awards for major hard goods were 66.2 percent but fell to 60.2 percent in the post-CICA data. The percentage of pre-CICA follow-on awards also decreased in post-CICA from 10.5 to 6.9 percent. In general, these changes in the post-CICA awards for major hard goods can be explained based on significant increases in the post-CICA levels of competitive awards for aircraft, missiles, and electronics.

The comparisons of awards made to small businesses for major hard goods, as measured by procurement actions, disclosed a statistically significant decrease in follow-on awards in the post-CICA period. There was also a noteworthy increase in competitive awards and a decrease in noncompetitive awards.

In contrast to the observed changes in post-CICA award data for major hard goods, the comparisons involving procurement actions for non-major hard goods disclosed no statistically significant differences between the pre- and post-CICA periods.

Based on the data in this study, all of the null hypotheses that dealt with non-major hard goods, measured in terms of procurement actions, failed to be rejected. In fact, the pre- and post-CICA mean values for competitive and noncompetitive awards were almost identical. Specifically, the pre- and post-CICA means for competitive awards were 49.4 percent and 49.6 percent, respectively, and 49.7 and 49.9 percent, respectively, for noncompetitive awards. Follow-on awards for non-major hard goods did not demonstrate noteworthy changes in the post-CICA data. Actually, follow-on awards for non-major hard goods are almost negligible and over the period of this study they have accounted for less than one percent of the total awards for non-major hard goods.

The six DOD Claimant Programs that collectively formed the non-major hard goods grouping were each tested individually for differences in pre- and post-CICA levels of the dependent variables. Noteworthy post-CICA changes were observed in the increased level of competitive procurement actions for services and the increased level of noncompetitive procurement actions for textiles.

Non-major hard good awards to small businesses disclosed no statistically significant differences between the pre- and post-CICA data when the dependent variables were measured in terms of procurement actions. It is worth noting, however, that competitive awards in this category decreased in the post-CICA period to mean of 62.7 percent, compared to a pre-CICA mean of 70.0 percent.

Modifications to original contracts involved a very significant share of the total prime contract awards investigated in this research. In terms of dollar awards, modifications have accounted for 41 percent of the total awards over the 22 years of data investigated in this research. In terms of procurement actions, modifications have accounted for 24.9 percent of the total awards. Modifications have accounted for 50.6 percent of all contract dollars spent on major hard goods. Modifications, however, are less significant in terms of total awards when awards to small businesses are involved. For example, modifications have accounted for only 25.5 percent of total dollar awards involving major hard goods awarded to small businesses over the full period of this research.

Because of the importance of modifications, the way they are viewed in terms of the dependent variables will influence the findings. It was shown that modifications skewed the award data when only "post" post-CICA data were considered in the post-CICA period. The consequence of such an analysis was a regression of the "post" post-CICA means toward the pre-CICA means. This phenomenon was essentially an artifact of the data rather than an actual change in the mix of dependent variables in the post-CICA period. It resulted because the first year of "post" post-CICA data understated modifications as a proportion of total awards and thus, original contract awards were overstated. This, in turn, overstated competitive awards and understated noncompetitive awards. With each additional year of "post" post-CICA data, the proportion of modifications to total awards grew

causing the proportion of noncompetitive awards to also grow and competitive awards to shrink. Thus, the means of the "post" post-CICA data regressed toward the pre-CICA means with each additional year of "post" post-CICA data.

Because of the rapidly increasing proportions of modifications relative to total awards in each of the initial years of "post" post-CICA data, comparisons of pre-CICA awards with "post" post-CICA awards are flawed and the subsequent findings will be distorted. Future investigations that distinguish modifications from original contracts, as in this research, should be sensitive to this point.

Overall, the evidence in this research suggests that CICA has had an influence on defense procurements. The influence of CICA in stimulating more competitive awards and fewer noncompetitive and follow-on awards for major hard goods has been particularly noteworthy. The evidence from the data, however, does not suggest that CICA has been influential in terms of increasing competitive awards or decreasing noncompetitive awards for non-major hard goods. There is even some indication that CICA may have influenced fewer competitive awards and more noncompetitive awards for non-major hard goods, when awards to small businesses are considered.

CONCLUSIONS

In formulating the hypotheses of this research it was suggested that CICA would not result in significant changes in the percentage levels of the dependent variables. On the other hand, it was suggested that if CICA were influential in changing the percentage mix of the dependent variables, then it would be likely that two assumptions concerning pre-CICA conditions would follow. The assumptions were:

1. That previous policy and established procedures for stimulating competition were either not sufficiently effective or they were not being properly implemented;
2. That there was pent-up demand in the private sector for more competition and potential sellers wanted more opportunities to compete for government contracts.

Based on the findings in this research and the demonstrated influence CICA has had on the dependent variables related to major hard goods, the foregoing assumptions would appear to have been correct concerning acquisitions for major hard goods. The significant post-CICA changes in the dependent variables, measured in terms of procurement actions, suggest that prior to CICA many procurement transactions were not accomplished competitively in situations when competition may have been possible.

The degree to which previous policies and procedures may have been lacking or ignored is unknown, but the fact that a significant post-CICA change has been observed in awards for major hard goods suggests shortcomings in pre-CICA efforts to

foster competitive contract awards for these commodities. This apparent shortcoming, however, appears to be associated with awards to large defense contractors rather than awards to small businesses. The data related to awards for major hard goods received by small business did not reflect noteworthy changes in the post-CICA period. It may be that this situation indicates that procurement policies and programs, such as CICA, have less of an influence on small business defense contractors than they do on large defense contractors.

The foregoing conclusions concerning the apparent influence of CICA on awards for major hard goods are in no way intended to imply that savings have resulted in the post-CICA period as a result of an increase in the volume of competitive awards for major hard goods. Such a conclusion is not justified from the findings in this research.

The lack of a demonstrated influence of CICA on the dependent variables related to non-major hard goods suggests that the above mentioned assumptions were not correct in regard to acquisitions for this commodity group. In other words, it would appear that policies and procedures established and implemented prior to CICA were sufficient to foster competitive contract awards at about the same levels experienced in the post-CICA period. It may even be possible that pre-CICA policies and procedures were more beneficial in terms of fostering competitive awards for small businesses, since competitive awards as a proportion of total small business awards for non-major hard goods fell by approximately 10 percent in the post-CICA period.

The importance of modifications can not be overlooked in a comprehensive investigation of defense procurements. In this study all modifications were treated as noncompetitive awards because in the purest sense a contract that is modified, either unilaterally or bilaterally, is done so in the absence of competitive bidding or offers from two or more contractors. In other words, modifications are clearly sole source transaction involving only one contractor - the incumbent.

It should be recognized that the DOD does not categorize modifications in the manner used in this study. Instead, the DOD records modifications as competitive, noncompetitive, or follow-on awards based upon the nature of the original contract. For example, a modification to a contract that was originally awarded based on competitive bids or offers would be recorded as a competitive award, despite the fact that only the incumbent contractor was involved in any negotiations related to the award of the contract modification.

Clearly, it is unrealistic to assume that all modifications could or should be subject to competitive resolicitation each time the need to modify a contract arises. Any interpretations of the findings in this research that suggest such a conclusion are without foundation. The reality of the contracting process mandates that contracts must be modified on occasion and that it is both economically impracticable and imprudent to subject each proposed modification to the rigors of competition. Having said this, however, it is also unrealistic to assume that modifications are competitive awards and hence, this research treated them as noncompetitive.

Treating all modifications as noncompetitive awards, as was done in this research, or as competitive, noncompetitive, or follow-on awards based on the original contract, as the DOD does, is merely an accounting function. Regardless of the approach, modifications are still modifications. The danger, however, lies in the political sensitivity of recognizing them as noncompetitive awards and thereby, acknowledging an even greater volume of noncompetitive awards than would otherwise be the case. The same potential danger could be associated with the accounting for follow-on awards. Follow-on awards, like modifications, are in essence noncompetitive awards, since they involve only the incumbent contractors.

The point here is that neither the arbitrary manipulation of the numbers or euphemistic definitions of the terms change the reality that every contract transaction is either competitive or it is not. The DOD's practice of reporting defense procurement awards, which include modifications to original competitive contracts as additional competitive awards, inflates the reported volume of competitive awards. This is merely an illusion of competition in defense procurement, not competition itself.

The findings from this research and the hypotheses that have been tested have been supported based upon statistical analyses and the related laws of probability associated with a statistical significance of .01 or less. This methodological approach, as a matter of convention, was applied to an entire population of contract award data. While supportable methodologically, research conclusions drawn solely from an observed statistical

significance may be too limiting when a full population of data are involved. With that thought in mind, a word about the practical significance of the findings from this research is in order.

The practical significance of the observed changes in pre- and post-CICA measurements of the dependent variables may not be as absolute as the statistical significance might suggest. The trends in the dollar awards in every aggregate measurement of the data, both with and without distinctions being made between major and non-major hard goods, showed that competitive awards had increased and noncompetitive and follow-on awards had decreased in the post-CICA period. While most of these changes were not particularly noteworthy and the probability of any individual change could clearly be attributed to chance, the collective and consistent nature of the changes suggests that CICA has had some influence on the dependent variables in terms of dollar awards. Thus, although each of the null hypotheses involving dollar measurements of the dependent variables failed to be rejected based on an observed statistical significance of .01 or less, there is, nonetheless, some reason to believe that CICA may have influenced the observed post-CICA changes.

The same conclusion, as mentioned above concerning the practical significance of the post-CICA changes measured in terms of dollar awards, can be postulated in regard to awards measured by procurement actions. The trends in the aggregate data, both with and without distinctions being made between major and non-major hard goods, reflect post-CICA increases in competitive awards and decreases in noncompetitive and follow-on awards.

Again, the individual changes in many cases were insignificant and were probably attributable to random variations in the data rather than to CICA. Collectively, however, the consistent nature of the changes and the fact that the observed changes in measurements by procurement actions followed the same general patterns as the observed changes related to dollar awards, again suggest that CICA has influenced the dependent variables. The fact that this study involved the entire population of award data lends credence to these observations about the practical significance of the observed post-CICA changes in the aggregate data.

The foregoing discussion of the practical significance of post-CICA changes is supportable merely in terms of a generality and not necessarily in terms of scientific inquiry. Clearly, the conclusions that are supportable based on the findings from this research relate to the hypotheses that were rejected or not rejected. In this context, it can be said that CICA has influenced the dependent variables related to awards for major hard goods but has failed to influence them in terms of awards for non-major hard goods.

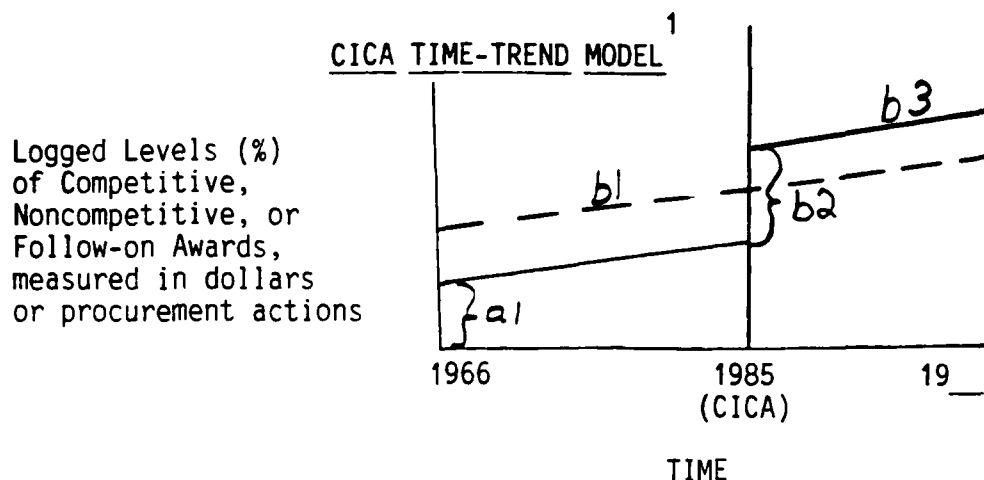
RECOMMENDATIONS FOR FUTURE RESEARCH

Because this study was constrained by the limited period of time that has elapsed since the implementation of CICA, the findings are subject to change or refinement given additional fiscal years of post-CICA data. It is recommended, therefore,

that this research be replicated once two or three more years of award data are available.

In addition to the replication of this study based on the same methodological approach used here, another methodological approach could also be taken. An interrupted time series design using a multiple regression model could be utilized effectively, given a few more years of award data. A suggested model for such a study appears on the following page.

Regardless of the approach that might be selected, it is recommended that fiscal year 1985 data be deleted from the analyses for the reasons given in this research. It is also recommended that the influence of modifications in the initial years of the "post" post-CICA data be noted and that this feature in the data be dealt with in subsequent comparisons with pre-CICA awards. Finally, individuals who may wish to pursue research dealing with defense procurement data should be aware that published award statistics may not be comparable from year to year because of frequent changes in the way the DOD has defined awards classified as competitive and noncompetitive. The key to understanding this shortcoming in the published DOD procurement statistics is a comprehensive understanding of how the original award data have been collected over the years, i.e., the DD Form 350.



$$\text{LOG}(Y_t) = a_1 + b_1X_{1t} + b_2X_{2t} + b_3X_{3t} + u_t$$

WHERE:

Y_t represents the annual percent of total prime contracts (dollars or actions) for any individual DOD Claimant Program (or major/non-major hard good groupings) made on the basis of competitive, noncompetitive, or follow-on awards, for $t=1966$ through $19\_\_$ (the natural log of Y_t is regressed).

X_{1t} represents a time trend from 1966 through $19\_\_$, where $X=1$ for 1966, 2 for 1967,..... n for $19\_\_$.

X_{2t} represents a division in pre- and post-CICA periods, with 0 before and 1 after, where $X=0$ for 1966, 0 for 1967,.....1 for 1986, 1 for 1987, 1 for $19\_\_$.

X_{3t} represents a time trend after CICA, with 0 before and a counter for each year after, $X=0$ for 1966...0 for 1984, 1 for 1986, 2 for 1987,..... n for $19\_\_$.

u_t represents the error term.

a_1 estimates the level (%) of the dependent variables (in dollars or actions) in 1966.

b_1 estimates the slope of the level (%) of the dependent variables across the entire time series.

b_2 estimates the increment in the level (%) of dependent variables from 1984 to 1986 (1985 data is not used).

b_3 estimates the increment in the slope of the level (%) of dependent variables after CICA.

1

For more conceptual details see Kathryn E. Newcomer and Richard J. Hardy, "Analyzing Policy Impacts: Selection of Linear Trend Models," Policy Studies Journal, VIII (Summer 1980): 928-941.

This research has provided some insight concerning the influence of CICA on reported contract awards. The question of whether or not more competition has actually resulted in overall savings to the DOD remains to be answered. It is perhaps impossible to answer this question beyond its relevance to an individual acquisition. It may, on the other hand, be possible to quantify the additional costs the DOD has incurred in its efforts to promote more competition pursuant to CICA and then evaluate these costs in terms of aggregate gains (or losses) in the numbers of competitive procurement actions that have been achieved for the added costs. This approach might be similar to a return on investment analysis but instead of equating profit to investment the approach would be to equate gains or losses in competitive procurement actions to the added costs (investment) associated with fostering more competition under CICA. The results may provide some empirical data that might be helpful in answering perhaps the most pressing question surrounding competition in defense procurements. That question is:

"A what point do we reach economic diminishing returns in our efforts to foster additional competition in defense procurements?"

APPENDIX 1

SECTION III

DOD CLAIMANT PROGRAM NUMBER

(Item B8B)

A claimant program number designates a grouping of supplies, construction or other services. One of the following code numbers should be entered in Item B8B of each DD Form 350 in accordance with definitions provided in this section.

<u>Code</u>	<u>Program Title</u>
A1A	Airframes and Related Assemblies and Spares
A1B	Aircraft Engines and Related Spares and Spare Parts
A1C	Other Aircraft Equipment and Supplies Not Included in A1A and A1B
A2B	Missile and Space Systems
A3B	Ships
A4A	Combat Vehicles
A4B	Non-Combat Vehicles
A5B	Weapons
A6B	Ammunition
A7B	Electronics and Communication Equipment
A8A	Petroleum
A8B	Other Fuels and Lubricants
A8C	Separately Procured Containers and Handling Equipment
A9B	Textiles, Clothing, and Equipage
B1B	Building Supplies
B2B	Subsistence
B3B	Transportation Equipment (Railway)
B9B	Production Equipment
C2B	Construction
C9A	Construction Equipment
C9B	Medical and Dental Supplies and Equipment
C9C	Photographic Equipment and Supplies
C9D	Materials Handling Equipment
C9E	All Others Not Identifiable to Any Other Procurement Program
S1B	Services

When planned use is known at the time of purchase, a procurement program should be selected on the basis of the use of the supplies or work purchased. This includes all items pertaining to the following:

1. Crating, packaging materials, and dunnage.
2. Conversion, maintenance, and repair, including:
 - a. Materials
 - b. Services (performed by contractors)
 - c. Operating supplies
 - d. Components and repair parts
3. Related training equipment and devices (including technical manuals and publications).
4. Related research and development and preproduction materials and equipment. An exception, however, is the construction of research and development facilities, which are included in program C2B.

When planned use is not known, items pertaining to the supplies and services listed above shall be identified with program C9E or S1B, as appropriate.

APPENDIX 1

A-1 AIRCRAFT PROGRAM

This program consists of three subprograms: (a) Airframes and Related Assemblies and Spares; (b) Aircraft Engines and Related Spares and Spare Parts; and (c) Other Aircraft Equipment and Supplies not included in subprograms (a) and (b).

(a) Airframes and Related Assemblies and Spares.

<u>Includes</u>	<u>Excludes</u>	<u>Program in Which Exclusions are Included</u>
Complete aircraft (procured as such, i.e., helicopters, excluding GFE).	GFE tires and tubes	A-1c
Airframe assemblies and spares, such as tail assemblies, wing assemblies, landing gears, etc.	General purpose production equipment.	B-9
Special jigs, dies, and fixtures to be used only in the fabrication of a specific airframe model (including variations thereof).	Production facilities.	C-2
Maintenance tools peculiar to the aircraft.		

(b) Aircraft Engines and Related Spares and Spare Parts.

<u>Includes</u>	<u>Excludes</u>	<u>Program in Which Exclusions are Included</u>
Aircraft engines and parts.	Aircraft engines incorporated in aircraft procured as complete aircraft.	A-1a
Assist takeoff other than droppable units.	Assist takeoff (ATO), droppable units only.	A-6
Aircraft jet engines and parts used, without major modification, on guided missiles.	General purpose production equipment.	B-9
Special jugs, dies, and fixtures to be used only in the fabrication of a specific model of aircraft engine, including inspection gauges.	Production facilities.	C-2
Maintenance tools peculiar to the engine.		

(c) Other Aircraft Equipment and Supplies Not Included in Subprograms (a) and (b).

<u>Includes</u>	<u>Excludes</u>	<u>Program in Which Exclusions are Included</u>
Aircraft instruments and parts (except electronic equipment for communication, fire control, and radar). Electrical equipment, such as generators, inverters, starters, alternators, etc.	GFE electronics and communications equipment.	A-7
Aircraft propellers and hubs.	GFE weapons.	A-5
Mobile training units.	GFE fire control, bomb sights and related electromechanical devices.	A-5 or A-7
Flight simulators.	Aircraft weapons.	A-5
Ground handling equipment peculiar to a specific model of aircraft.	Photographic equipment.	C-9
Other accessories and parts readily identifiable for aircraft use, such as gun turrets, bomb racks and releases, rocket launchers, fuel tanks, droppable aircraft tanks, tires and tubes, control wires, servo and other control mechanisms, etc.	Airborne accessories not an operational part of the aircraft, such as life rafts, oxygen masks, parachutes, fire extinguishers, etc.	A-9 or C-9
	Organizational equipment, such as general ground or deck handling equipment, ships, hangar, and airfield equipment.	B-9 or C-9

APPENDIX 1

A-2 MISSILES AND SPACE SYSTEMS PROGRAM

<u>Includes</u>	<u>Excludes</u>	<u>Program in Which Exclusions are Included</u>
Missiles and space systems.	GFE aircraft jet engines used, without major modifications, on missiles or space systems.	A-1b
All missile and space system parts and related equipment procured from prime contractors except items excluded.	Fuels.	A-6 or A-8
CFE electronic equipment for missiles and space systems.	GFE electronic equipment.	A-7
Booster cases for missiles.		
Ground handling and launching equipment peculiar to a specific model of missile or space system.		
Target drones.		
Special jigs, dies, and fixtures which can be used only in producing specific types of missiles and space systems, including inspection gauges.		

A-3 SHIPS PROGRAM

<u>Includes</u>	<u>Excludes</u>	<u>Program in Which Exclusions are Included</u>
Construction of vessels of all types.	Guns, rocket launchers, torpedo tubes, depth charge projectors, and other weapons.	A-5
Total cost of services, civilian labor, and ship parts used in conversion, repair, overhaul, and modernization, whether done by private contractors or in government shipyards.	Fire control equipment.	A-5
Ship parts (except those excluded).	GFE electronic equipment, e.g., communications, fire control, radar, etc.	A-7
Ship armor not procured with, or as a part of, weapons.	Ship equipment and housekeeping supplies, such as brooms, soap, paint, grease, light bulbs, mess and galley utensils, cleaning rags, office supplies, clothing and other personal items, recreation equipment and supplies, and similar types of items which are not usually produced as ship parts.	Generally A-9 or C-9
Aircraft catapults and arresting gear.	Pontoons (including propelling units).	B-1
Assault boats.	Fabric or rubber life rafts.	A-9
Floating cranes, floating drydocks, and bridge erection boats.	GFE production equipment.	B-9
Production equipment procured as a part of and mounted on floating equipment.		
Tracked amphibious vehicles, such as LVT's.		
Shipborne deperming and degaussing equipment.		
Special jigs, dies, and fixtures, which can be used only in specific shipbuilding operations, including inspection gauges.		

APPENDIX 1

A-4 TANK/AUTOMOTIVE PROGRAM

This program consists of two subprograms: (a) Combat Vehicles and (b) Non-combat Vehicles.

(a) Combat Vehicles.

<u>Includes</u>	<u>Excludes</u>	<u>Program in Which Exclusions are Included</u>
Tanks.	Weapons.	A-5
Self-propelled gun motor carriages.	Fire control equipment.	A-5
Other combat vehicles.	GFE electronic equipment.	A-7
Combat vehicle parts.	e.g., communication, fire control, etc.	
Modification, whether done in private or in government production facilities.	Tracked amphibious vehicles, such as LVT's.	A-3
Special jigs, dies, and fixtures which can be used only in producing a specific combat vehicle model.	Production facilities.	C-2
	General purpose production equipment.	B-9

(b) Noncombat Vehicles.

<u>Includes</u>	<u>Excludes</u>	<u>Program in Which Exclusions are Included</u>
Trucks, ambulances, passenger cars, buses, motorcycles, and other motorized vehicles, including wheeled amphibious vehicles (except vehicles identifiable to the construction equipment portion of the Miscellaneous Equipment Program C-9).	Weapons.	A-5
Power-driven trucks, decontaminating.	GFE electronic equipment.	A-7
Bicycles.	e.g., communication, fire control, radar, etc.	
Trailers and semitrailers.	Fire control equipment.	A-5
Repair, maintenance, and other special purpose noncombat vehicles.	Warehouse, airfield, and industrial tractors.	C-9
Prime, contractor-furnished repair, rebuild, production, and service equipment procured as a part of and mounted on noncombat vehicles.	GFE repair, production, and service equipment mounted on noncombat vehicles.	C-9
Other accessories and parts readily identifiable for noncombat vehicle use, such as tires, spark plugs, batteries, etc.		
Modification whether done in private or in government production facilities (kits).		
Truck tractors.		
Special jigs, dies, and fixtures which can be used only in producing a specific noncombat vehicle model, including inspection gauges.		

APPENDIX 1

A-5 WEAPONS PROGRAM

<u>Includes</u>	<u>Excludes</u>	<u>Program in Which Exclusions are Included</u>
Small arms, automatic weapons, mortars, artillery, guns, rocket and grenade launchers, and pyrotechnic projectors, including those mounted on vehicles, ships, and aircraft.	Paravanes	A-3
Flame throwers.	Shipborne deperming and degaussing equipment.	A-3
Smoke generators (land).	Rocket launchers readily identifiable for aircraft use and launching equipment peculiar to a specific model of guided missile	A-1 or A-2
Torpedo tubes.	Electronic fire control equipment such as MK56, MK63, T33, MK101, MK102, etc.	A-7
Harbor protection nets.		
Depth charge projectors.		
Wholly optical, electrical, or mechanical fire control equipment, including binoculars, bomb sights, other optical equipment, stop watches, and fire control mounts.		
Nonelectronic portions of electronic fire control equipment if separately procured and if procurement and requirement data are separately maintained.		
Special jigs, dies, and fixtures which can be used only in producing specific types of weapons, including inspection gauges.		
Deperming and degaussing equipment (Range Station).		

A-6 AMMUNITION PROGRAM

<u>Includes</u>	<u>Excludes</u>	<u>Program in Which Exclusions are Included</u>
Ammunition, rockets, bombs, mines, grenades, torpedoes, depth charges, demolition material, and pyrotechnics.	Commercial type petroleum products.	A-8
ATO units (droppable units only) and fuel for ATO units.	VT fuzes.	A-7
Rocket and guided missile fuel.	Booster cases for guided missiles.	A-2
Machine gun links.	Nondroppable propulsion devices installed in aircraft.	A-1
Ammunition parts.	Droppable aircraft tanks.	A-1c
Chemicals used in bombs, flame throwers, smoke generators, and ammunition.		
Special jigs, dies, and fixtures which are used in producing a specific type of ammunition, including inspection gauges.		

APPENDIX 1

A-7 ELECTRONICS AND COMMUNICATION EQUIPMENT PROGRAM

<u>Includes</u>	<u>Excludes</u>	<u>Program in Which Exclusions are Included</u>
Electromagnetic radiating and non-radiating equipment, except that radiating in the visible spectrum, including: radio equipment including uses for telegraph, telephone, teletype, facsimile, television, and IFF signals.	X-ray apparatus.	C-9
Radar equipment.	Nonelectrical communication equipment such as pigeons and flags.	A-9 and C-9
Electronic and electro-mechanical computers.	Blinker lights and flash lights.	C-9
Radiation aids to aircraft control and navigation, including control of guided missiles.	Telephone poles.	B-1
Radiation aids to control fire bombing, armament, and related electro-mechanical types (not otherwise covered).	Tool repair kits, pole climbing equipment, plows, earth augers, and other tools.	C-9
Radiation countermeasures, including electronic deception and electronic jamming.	Photographic equipment.	C-9
Radiac.	Nonelectronic meteorological equipment such as thermometers, barometers, etc.	C-9
Infrared.	Shelters, carts winches, rope, boards, maps, tables, stakes, air conditioners, etc.	C-9
Meteorological.	Wholly optical, electrical or mechanical fire control equipment, including binoculars, bomb sights, other optical equipment, stop watches, and fire control mounts.	A-5
Sonar equipment.	Nonelectric portions of electronic fire control equipment if separately procured and if procurement and requirements data are separately maintained.	A-5
Magnetic amplifier and detection equipment.		
Equipment used for transmission or reception of intelligence by wires, cables, or coaxial cable, including recorders, reproducers, telegraph, telephone, teletype, facsimile, television, interphone, public address, and telemetering.		
Equipment which is used for the detection of noise and interference in the radio frequency spectrum.		
Radiation and reradiation equipment related to the preceding items.		
Equipment which is ancillary to the preceding items such as antennas, connectors, dynamotors, headsets, microphones, radomes, servoamplifiers, test equipment, wave-guides, cooling, heating, and pressurizing equipment.		
VT fuzes.		
Guided bombs, such as Tarzon and Razon.		
Special jigs, dies, and fixtures which can be used only in producing specific types of electronics and communication equipment, including inspection gauges.		
Electronic fire control equipment such as MK56, MK63, T33, MK101, MK102, etc.		
Sniperscope.		

APPENDIX 1

A-8 FUELS AND LUBRICANTS PROGRAM

This program consists of three subprograms: (a) Petroleum Products, (b) Other Fuels and Lubricants, and (c) Separately Procured Containers.

(a) Petroleum Products.

<u>Includes</u>	<u>Excludes</u>	<u>Program in Which Exclusions are Included</u>
Residual fuel oils.	Other fuels and lubricants.	A-8b
Lubricating oils.	Separately procured containers for petroleum and petroleum products.	A-8c
Aviation gasolines.	Petroleum handling equipment	A-8c
Motor gasolines.		
Kerosene		
Distillate fuels.		
Insulating transformer oils.		
Fog oil.		
Greases.		
Jet fuels.		
Asphalts and road oils.		
Liquefied petroleum gas.		
Solvents and naphthas.		
Containers, when provided by the supplier, in which petroleum products are delivered to the government.		
Chemicals which are used directly in the production of petroleum and petroleum products as well as chemicals used in the processing of petroleum and petroleum products which will be consumed or converted into by-products in the course of processing.		

(b) Other Fuels and Lubricants.

<u>Includes</u>	<u>Excludes</u>	<u>Program in Which Exclusions are Included</u>
Coal and coke.	Fuel for ATO.	A-6
Manufactured gas.		
Natural gas.		
Other nonpetroleum fuel and lubricants.		
Containers, when provided by the suppliers, in which other fuels and lubricants are delivered to the government.		

(c) Separately Procured Containers and Handling Equipment.

<u>Includes</u>	<u>Excludes</u>	<u>Program in Which Exclusions are Included</u>
Separately procured containers specifically intended for use with petroleum and petroleum products noted in A-8a such as can, inflammable liquid, steel 5 gallon and drum inflammable liquid, steel, 16-gauge 55 gallon.	Fuel cells.	A-1
Drum cleaning machines, portable petroleum pumps, skid tanks, and petroleum dispensing nozzles.		

APPENDIX 1

A-9 TEXTILES, CLOTHING, AND EQUIPAGE PROGRAM (TEXTILES)

<u>Includes</u>	<u>Excludes</u>	<u>Program in Which Exclusions are Included</u>
All clothing and leather products.	Metal containers of more than 1 quart capacity.	C-9
All textiles and textile products, such as tenting, paulins, bags, towels, bedding, canvas cots, packs, etc.	General housekeeping supplies such as insecticides, soap, toilet paper, candles, light bulbs, paint, etc.	C-9
Tents, etc.	General housekeeping equipment such as cooking and heating equipment, refrigeration and air conditioning equipment, garbage cans, furniture, etc.	C-9
Flags and accessories.	Office, depot, and warehouse supplies and equipment.	C-9
Athletic equipment.	Fire extinguishers.	C-9
Gas masks (including carrier).	Steel, 16 gauge, 55 gallon.	A-8c
Items which are generally issued to the individual for his own use such as toilet articles, entrenching tools, eating and drinking utensils, etc. (but excluding weapons, ammunition, medical, engineer, and other technical items).	Separately procured containers specifically intended for use with petroleum and petroleum products such as can, inflammable liquid, steel, 5 gallon and drum inflammable liquid.	A-8c
Oxygen masks, parachutes, and drop kits.		
Life belts and jackets.		
Dust respirators.		
Rubber or fabric life rafts.		
Shoe lasts.		

B-1 BUILDING SUPPLIES

<u>Includes</u>	<u>Excludes</u>	<u>Program in which Exclusions are Included</u>
Military type bridging (including pontoon bridges).	Construction machinery, such as tractors, power shovels, etc.	C-9a
Landing mats.	Hand tools	C-9E
Barbed wire and metal posts	Portable heating, refrigerating, and ventilating equipment.	C-9E
Pipe, and storage tanks for pipeline projects.	Bridge erection boats	A-3
Prefabricated buildings.		
Construction supplies including telephone poles, piling, railway track and ties, lumber, cement, bricks, hardware, millwork, etc.		
Heating, refrigerating, plumbing, and lighting fixtures and other electrical equipment to be incorporated as an integral part of structures.		
Pontoon and pontoon propelling units.		
Insulated wire and cable, except communication wire.		

APPENDIX 1

B-2 SUBSISTENCE PROGRAM

<u>Includes</u>	<u>Excludes</u>	<u>Program in Which Exclusions are Included</u>
All food and beverage products for human use, including operational type rations	Water can, 5 gallon	C-9E
Materials used for care and preservation of subsistence supplies.	Cigarettes not part of a subsistence package	C-9E
Drums, cans, and other containers and packaging materials, required for the delivery of food and beverage products.		
Chemicals which are used directly in the production of food and food products as well as chemicals used in the processing of food and food products which will be consumed or converted into byproducts in the course of processing		
Forage for animals		

B-3 TRANSPORTATION EQUIPMENT PROGRAM

<u>Includes</u>	<u>Excludes</u>	<u>Program in which Exclusions are Included</u>
Railway rolling stock and parts.	Railway track, ties, and accessories.	B-1
Railway cranes and parts.		
Railway tools.		
Railway signal equipment		
Maintenance of way equipment.		

APPENDIX 1

B-9 PRODUCTION EQUIPMENT

This program consists of Production Equipment to be used by Government-Owned Facilities, and by Privately-Owned Facilities.

<u>Includes</u>	<u>Excludes</u>	<u>Program in Which Exclusions are Included</u>
Machine tools and other general purpose cutting, forming, shaping, grinding, abrading, measuring, joining, testing, heating or treating, production equipment to be used in production facilities. Rehabilitation and modernization costs and parts (but not routine maintenance) for above production equipment. Heavy duty materials handling equipment not incorporated as an integral part of the industrial facility such as overhead traveling cranes, shipyard cranes, etc. Production equipment used for repair and maintenance if such equipment is not procured as a part of and mounted on floating equipment or vehicles.	Materials handling equipment such as conveyor systems installed in warehouses or other nonproduction facilities. Portable conveyors, fork lift trucks, industrial tractors and trailers, stackers, etc. Nonmechanical processing equipment and incorporated as an integral and permanent part of an industrial facility, such as processing vats, etc. Special jigs, dies, and fixtures which can be used only in producing a specific model of a military item. Hand tools Heavy duty materials handling equipment incorporated as an integral part of the industrial facility such as overhead traveling cranes, shipyard cranes, etc.	C-9d C-9d C-2 Applicable Program C-9e C-2

APPENDIX 1

C-2 DEPARTMENT OF DEFENSE CONSTRUCTION PROGRAM

This program consists of all construction, alteration, rehabilitation, or conversion of military industrial and nonindustrial installations, facilities, or portions thereof. It comprises all of the above facilities financed in whole or in part from appropriated funds. All machinery and equipment (except production equipment) organic to the facility and installed as part of the construction project for the facility will be included. Also includes ground improvement and installation of utilities.

<u>Includes</u>	<u>Excludes</u>	<u>Program in which Exclusions are Included</u>
Architect engineer services.	Production equipment installed in construction projects	B-9
Construction of new industrial facilities and expansion, major alteration or conversion of existing industrial facilities, which are Government-financed and will become Government owned including both Government-operated and contractor-operated facilities.		
Training, operational, housing and support facilities or any other facilities necessary for the military forces. Installed equipment organic to the facility will be included.	Land and departmental overhead services.	
Construction of military nonindustrial facilities financed under Public Works Appropriations (MCA, PW-N, and ACEP-AF).	Construction equipment and machinery.	C-9A
Construction of military nonindustrial facilities financed from appropriations other than Public Works Appropriations.	Facilities constructed entirely from State funds and for which the title will be vested in the State.	
Military housing projects constructed under Title VIII of the National Housing Act.		
Air and Army National Guard facilities to be constructed partially or entirely from Federal funds.		
Building equipment such as elevators, fire protection systems, electrical power systems, or other equipment organic to a facility, and installation materials therefor.		

APPENDIX 1

C-9 MISCELLANEOUS PROGRAM

This program consists of five subprograms: (a) Construction Equipment; (b) Medical and Dental Supplies and Equipment; (c) Photographic Equipment and Supplies; (d) Material Handling Equipment; (e) All Others not Identifiable to any Other Procurement Program.

(a) Construction Equipment.

<u>Includes</u>	<u>Excludes</u>	<u>Program in which Exclusions are Included</u>
Power shovels, mobile cranes, bulldozers, concrete mixers, ditching machines, road and airfield construction, and maintenance machinery, earthmoving trailers, and similar construction equipment.	Dump trucks	A-4
Pneumatic drills, welding equipment	Engineering, drafting and mapping instruments.	C-9e
Paint sprayers, air compressors, and pumps of the type used for construction.	Generator sets	C-9e or other applicable program.
Commercial construction type tractors.	Photographic and Reproduction equipment.	C-9c
Power saws.	Water storage, distribution, and purification equipment for field use.	C-9e
Earth augers and well drilling machines.	Tractors of a type not usually used for construction, such as artillery prime movers, warehouse tractors, etc.	A-4
	Refrigeration and air conditioning equipment.	C-9d
		C-9e

(b) Medical and Dental Supplies and Equipment.

<u>Includes</u>	<u>Excludes</u>	<u>Program in which Exclusions are Included</u>
Medical and dental supplies and equipment such as drugs, chemicals, biologicals, surgical dressings, instruments, hospital and dental furniture and equipment, X-ray equipment and film, etc.	Ambulances	A-4
	Bedding	A-9
	Pajamas and robes	A-9
	Towels	A-9

(c) Photographic Equipment and Supplies.

<u>Includes</u>	<u>Excludes</u>	<u>Program in which Exclusions are Included</u>
Cameras.	X-ray Cameras and film	C-9b
Film.		
Photographic projecting, developing, copying and related equipment.		

(d) Materials Handling Equipment.

APPENDIX 1

<u>Includes</u>	<u>Excludes</u>	Program in which Exclusions are Included
Conveyors. Warehouse trucks, tractors, and trailers. Forklift trucks, stackers, etc.	Conveyors and elevators in- stalled as an integral part of building.	C-2
(e) All Others Not Identified to Any Other Procurement Program.		

<u>Includes</u>	<u>Excludes</u>	Program in which Exclusions are Included
Housekeeping supplies such as insecticides, toilet paper, candles, soap, etc. Heating, refrigerating, plumbing and lighting fixtures, other electrical equipment, furniture and cooking equipment, except equipment incorporated as an integral part of a building or structure. Office supplies and equipment. Nonelectronic meteorological equip- ment. Animals. Mortuary and grave registration supplies and equipment. Training and educational supplies and equipment not included in other programs. Laundry and dry cleaning equipment. Mess equipment. Water storage, distribution and purification equipment f/field use. Field, combat, and troop equipment including water can (5 gal.), heaters (immersion and tent), field range, cooking outfit (one burner), field stove. Maintenance items, repair items, and operating supply items.		

APPENDIX 1

S-1 SERVICES PROGRAM

This program consists of all services which cannot be identified to any other procurement program.

<u>Includes</u>	<u>Excludes</u>	<u>Program in which Exclusions are Included</u>
Technical representative service.	Maintenance or repair of building.	C-2
Operation of Government facility.	Architect engineer services.	C-2
Basic research.	Construction	C-2
Medical services.	Research & development where end product is known.	Appropriate supply program.
Lease or rental of machinery or equipment.	Maintenance, repair or rebuild of equipment.	Appropriate supply program.
Utility services (electrical, gas, telephone, water, steam).		
Custodial, janitorial services.		
Training, education, tuition services.		
Photographic services.		
Mapping services.		
Printing services.		
Publication services.		
Funeral services.		

APPENDIX 2-1

INDIVIDUAL PROCUREMENT ACTION REPORT		REPORT CONTROL SYMBOL CSGLD-525 (W7)					
1A. REPORT NO. (Current)		1B.	1C. REPORT NO. (Previous)		2. CONTRACT NO.		
					A. Dept.	B. Activity	C. FY.
					D. CMD	E. Serial No.	F. RO
Item 3 Code	3. CORRECTION OF PRIOR DD FORM 350 Number				4. MOD. NO. AND OTHER IDENT.		
1. Corrected entry				2. Reversing entry			
Item 5 Code	5. PURCHASING OFFICE AND MAILING ADDRESS						
Item 6 Code	6. CONTRACTOR IDENTIFICATION						
Company Name:							
Division Name (if any):							
Number and Street:							
City and State or Country:							
Item 7 Code	7. PRINCIPAL PLACE OF PERFORMANCE (City and State or Country)					8. SUBJECT TO WALSHEALEY ACT	
					☐ Material ☐ Regular ☐ Subject		
Item 9 Code	9. LABOR SURPLUS AREA						
1. Labor Surplus Area—No preference							2. Labor Surplus Area—Tie bid preference
3. Labor Surplus Area—Set Aside Preference							4. Labor Surplus Area—Individuality certified by Dept. of Labor
10A. PSC OR SV CODE	10B. SYSTEM OR EQUIPMENT CODE	10C. DD CLAIMANT PROG. NO.	11. DESCRIPTION OF COMMODITY OR SERVICE				
Item 12 Code	12. COORDINATED PROCUREMENT						
1. (Reserved—Do not use)							2. GSA Supply Schedule
3. GSA Stores Depot							4. GSA Consolidated Purchase Program
5. Single Department Procurement							6. Defense Supply Agency
7. Outside U.S.							8. Other
Item 13 Code	13. SYNOPSIS OF PROPOSED PROCUREMENT						
A. Synopsized per ASPR 1-1003.9							B. Not Synopsized: Original Estimate under \$10,000
C. Not Synopsized: Original Estimate under \$10,000							D. Not Synopsized per ASPR 1-1003.1 Exception:
							1 2 3 4 5 6 7 8 9
Item 14 Code	14. KIND OF PROCUREMENT ACTION						
1. Initial Letter Contract							2. Definitive Contract superseding Letter Contract
3. Definitive Contract (including Notice of Award)							4. Order under Contract
5. Programming Order (AF use only)							6. Additional work
7. Funding action							8. Change order
9. Termination or cancellation							
Item 15 Code	15. CONTRACT PLACEMENT						
1. Intragovernmental (Do not fill in items 16 thru 22)							2. Two-step formal advertising (Do not fill in items 17 and 18)
3. Other formal advertising (Do not fill in items 17 and 18)							4. Small Business restricted advertising (Fill in all items)
5. Other negotiated (Fill in all items)							6. Military Assistance Sales (Do not fill in items 16 thru 22)
Item 16 Code	16. SMALL BUSINESS						
Awarded to Large Business because Small Business:							J. Awarded to Small Business
A. Not solicited							B. Solicited but did not bid
C. Bid was not low							D. Did not accept for other reasons
E. Awarded to nonprofit institution							F. Awarded for work outside U.S. and possessions
Item 17 Code	17. NEGOTIATED UNDER 10 USC 2304(a) EXCEPTION						
For 10 USC 2304(a)(1), ASPR 3-201.2 Citation:							
1A. Labor Surplus Area or industry set-aside							1B. Unilateral Small Business set-aside
1C. Disaster Area set-aside							1D. Exempt, Devel., or Research not more than \$100,000
1E. Balance of Payments Program							1F. Other (Specify):
Otherwise authorized by law: 17A. Joint Small Business set-aside PL 85-536							17B. Other (Specify):
Item 18 Code	18. EXTENT OF COMPETITION IN NEGOTIATION						
Competitive: Two or more sources solicited for:							Follow-on action after:
1. Price competition							2. Price competition
3. Design, technical, or other competition							4. Design, technical, or other competition
Item 19 Code	19. PATENT RIGHTS CLAUSE (ASPR 9-107.5)						
1. Category I (Title)							2. Category II (License)
3. Category III (Deferred)							4. No patent rights clause
Item 20 Code	20. TYPE OF CONTRACT—ASPR SECTION III, PART 4						
Fixed Price: A. Type A							B. Type B
C. Other							D. Fixed price escalation
E. With performance incentive							F. Without performance incentive
G. Cost contract							H. Cost sharing
I. Cost-plus-fixed fee							J. Cost-plus-incentive fee
K. With performance incentive							L. Without performance incentive
M. Time and materials							N. Labor hour
Item 21 Code	21. VALUE ENGINEERING CLAUSE (ASPR SECTION I, PART 17)						
Extent of Savings Shared with Contractor:							
Instant contract only							Instant contract plus collateral savings
Instant contract plus additional contracts							Instant contract plus collateral savings plus additional contracts
B. No value engineering clause							
Incentive (1-1707)							Program Requirement (1-1708)
A							J
B							K
C							L
D							M
Item 22 Code	22. SUBCONTRACTING CLAUSES (ASPR 1-707.3 (b) or (c) and 1-805.3(b))						
1. Small Business							2. Labor Surplus Area
3. Small Business and Labor Surplus Area							4. No clause
23. DATE OF THIS ACTION	24. EST. COMPLETION DATE	25. TOTAL OF THIS ACTION	26. CUMULATIVE TOTAL OF CONT.				
Day Month Year	(Month and year)	(Round out to nearest whole dollar)	(Including this amount)				
/ /	/	\$	\$				
27. DATE SUBMITTED	28. TYPED NAME AND SIGNATURE OF CONTRACTING OFFICER OR REPRESENTATIVE		29. TEL. EXT.				

APPENDIX 2-2

INDIVIDUAL PROCUREMENT ACTION REPORT				REPORT CONTROL SYMBOL			
1A. REPORT NO. (Current) 1B.		1C. REPORT NO. (Previous)		2. CONTRACT NO.		3. (Army only)	
				A. Dept. B. Activity C. FT.		D. CDD E. Serial No. F. BO	
Item 3 Code	1. CORRECTION OF PRIOR DD FORM 130 Number			4. BOD. NO. AND OTHER IDENT.			
	1. Corrected entry						
	2. Breaching entry						
Item 4 Code	5. PURCHASING OFFICE AND MAILING ADDRESS						
Item 5A Code	5A. SOUTHEAST AREA (Actions of \$200,000 or more)						
	1. In support of SEA 2. Not in support of SEA						
Item 6 Code	6. CONTRACTOR IDENTIFICATION						
	Company Name:						
	Division Name (if any):						
	Number and Street:						
	City and State or Country:						
Item 7 Code City State	7. PRINCIPAL PLACE OF PERFORMANCE (City and State or Country)						7A. 7B.
Item 7C Code	7C. MULTI-YEAR PROCUREMENT						
	A. First year B. Second or subsequent year C. Not a multi-year procurement						
Item 8 Code	8. SUBJECT TO WALSH-HEALEY OR SERVICE CONTRACT ACT						
	A. Walsh-Healey Act, Manufacturer B. Walsh-Healey Act, Regular Dealer C. Service Contract Act D. Not subject to Walsh-Healey or Service Contract Act						
Item 9 Code	9. LABOR SURPLUS AREA						
	1. Labor Surplus Area—No preference 2. Labor Surplus Area—The bid preference 3. Not a Labor Surplus Area 4. Labor Surplus Area—Set Aside preference 5. Labor Surplus Area/Concerns individually certified by Dept. of Labor						
10A. FSC OR SV CODE	10B. SYSTEM OR EQUIPMENT CODE	10C. DD CLAIMANT PROG. NO.	11. DESCRIPTION OF COMMODITY OR SERVICE				
Item 12 Code	12. COORDINATED PROCUREMENT						
	1. Procurement Agreement 2. (Reserved - Do not use) 3. OSA Supply Schedule (Enter Code 1 in item 15) 4. (Reserved - Do not use) 5. Single Department Procurement 6. Defense Supply Agency 7. Outside U.S. 8. Other						
Item 13 Code	13. SYNOPSIS OF PROPOSED PROCUREMENT						
	A. Synopsized per ASPR 1-1003.9 B. Not Synopsized: Original Estimate under \$10,000 C. Not synopsized per ASPR 1-1003.1 Exception: 1 2 3 4 5 6 7 8 9						
Item 14 Code	14. KIND OF PROCUREMENT ACTION						
	1. Initial Letter Contract 2. Definitive Contract superseding Letter Contract 3. Definitive Contract (Including Notice of Award) 4. Order under Contract 5. Provisioning Order 6. Additional work 7. Change Order 8. Termination or cancellation						
Item 15 Code	15. CONTRACT PLACEMENT						
	1. Intragovernmental (Do not fill in items 16 thru 22) 2. Two-step formal advertising (Do not fill in items 17 thru 19) 3. Other formal advertising (Do not fill in items 17 thru 19) 4. Small Business restricted advertising (Fill in all items) 5. Other negotiated (Fill in all items) 6. Foreign Military Sale (Do not fill in items 20 thru 22)						
Item 16 Code	16. SMALL BUSINESS						
	A. Not solicited B. Solicited but did not bid C. Did not accept for other reasons D. Awarded to Small Business E. Awarded to nonprofit institution F. Awarded for work outside U.S. and possessions						
Item 17 Code	17. NEGOTIATED UNDER 10 USC 2304(a) EXCEPTION						
	Per 10 USC 2304(a)(1) ASPR 1-201.2 Cite(s):						
	1A. Labor Surplus Area or industry not-aside 1B. Unilateral Small Business not-aside 1C. Disaster Area not-aside 1D. Business of Payment Program						
	Negotiation accomplished pursuant to 10 USC 2304(a) Clause No. 15-1 15-2 15-3 15-4 15-5 15-6 15-7 15-8 15-9 15-10 15-11 15-12 15-13 15-14 15-15 15-16 15-17 15-18 15-19 15-20 15-21 15-22						
	Otherwise authorized by law: 17A. Joint Small Business not-aside 17B. Other (Specify)						
Item 18 Code	18. EXTENT OF COMPETITION IN NEGOTIATION						
	Competitive: 1. Price competition 2. Design, technical, or other competition 3. Other non-competitive						
Item 19 Code	19. PROFIT NEGOTIATION (This action only)						
	1. Profit negotiated and DD Form 1499 required 2. Profit negotiated but DD Form 1499 not required 3. Profit not negotiated						
Item 20 Code	20. TYPE OF CONTRACT—ASPR SECTION III, PART 4						
	Fixed Price: A. Type A price B. Type B price C. Other J. Price fixed K. Price incentive L. With performance incentive M. Without performance incentive N. Cost-plus-award fee O. Cost-plus-award fee V. With performance incentive W. Without performance incentive X. Time and materials Y. Labor hour						
Item 21 Code	21. VALUE ENGINEERING CLAUSE (ASPR SECTION I, PART 17)						
	A. Incentive B. Program Requirement C. No value engineering clause						
Item 22 Code	22. DATE OF THIS ACTION		23. EST. COMPLETION DATE		24. TOTAL OF THIS ACTION		25A.
	Year Month Day		(Year and Month)		(Grand total in current whole dollars)		
26. TYPED NAME AND SIGNATURE OF CONTRACTING OFFICER OR REPRESENTATIVE						26. TEL. EXTEN.	27. DATE SUBMITTED

DD FORM 350

PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

APPENDIX 2-3

INDIVIDUAL PROCUREMENT ACTION REPORT		REPORT CONTROL SYMBOL		DD-161 (Rev. 10-1-64)
A. REPORT NO. (Current) 1B		1C. REPORT NO. (Previous)		2. CONTRACT NO.
				A. Dept. B. Activity C. FY. D. Serial No. E. RO
Item 3 Code	3. CORRECTION OF PRIOR DD FORM 130 Number _____ Item(s) _____			4. MOD. NO AND OTHER IDENT.
	1. Corrected entry			
	2. Reversing entry			
Item 5 Code	5. PURCHASING OFFICE			
Item 5A Code	5A. SOUTHEAST AREA (Actions of \$200,000 or more)			
	1. In support of SEA 2. Not in support of SEA			
Item 6 Code	6. CONTRACTOR IDENTIFICATION			
	Company Name:			
	Division Name (if any):			
	Number and Street:			
	City and State or Country:			
Item 7 Code	City	State	7. PRINCIPAL PLACE OF PERFORMANCE (City and State or Country)	
			7A.	7B.
Item 7C Code	7C. MULTI-YEAR PROCUREMENT ASPR 1-322.1(a)			
	A. First year B. Second or subsequent year C. Not a multi-year procurement			
Item 8 Code	8. SUBJECT TO WALEN-HEALEY OR SERVICE CONTRACT ACT			
	A. Walsh-Healey Act, Manufacturer B. Walsh-Healey Act, Regular Dealer			
	C. Service Contract Act D. Not Subject to Walsh-Healey or Service Contract Act			
Item 9 Code	9. LABOR SURPLUS AREA			
	1. Labor Surplus Area—No preference 2. Labor Surplus Area—The bid preference 3. Not a Labor Surplus Area			
	4. Labor Surplus Area—Set Aside preference 5. Labor Surplus Area/Concern individually certified by Dept. of Labor			
10A PSC OR SV CODE	10B SYSTEM OR EQUIPMENT CODE	10C DD CLAIMANT PROG. NO.	11. DESCRIPTION OF COMMODITY OR SERVICE	
Item 12 Code	12. COORDINATED PROCUREMENT			
	1. Procurement Agreement 2. (Reserved - Do not use) 3. GSA Supply Schedule (Enter Code 1 in item 15)			
	4. (Reserved - Do not use) 5. Single Departmental Procurement 6. Defense Supply Agency 7. Outside U.S. 8. Other			
Item 13 Code	13. SYNOPSIS OF PROPOSED PROCUREMENT			
	A. Synopsized per ASPR 1-1603.9 B. Not Synopsized: Original Estimate under \$10,000 C. Not synopsized per ASPR 1-1603.1 Exception: 1 2 3 4 5 6 7 8 9			
Item 14 Code	14. KIND OF PROCUREMENT ACTION			
	1. Initial Letter Contract 2. Definitive Contract superseding Letter Contract 3. Definitive Contract (Including Notice of Award) 4. Order under Contract 5. Provisional Order 6. Additional work 7. Change Order 8. Termination or cancellation			
Item 15 Code	15. CONTRACT PLACEMENT			
	1. In-house (Do not fill in items 16 thru 19) 2. Two-step formal advertising (Do not fill in items 17 thru 19) 3. Other formal advertising (Do not fill in items 17 thru 19) 4. Small Business restricted advertising (Fill in all items) 5. Other negotiated (Fill in all items) 6. Foreign Military Sales (Do not fill in items 16 thru 23)			
Item 16 Code	16. SMALL BUSINESS			
	A. Not solicited B. Solicited but did not bid C. Did not accept for other reasons D. Awarded to Small Business E. Awarded to nonprofit institution F. Awarded for work outside U.S. and possessions			
Item 17 Code	17. NEGOTIATED UNDER 10 USC 2304(a) EXCEPTION			
	For 10 USC 2304(a)(1) ASPR 1-201.2 Cite: Negotiation accomplished pursuant to 10 USC 2304(a) Cite: No.			
	1A. Labor Surplus Area or industry set-aside 1B. Unilateral Small Business set-aside 1C. Diameter Area set-aside 1D. Balance of Payments Program			
	1E. Otherwise authorized by law: 17A. Joint Small Business set-aside 17B. Other (Specify)			
Item 18 Code	18. EXTENT OF COMPETITION IN NEGOTIATION			
	1. Price competition 2. Design, technical, or other competition 3. Price competition 4. Design, technical, or other competition 5. Other non-competitive			
Item 19 Code	19. CERTIFIED COST OR PRICING DATA (This action only) ASPR 1-607.3			
	A. Required B. Not Required			
Item 20 Code	20. TYPE OF CONTRACT—ASPR SECTION II, PART 4			
	Fixed Price: A. Type A B. Type B C. Other J. Firm fixed price K. Without performance incentive L. With performance incentive M. Without performance incentive N. Cost-plus-award fee O. Cost contract P. Cost sharing Q. Cost-plus-fixed fee R. Cost-plus-incentive fee S. With performance incentive T. Time and materials U. Labor hour			
Item 21 Code	21. VALUE ENGINEERING CLAUSE (ASPR SECTION I, PART 1)			
	A. Incentive B. Program Requirement C. No value engineering clause			
22. DATE OF THIS ACTION	23. EST. COMPLETION DATE	24. TOTAL OF THIS ACTION	25A.	
Year Month Day	(Year and Month)	(Round out to nearest whole dollar)		
26. TYPED NAME AND SIGNATURE OF CONTRACTING OFFICER OR REPRESENTATIVE		27. TEL. EXTEN.	28. DATE SUBMITTED	

APPENDIX 2-5

INDIVIDUAL PROCUREMENT ACTION REPORT										ACS DD FORM 1000	
1A. REPORT NO. (Current)		1B.		1C. REPORT NO. (Previous)		CONTRACT NO. (1) Agency (2) FY (3) Serial No.					
2. Code		3. CORRECTION OF PRICE DD FORM 150				4. MOD. NO. AND OTHER IDENT.					
Item 5 Code		5. PURCHASING OFFICE									
Item 6A Code		6A. MINORITY BUSINESS FIRM ASPR 1-332				6. Not Awarded to Minority Business Firm.					
Item 6 Code		6. CONTRACTOR IDENTIFICATION									
Item 7 Code		7. PRINCIPAL PLACE OF PERFORMANCE (City and State or Country)				7A.		7B.			
Item 7C Code		7C. MULTI-YEAR PROCUREMENT ASPR 1-332.1(a)									
Item 8 Code		8. SUBJECT TO STATUTORY REQUIREMENTS									
Item 9 Code		9. LABOR SURPLUS AREA PREFERENCE									
Item 10 Code		10. AFFIRMATIVE ACTION PLAN									
Item 11 Code		11. DESCRIPTION OF COMMODITY OR SERVICE									
Item 12 Code		12. COORDINATED PROCUREMENT									
Item 13 Code		13. SYNOPSIS OF PROPOSED PROCUREMENT									
Item 14 Code		14. KIND OF PROCUREMENT ACTION									
Item 15 Code		15. CONTRACT PLACEMENT									
Item 16 Code		16. TYPE OF BUSINESS CONCERN									
Item 17 Code		17. NEGOTIATED UNDER 10 USC 2304(a) EXCEPTION									
Item 18 Code		18. EXTENT OF COMPETITION IN NEGOTIATION									
Item 19 Code		19. CERTIFIED COST OR PRICING DATA (The action only) ASPR 2-607.3									
Item 19A Code		19A. COST ACCOUNTING STANDARDS CLAUSE ASPR 7-104.53									
Item 20 Code		20. TYPE OF CONTRACT - ASPR SECTION III, PART 4									
Item 21 Code		21. CONTRACT ADMINISTRATION									
Item 22 Code		22. TRADE DATA									
Item 23 Code		23. DATE OF THIS ACTION									
Item 24 Code		24. ESTIMATED COMPLETION DATE									
Item 25 Code		25. TOTAL OF THIS ACTION									
Item 26 Code		26. TYPED NAME AND SIGNATURE OF CONTRACTING OFFICER OR REPRESENTATIVE									
Item 27 Code		27. TEL. EXTEN.									
Item 28 Code		28. DATE SUBMITTED									

Form 350

PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

APPENDIX 2-7

INDIVIDUAL PROCUREMENT ACTION REPORT (OVER \$25,000)				REPORT CONTINUATION NO. DD FORM 1, 1974	
PART A		A1 TYPE OF REPORT 0 Original 1 Continuing		A2 REPORT NR	
PART B		B1 CONTRACT NUMBER		B2 MOD ORDER OR OTHER ID NR	
B3 ACTION DATE (YY-MM-DD)					
B4 CONTRACTOR IDENTIFICATION INFORMATION				B5 PRINCIPAL PLACE OF PERFORMANCE	
B4A DUNS NO				B5A CITY OR PLACE CODE	
B4B CONTRACTOR NAME AND DIVISION NAME				B5B STATE OR COUNTRY CODE	
B4C CONTRACTOR ADDRESS				B5C CITY (State) / STATE (Country) / NAME	
B6 TYPE OF OBLIGATION 1 Obligation 2 Description		B7 TOTAL DOLLARS (Obligated or Deobligated) (Enter whole dollars only)		B8 PRINCIPAL PRODUCT OR SERVICE	
B9 CONSULTING SERVICES CONTRACT 1 Yes 2 No		B10 MULTI YEAR CONTRACT 1 Yes 2 No		B11 TOTAL MULTI YEAR VALUE (Enter whole dollars only)	
B12 FOREIGN MILITARY SALE 1 Yes 2 No		B13 KIND OF CONTRACTING ACTION (Make one selection from 1-7 or A-G)		B14 NAME/DESCRIPTION	
		1 Initial Letter Contract 2 Definitive Contract Subsequent Letter Contract 3 Definitive Contract 4 Order Under DOD SOA 5 Order Under DOD Contract 6 Order Under GSA Federal Supply Schedule 7 Action with Another Agency A Additional work (new agreement) B Additional work (renewal) C Funding Action D Change Order E Termination for Default F Termination for Convenience G Cancellation			
PART C (Do Not Complete This Part if Item B13 Above is Coded 1 or if Item B13 is Coded 6 or 7)					
C1 SYNOPSIS 1 Yes 2 No		C2 REASON NOT SYNOPSIS (Enter appropriate code from (a) or (b))		C3 METHOD OF CONTRACTING 1 Formal 2 Negotiated	
				C4 NEGOTIATION AUTHORITY (Enter appropriate reason code from (a) or (b))	
				C5 EXTENT OF COMPETITION IN NEGOTIATION 1 Price Competition 2 Design/Technical Competition 3 Follow on After Price Competition 4 Follow on After Design/Technical Competition 5 Other Non competition 6 Catalog or Market Price 7 Not Applicable	
C6 TYPE OF CONTRACT A Fixed Price Redetermination, Type A B Fixed Price Redetermination, Type B C Firm Fixed Price		E Fixed Price Economic Price Adjustment L Fixed Price Incentive (W/Perf. Incentive) M Fixed Price Incentive (W/O Perf. Incentive) N Cost Plus Award Fee		S Cost Contract T Cost Sharing U Cost Plus Fixed Fee V CPIS (W/Perf. Incentive) W CPIS (W/O Perf. Incentive) X Labor Hour	
PART D (Do Not Complete This Part if Item B13 Above is Coded 1 or if Item B13 is Coded 6 or 7)					
D1 TYPE OF BUSINESS (Make one selection from 1-4 or A-E)		D2 REASON NOT AWARDED TO SMALL BUSINESS		D3 WOMEN OWNED SMALL BUSINESS	
1 Large Business Performing in the U.S. 2 Small Business Performing in the U.S. 3 Foreign Company 4 Domestic Firm Performing Work Outside the U.S. A Education B Workshop for the Blind or Other Severely Handicapped from the Procurement List C Other Nonprofit		1 No Known Small Business Source 2 Small Business Not Solicited 3 Small Business Solicited, No Offer 4 Other Reason		1 No 2 Yes 3 Did Not Certify	
D4 SMALL BUSINESS SET-ASIDE PREFERENCE 1 Not Set Aside for Small Business 2 Total Small Business Set-Aside 3 Partial Small Business Set-Aside		D5 REASON NOT AWARDED TO SMALL DISADVANTAGED BUSINESS (SDB) 1 No Known SDB Source 2 SDB Not Solicited 3 SDB Solicited, No Offer 4 SDB Solicited, Offer Was Not Low 5 Other Reason		D6 SMALL BUSINESS INNOVATION RESEARCH (SBIR) PROGRAM 1 Not a SBIR Program Action 2 SBIR Program Phase I Action 3 SBIR Program Phase II Action	
D7 SUBCONTRACTING PLAN FOR SMALL AND SMALL DISADVANTAGED BUSINESS 1 Plan Not Included 2 Plan Included, Subcontracting Opportunities Not Exhausted 3 Plan Not Required		D8 SUBJECT TO LABOR STANDARDS STATUTES 1 Walsh-Hesley Act, Manufacturer 2 Walsh-Hesley Act, Regular Dealer 3 Service Contract Act 4 Davis-Bacon Act 5 Not Subject to Walsh-Hesley Davis-Bacon or Service Contract Act		D9 CERTIFICATE OF CURRENT COST OR PRICING DATA 1 Obtained 2 Not Obtained 3 Waived	
D12 TRADE DATA RELATING TO PRODUCTS OR COMPONENTS NOT MANUFACTURED IN THE U.S. OR SERVICES PERFORMED BY FOREIGN CONCERN					
D12A NUMBER OF OFFERS		D12B BUY AMERICAN ACT PERCENT DIFFERENCE		D12C COUNTRY OF ORIGIN CODE	
D13 CONTRACT FINANCING (Program Payments (PP) and Advance Payments (AP)) 1 Contains DAR Clause 7 104.35(a) and 7 104.35(b) 2 Contains DAR Clause 7 104.35(c) 3 Provides Percentage of Completion PP 4 Contains Unusual PP or AP 5 None of the Above					
PART E (RESERVED FOR GSA USE)		PART F (FOR DEPARTMENTAL USE)			
F1 NAME OF CONTRACTING OFFICER OR REPRESENTATIVE (Last, First, MI)		F2 SIGNATURE		F3 TELEPHONE NUMBER	
F4 DATE (YY, Mo, Da)					

PREVIOUS CONTACTS OF SUBJECT

APPENDIX 3-1

SUMMARY OF DOLLAR AWARDS

FY	TOTAL (\$'s in Thousands)	<u>Percent by Form of Competition</u>		
		COMPETITIVE	NONCOMPETITIVE	FOLLOW-ON
66	\$34,348,069	35.0	54.7	10.3
67	\$16,828,236	49.4	49.0	1.6
68	\$39,866,297	29.6	62.6	7.8
69	\$37,826,996	28.9	60.8	10.3
70	\$31,580,363	29.2	62.3	8.5
71	\$30,514,681	25.1	65.7	9.2
72	\$33,296,073	25.4	65.8	8.9
73	\$32,013,873	29.4	63.9	6.6
74	\$34,120,378	25.0	67.7	7.3
75	\$37,423,073	24.1	67.8	8.1
76	\$37,696,362	25.7	67.2	7.1
77	\$46,244,678	24.7	66.4	8.9
78	\$54,424,229	23.0	70.3	6.7
79	\$58,110,156	22.2	67.5	10.3
80	\$67,340,684	20.3	69.9	9.8
81	\$88,362,777	25.4	64.5	10.1
82	\$104,776,138	22.9	64.1	13.0
83	\$119,805,115	22.2	68.0	9.8
84	\$125,013,835	24.6	65.1	10.3
85	\$139,912,096	26.6	61.5	11.9
86	\$137,542,840	29.8	62.7	7.5
87	\$135,458,767	28.9	62.6	8.5

NOTE: Figures may not add correctly due to rounding.

APPENDIX 3-2

SUMMARY OF DOLLAR AWARDS FOR MAJOR HARD GOODS

FY	TOTAL in (Thousands)	2 (%) OF ALL DOD PRIME CONTRACTS	Percent by Form of Competition		
			COMPETITIVE	NONCOMPETITIVE	FOLLOW-ON
66	\$22,175,200	64.7	20.7	64.7	14.6
67	\$9,511,020	56.5	30.7	66.6	2.7
68	\$27,428,500	68.8	15.9	73.4	10.7
69	\$26,112,400	69.0	15.1	70.6	14.3
70	\$21,372,800	67.7	15.9	72.1	12.0
71	\$20,948,400	68.7	11.2	75.7	13.1
72	\$22,913,100	68.8	11.3	76.2	12.5
73	\$20,246,600	63.2	14.0	76.0	10.0
74	\$21,616,900	63.4	13.9	74.8	11.3
75	\$22,936,800	61.3	11.6	75.4	13.0
76	\$23,413,100	62.1	14.9	74.0	11.1
77	\$30,075,200	65.0	14.4	72.2	13.4
78	\$35,237,400	64.7	10.5	79.3	10.2
79	\$38,541,200	66.3	12.9	72.1	15.0
80	\$42,291,200	62.8	10.3	74.6	15.1
81	\$54,911,200	62.1	9.8	74.4	15.8
82	\$69,999,400	66.8	9.3	71.6	19.1
83	\$82,963,200	69.2	8.8	77.3	13.9
84	\$88,574,800	70.9	11.5	74.3	14.2
85	\$101,066,000	72.2	14.8	69.1	16.1
86	\$95,925,000	69.7	17.8	71.6	10.6
87	\$96,070,100	70.9	18.4	69.8	11.8

APPENDIX 3-3

SUMMARY OF DOLLAR AWARDS FOR NON-MAJOR HARD GOODS

FY	TOTAL in (Thousands)	DOD PRIME (%) OF ALL CONTRACTS	<u>Percent by Form of Competition</u>		
			COMPETITIVE	NONCOMPETITIVE	FOLLOW-ON
66	\$12,122,900	35.3	61.2	36.7	2.1
67	\$7,317,210	43.5	73.6	26.1	0.3
68	\$12,438,100	31.2	59.9	39.0	1.1
69	\$11,714,600	31.0	59.8	39.0	1.2
70	\$10,207,500	32.3	57.0	41.8	1.2
71	\$9,566,320	31.3	55.5	43.7	0.8
72	\$10,383,000	31.2	56.4	42.8	0.8
73	\$11,767,300	36.8	56.3	43.1	0.6
74	\$12,503,400	36.6	44.2	55.4	0.4
75	\$14,486,300	38.7	43.9	55.8	0.3
76	\$14,283,300	37.9	43.3	56.3	0.4
77	\$16,169,500	35.0	43.8	55.7	0.5
78	\$19,186,900	35.3	45.8	53.8	0.4
79	\$19,568,900	33.7	40.7	58.3	1.0
80	\$25,049,500	37.2	37.1	62.0	0.9
81	\$33,451,600	37.2	51.0	48.4	0.6
82	\$34,776,800	33.2	50.1	49.1	0.8
83	\$36,841,900	30.8	52.5	46.9	0.6
84	\$36,439,100	29.1	56.3	42.9	0.8
85	\$38,845,900	27.8	57.3	41.8	0.9
86	\$41,617,900	30.3	57.5	42.0	0.5
87	\$39,388,700	29.1	54.3	45.3	0.4

APPENDIX 3-4

SUMMARY OF PROCUREMENT ACTIONS

FY	TOTAL ACTIONS	<u>Percent by Form of Competition</u>		
		COMPETITIVE	NONCOMPETITIVE	FOLLOW-ON
66	199,249	50.6	44.2	5.2
67	221,709	49.9	45.8	4.3
68	202,745	44.7	49.6	5.7
69	199,327	40.7	52.6	6.7
70	173,648	39.5	54.5	6.0
71	160,988	38.0	57.0	5.0
72	174,262	37.3	57.5	5.2
73	179,365	38.6	56.9	4.5
74	188,343	36.9	58.2	4.9
75	201,411	35.0	60.2	4.8
76	197,740	34.1	60.9	5.0
77	219,047	33.8	61.5	4.7
78	241,950	33.0	61.8	5.2
79	266,032	33.6	61.4	5.0
80	289,774	33.5	60.9	5.6
81	326,358	34.2	60.2	5.6
82	373,615	34.4	60.6	5.0
83	217,470	32.3	63.3	4.4
84	213,850	37.2	57.4	5.4
85	228,937	40.5	54.5	5.0
86	238,688	42.0	54.1	3.9
87	236,276	42.3	54.9	2.8

APPENDIX 3-5

SUMMARY OF PROCUREMENT ACTIONS FOR MAJOR HARD GOODS

FY	TOTAL ACTIONS	(%) OF ALL DOD PRIME CONTRACTS	<u>Percent by Form of Competition</u>		
			COMPETITIVE	NONCOMPETITIVE	FOLLOW-ON
66	87,877	44.1	33.5	55.9	10.6
67	99,317	44.8	33.4	57.9	8.7
68	94,429	45.6	27.8	61.4	10.8
69	95,484	47.9	23.3	64.5	12.2
70	80,909	46.6	22.7	66.0	11.3
71	71,742	44.6	21.2	69.5	9.3
72	77,116	44.3	21.7	68.6	9.7
73	73,945	41.2	22.3	68.6	9.1
74	76,749	40.7	22.9	66.3	10.8
75	84,301	41.9	22.4	67.0	10.6
76	82,730	41.8	21.8	67.1	11.1
77	93,711	42.8	20.6	69.4	10.0
78	106,221	43.9	20.3	68.7	11.0
79	118,823	44.7	20.9	68.8	10.3
80	129,544	44.7	21.4	67.0	11.6
81	144,124	44.2	21.0	67.3	11.7
82	162,277	43.4	22.1	67.0	10.9
83	106,205	48.8	19.2	72.3	8.5
84	98,705	46.2	23.7	65.4	10.9
85	105,881	46.2	28.7	61.3	10.0
86	109,267	45.8	32.4	59.7	7.9
87	102,969	43.6	33.3	60.9	5.8

APPENDIX 3-6

SUMMARY OF PROCUREMENT ACTION FOR NON-MAJOR HARD GOODS

FY	TOTAL ACTIONS	(%) OF ALL DOD PRIME CONTRACTS	<u>Percent by Form of Competition</u>		
			COMPETITIVE	NONCOMPETITIVE	FOLLOW-ON
66	111,372	55.9	64.1	34.9	1.0
67	122,392	55.2	63.2	36.2	0.6
68	108,316	53.4	59.3	39.5	1.2
69	103,843	52.1	56.7	41.8	1.5
70	92,739	53.4	54.1	44.4	1.5
71	89,246	55.4	51.4	47.1	1.5
72	97,146	55.7	49.7	48.6	1.7
73	105,420	58.8	50.1	48.7	1.2
74	111,594	59.3	46.4	52.8	0.8
75	117,110	58.1	44.1	55.2	0.7
76	115,010	58.2	43.0	56.4	0.6
77	125,336	57.2	43.7	55.6	0.7
78	135,729	56.1	42.9	56.4	0.7
79	147,209	55.3	43.8	55.5	0.7
80	160,230	55.3	43.4	55.9	0.7
81	182,234	55.8	44.6	54.7	0.7
82	211,338	56.6	43.9	55.6	0.5
83	111,265	51.2	44.8	54.7	0.5
84	115,145	53.8	48.7	50.6	0.7
85	123,056	53.8	50.7	48.6	0.7
86	129,421	54.2	50.1	49.3	0.6
87	133,307	56.4	49.1	50.5	0.4

APPENDIX 4-1

SUMMARY OF DOLLAR AWARDS TO SMALL BUSINESS
FOR
MAJOR HARD GOODS

FY	TOTAL in (Thousands)	(% OF ALL DOD PRIME CONTRACTS	<u>Percent by Form of Competition</u>		
			COMPETITIVE	NONCOMPETITIVE	FOLLOW-ON
66	\$1,841,370	5.4	59.6	37.9	2.5
67	\$1,497,420	8.9	65.0	33.8	1.2
68	\$1,794,550	4.5	54.8	42.2	3.0
69	\$1,493,930	3.9	56.1	41.2	2.7
70	\$1,072,300	3.4	61.3	36.0	2.7
71	\$917,455	3.0	56.7	40.9	2.4
72	\$1,282,270	3.9	54.9	41.6	3.5
73	\$1,301,190	4.1	51.1	44.7	4.2
74	\$1,395,490	4.1	52.3	44.3	3.4
75	\$1,509,920	4.0	49.4	47.7	2.9
76	\$1,548,270	4.1	50.1	47.0	2.9
77	\$2,109,210	4.6	49.8	47.3	2.9
78	\$2,466,650	4.5	47.2	48.7	4.1
79	\$2,858,260	4.9	45.8	50.2	4.0
80	\$3,122,850	4.6	49.6	47.3	3.1
81	\$3,857,180	4.4	46.8	49.5	3.7
82	\$4,869,580	4.6	42.9	55.1	2.0
83	\$4,969,050	4.1	43.2	55.2	1.6
84	\$5,843,620	4.7	47.0	50.6	2.4
85	\$6,819,180	4.9	47.9	50.4	1.7
86	\$7,478,750	5.4	53.9	45.2	0.9
87	\$7,174,720	5.3	55.0	44.0	1.0

NOTE: figures may not add correctly due to rounding.

APPENDIX 4-2

SUMMARY OF DOLLAR AWARDS TO SMALL BUSINESS
FOR
NON-MAJOR HARD GOODS

FY	TOTAL in (Thousands)	(% OF ALL DOD PRIME CONTRACTS	<u>Percent by Form of Competition</u>		
			COMPETITIVE	NONCOMPETITIVE	FOLLOW-ON
66	\$3,934,930	11.5	81.2	18.5	0.3
67	\$3,101,890	18.4	82.2	17.7	0.1
68	\$4,050,740	10.2	76.5	23.1	0.4
69	\$3,609,760	9.5	78.2	21.6	- 0.2
70	\$2,861,370	9.1	77.1	22.6	0.3
71	\$2,850,400	9.3	76.3	23.5	0.2
72	\$3,211,050	9.6	77.0	22.6	0.4
73	\$3,660,047	11.4	75.6	24.1	0.3
74	\$3,892,480	11.4	71.3	28.5	0.2
75	\$4,379,800	11.7	67.6	32.2	0.2
76	\$4,494,250	11.9	63.2	36.7	0.1
77	\$5,241,000	11.3	66.2	33.4	0.4
78	\$5,933,810	10.9	66.0	33.8	0.2
79	\$6,742,180	11.6	64.7	34.7	0.6
80	\$7,526,530	11.2	63.5	36.1	0.4
81	\$10,374,900	11.7	67.8	31.9	0.3
82	\$11,672,900	11.1	64.2	35.5	0.3
83	\$12,479,000	10.4	66.5	33.2	0.3
84	\$12,652,500	10.1	68.6	31.2	0.2
85	\$13,590,300	9.7	72.9	27.0	0.1
86	\$13,690,200	9.9	70.2	29.7	0.1
87	\$13,364,900	9.9	68.3	31.6	0.1

APPENDIX 4-3

SUMMARY OF PROCUREMENT ACTIONS TO SMALL BUSINESS
FOR
MAJOR HARD GOODS

FY	TOTAL ACTIONS	(% OF ALL DOD PRIME CONTRACTS	<u>Percent by Form of Competition</u>		
			COMPETITIVE	NONCOMPETITIVE	FOLLOW-ON
66	20,674	10.4	63.7	33.4	2.9
67	24,207	10.9	64.2	33.5	2.3
68	20,557	10.1	59.3	38.0	2.7
69	18,575	9.3	56.7	39.8	-3.5
70	15,273	8.8	56.8	40.3	2.9
71	13,389	8.3	54.1	42.9	3.0
72	15,388	8.8	52.1	44.2	3.7
73	15,888	8.9	52.1	44.2	3.7
74	17,647	9.4	52.0	44.4	3.6
75	20,363	10.1	51.9	44.6	3.5
76	19,945	10.1	52.0	44.5	3.5
77	22,422	10.2	48.8	47.3	3.9
78	26,216	10.8	48.9	47.6	3.5
79	31,037	11.7	49.2	46.9	3.9
80	33,926	11.7	51.4	44.8	3.8
81	37,556	11.5	49.7	46.5	3.8
82	44,749	12.0	50.9	45.2	3.9
83	24,942	11.5	48.1	49.0	2.9
84	25,738	12.0	52.6	44.1	3.3
85	30,041	13.1	56.7	40.7	2.6
86	32,471	13.6	60.0	38.5	1.5
87	30,502	12.9	56.7	41.9	1.4

APPENDIX 4-4

SUMMARY OF PROCUREMENT ACTIONS TO SMALL BUSINESS
FOR
NON-MAJOR HARD GOODS

FY	TOTAL ACTIONS	(% OF ALL DOD PRIME CONTRACTS	<u>Percent by Form of Competition</u>		
			COMPETITIVE	NONCOMPETITIVE	FOLLOW-ON
66	48,180	24.2	81.0	18.6	0.4
67	52,396	23.6	79.8	20.0	0.2
68	46,668	23.0	79.9	19.7	0.4
69	43,759	22.0	78.8	20.8	-0.4
70	38,518	22.2	77.8	21.7	0.5
71	35,585	22.1	75.3	24.2	0.5
72	39,813	22.8	72.7	26.4	0.9
73	44,867	25.0	71.5	27.7	0.8
74	45,879	24.4	68.6	30.8	0.6
75	46,271	23.0	67.3	32.2	0.5
76	46,848	23.7	65.3	34.4	0.3
77	52,862	24.1	66.7	33.0	0.3
78	58,857	24.3	63.1	36.4	0.5
79	64,562	24.3	64.0	35.5	0.5
80	69,360	23.9	62.8	36.7	0.5
81	79,897	24.5	64.6	35.0	0.4
82	92,537	24.8	63.5	36.2	0.3
83	50,460	23.2	62.6	37.1	0.3
84	53,963	25.2	64.2	35.5	0.3
85	57,650	25.2	65.6	34.2	0.2
86	59,695	25.0	63.5	36.4	0.1
87	61,375	26.0	61.9	37.9	0.2

APPENDIX 5-1

SUMMARY OF DESCRIPTIVE PARAMETERS

TOTAL PRIME CONTRACT AWARDS: 1966 - 1987
 (all figures are percentages)

DESCRIPTION OF THE VARIABLE & DESCRIPTIVE PARAMETER	DOLLAR AWARDS	PROCUREMENT ACTIONS

<u>COMPETITIVE</u> <u>(with modifications)</u>		
Mean	42.6	48.7
Median	42.2	46.6
Range	28.4	19.1
Low	28.4	42.3
High	33.7	61.4
Std. Dev.	6.382	6.198
 <u>COMPETITIVE</u> <u>(modifications only)</u>		
Mean	15.4	10.4
Median	14.6	9.2
Range	12.6	11.3
Low	11.0	7.8
High	23.6	19.1
Std. Dev.	3.078	2.943
 <u>COMPETITIVE</u> <u>(w/o modifications)</u>		
Mean	27.2	38.3
Median	25.4	37.3
Range	29.1	18.3
Low	20.3	32.3
High	49.4	50.6
Std. Dev.	6.000	5.177

NOTE: Figures may not add correctly due to rounding

APPENDIX 5-1

DESCRIPTION OF THE VARIABLE & DESCRIPTIVE PARAMETER	DOLLAR AWARDS	PROCUREMENT ACTIONS
<u>NONCOMPETITIVE (with modifications)</u>		
Mean	37.9	42.5
Median	38.7	43.7
Range	16.8	25.8
Low	27.7	23.8
High	44.5	49.6
Std. Dev.	5.020	6.999
<u>NONCOMPETITIVE (modifications only)</u>		
Mean	14.8	10.7-
Median	15.2	11.1
Range	7.2	5.7
Low	11.3	7.4
High	18.5	13.1
Std. Dev.	2.026	1.561
<u>NONCOMPETITIVE (w/o modifications)</u>		
Mean	23.1	31.8
Median	24.0	32.0
Range	16.3	15.2
Low	14.6	22.9
High	30.9	38.1
Std. Dev.	4.325	4.988
<u>FOLLOW-ON (with modifications)</u>		
Mean	19.5	8.7
Median	19.9	8.6
Range	32.3	4.8
Low	-3.7	6.2
High	28.6	11.0
Std. Dev.	6.342	1.156
<u>FOLLOW-ON (modifications only)</u>		
Mean	10.8	3.7
Median	11.5	3.6
Range	23.6	2.1
Low	-5.3	2.9
High	18.3	5.0
Std. Dev.	4.410	.650

APPENDIX 5-1

DESCRIPTION OF THE VARIABLE & DESCRIPTIVE PARAMETER	DOLLAR AWARDS	PROCUREMENT ACTIONS
<u>FOLLOW-ON</u> <u>(w/o modifications)</u>		
Mean	8.7	5.0
Median	8.9	5.0
Range	11.4	3.9
Low	1.6	2.8
High	13.0	6.7
Std. Dev.	2.285	.777
<u>TOTAL MODIFICATIONS</u>		
Mean	41.0	24.9
Median	42.1	24.9
Range	23.0	11.4
Low	25.1	20.7
High	48.1	32.1
Std. Dev.	4.739	2.678
<u>TOTAL NONCOMPETITIVE</u> <u>(including all modifications)</u>		
Mean	64.1	56.7
Median	64.8	57.5
Range	21.3	19.2
Low	49.0	44.1
High	70.3	63.3
Std. Dev.	4.823	5.149

APPENDIX 5-2

SUMMARY OF DESCRIPTIVE PARAMETERS

AWARDS FOR MAJOR & NON-MAJOR HARD GOODS: 1966 - 1987
 (all figures are percentages)

DESCRIPTION OF THE VARIABLE & DESCRIPTIVE PARAMETER	DOLLAR AWARDS		PROCUREMENT ACTIONS	
	MAJOR	NON-MAJOR	MAJOR	NON-MAJOR
<u>PROPORTION OF ALL AWARDS</u>				
Mean	66.1	33.9	44.5	55.5
Median	66.6	33.5	44.5	55.6
Range	15.7	15.7	8.1	8.1
Low	56.5	27.8	40.7	51.2
High	72.2	43.5	48.8	59.3
Std. Dev.	3.889	3.857	2.087	2.087
<u>COMPETITIVE (with modifications)</u>				
Mean	30.9	65.9	35.0	59.8
Median	30.1	68.7	31.9	59.0
Range	25.1	32.5	21.7	20.6
Low	22.0	49.0	29.9	52.0
High	47.1	81.5	51.6	72.6
Std. Dev.	6.615	8.912	6.259	7.059
<u>COMPETITIVE (modifications only)</u>				
Mean	16.6	13.3	10.6	10.4
Median	16.4	13.1	9.6	9.0
Range	14.5	11.2	10.2	12.1
Low	10.9	7.9	8.1	7.6
High	25.4	19.1	18.3	19.7
Std. Dev.	4.020	2.638	2.465	6.480
<u>COMPETITIVE (w/o modifications)</u>				
Mean	14.3	52.6	24.4	49.4
Median	14.0	54.9	22.4	48.9
Range	21.9	36.5	14.3	21.2
Low	8.8	37.1	19.2	42.9
High	30.7	73.6	33.5	64.1
Std. Dev.	4.817	8.411	4.746	6.480

NOTE: Figures may not add correctly due to rounding

APPENDIX 5-2

DESCRIPTION OF THE VARIABLE & DESCRIPTIVE PARAMETER	DOLLAR AWARDS		PROCUREMENT ACTIONS	
	MAJOR	NON-MAJOR	MAJOR	NON-MAJOR
NONCOMPETITIVE				
(with modifications)				
Mean	41.0	31.9	47.7	38.3
Median	41.2	28.7	50.1	38.6
Range	29.3	29.1	18.6	21.3
Low	29.4	19.3	35.7	25.2
High	58.7	48.4	54.3	46.5
Std. Dev.	6.087	9.088	5.355	7.177
 NONCOMPETITIVE				
(modifications only)				
Mean	18.6	7.6	15.6	6.8
Median	19.1	7.9	16.6	6.8
Range	14.5	5.7	10.9	4.4
Low	13.7	4.1	9.2	4.8
High	28.2	9.8	20.1	9.2
Std. Dev.	3.665	1.412	3.222	1.034
 NONCOMPETITIVE				
(w/o modifications)				
Mean	22.4	24.3	32.1	31.4
Median	22.6	22.0	32.0	31.8
Range	16.3	25.2	13.7	19.0
Low	14.2	13.7	23.6	20.4
High	30.5	38.9	37.3	39.4
Std. Dev.	3.750	8.478	3.657	6.798
 FOLLOW-ON				
(with modifications)				
Mean	28.1	2.2	17.3	1.9
Median	28.3	2.0	17.8	1.7
Range	45.4	5.7	8.0	1.4
Low	-5.9	-0.8	12.7	1.2
High	39.5	4.9	20.7	2.6
Std. Dev.	8.988	1.336	1.985	.420
 FOLLOW-ON				
(modifications only)				
Mean	15.4	1.4	7.2	1.0
Median	15.7	1.3	7.0	1.0
Range	33.9	4.9	4.6	0.5
Low	-8.6	-1.1	5.5	0.8
High	25.3	3.8	10.1	1.3
Std. Dev.	6.367	1.040	1.405	.134

APPENDIX 5-2

DESCRIPTION OF THE VARIABLE & DESCRIPTIVE PARAMETER	DOLLAR AWARDS		PROCUREMENT ACTIONS	
	MAJOR	NON-MAJOR	MAJOR	NON-MAJOR
<u>FOLLOW-ON</u>				
<u>(w/o modifications)</u>				
Mean	12.7	0.8	10.1	0.9
Median	13.1	0.7	10.6	0.7
Range	16.4	1.8	6.4	1.3
Low	2.7	0.3	5.8	0.4
High	19.1	2.1	12.2	1.7
Std. Dev.	3.174	.411	1.463	.382
 <u>TOTAL MODIFICATIONS</u>				
Mean	50.6	22.3	33.4	-18.2
Median	51.4	22.7	34.2	16.5
Range	20.9	18.9	10.3	13.6
Low	36.1	10.9	27.4	14.5
High	57.0	29.8	37.7	28.1
Std. Dev.	4.855	3.617	3.145	3.990
 <u>TOTAL NONCOMPETITIVE</u>				
<u>(including all modifications)</u>				
Mean	73.0	46.6	65.5	49.7
Median	73.7	44.5	67.0	50.6
Range	14.6	35.9	16.4	21.5
Low	64.7	26.1	55.9	34.9
High	79.3	62.0	72.3	56.4
Std. Dev.	3.439	8.524	4.206	6.651

APPENDIX 5-3

SUMMARY OF DESCRIPTIVE PARAMETERS

AWARDS TO SMALL BUSINESS: 1966 - 1987
 (all figures are percentages)

DESCRIPTION OF THE VARIABLE & DESCRIPTIVE PARAMETER	DOLLAR AWARDS		PROCUREMENT ACTIONS	
	MAJOR	NON-MAJOR	MAJOR	NON-MAJOR
<u>PROPORTION OF ALL AWARDS</u>				
Mean	4.6	11.0	10.7	23.9
Median	4.5	11.0	10.6	24.2
Range	5.9	9.3	5.3	4.0
Low	3.0	9.1	8.3	22.0
High	8.9	18.4	13.6	26.0
Std. Dev.	1.131	1.880	1.496	1.096
<u>COMPETITIVE (with modifications)</u>				
Mean	66.3	84.5	67.5	81.9
Median	64.9	83.8	65.6	82.2
Range	16.5	20.8	17.2	15.3
Low	60.0	75.0	60.4	74.9
High	76.5	95.8	77.6	90.2
Std. Dev.	5.072	6.548	5.001	5.112
<u>COMPETITIVE (modifications only)</u>				
Mean	14.5	13.4	13.5	12.8
Median	12.1	13.4	12.4	11.8
Range	12.0	7.1	12.0	12.7
Low	10.1	9.4	8.9	8.9
High	22.1	16.5	20.9	21.6
Std. Dev.	4.152	1.707	2.804	3.789
<u>COMPETITIVE (w/o modifications)</u>				
Mean	51.8	71.1	54.0	69.1
Median	50.6	69.4	52.4	66.2
Range	22.1	18.9	16.1	19.1
Low	42.9	63.2	48.1	61.9
High	65.0	82.1	64.2	81.0
Std. Dev.	5.723	5.937	4.678	6.685

NOTE: Figures may not add correctly due to rounding

APPENDIX 5-3

DESCRIPTION OF THE VARIABLE & DESCRIPTIVE PARAMETER	DOLLAR AWARDS		PROCUREMENT ACTIONS	
	MAJOR	NON-MAJOR	MAJOR	NON-MAJOR
NONCOMPETITIVE				
(with modifications)				
Mean	28.6	14.8	27.7	17.3
Median	29.8	15.7	29.4	16.7
Range	14.9	20.4	13.9	15.0
Low	19.8	3.8	20.1	9.1
High	34.7	24.2	34.0	24.1
Std. Dev.	4.093	6.478	4.182	5.047
 NONCOMPETITIVE				
(modifications only)				
Mean	8.8	3.9	7.2	4.0
Median	8.9	4.1	6.8	4.5
Range	6.6	5.0	5.1	4.0
Low	5.4	1.2	5.2	1.8
High	12.0	6.2	10.3	5.8
Std. Dev.	1.686	1.535	1.517	1.287
 NONCOMPETITIVE				
(w/o modifications)				
Mean	20.0	10.9	20.6	13.2
Median	21.1	10.9	21.8	12.7
Range	10.6	17.0	9.3	11.4
Low	14.3	2.5	14.9	7.2
High	24.9	19.5	24.2	18.6
Std. Dev.	3.034	5.309	2.992	3.928
 FOLLOW-ON				
(with modifications)				
Mean	5.0	0.6	4.8	0.8
Median	5.1	0.6	5.1	0.8
Range	5.9	1.0	3.5	1.1
Low	1.5	0.3	2.1	0.4
High	4.2	1.3	5.6	1.5
Std. Dev.	1.394	.206	.957	.272
 FOLLOW-ON				
(modifications only)				
Mean	2.2	0.4	1.6	0.4
Median	2.1	0.4	1.7	0.4
Range	3.2	0.4	1.4	0.4
Low	0.5	0.2	0.7	0.2
High	3.7	0.6	2.1	0.6
Std. Dev.	.832	.089	.355	.117

APPENDIX 5-3

DESCRIPTION OF THE VARIABLE & DESCRIPTIVE PARAMETER	DOLLAR AWARDS		PROCUREMENT ACTIONS	
	MAJOR	NON-MAJOR	MAJOR	NON-MAJOR
<u>FOLLOW-ON</u> <u>(w/o modifications)</u>				
Mean	2.7	0.3	3.2	0.4
Median	2.8	0.3	3.5	0.4
Range	3.3	0.5	2.5	0.8
Low	0.9	0.1	1.4	0.1
High	4.2	0.6	3.9	0.9
Std. Dev.	.968	.126	.719	.191
 <u>TOTAL MODIFICATIONS</u>				
Mean	25.5	17.6	22.3	17.3
Median	24.5	17.3	22.4	17.2
Range	14.7	8.2	11.8	15.1
Low	19.0	13.8	15.9	11.3
High	33.7	22.0	27.7	26.4
Std. Dev.	4.818	2.138	2.669	4.497
 <u>TOTAL NONCOMPETITIVE</u> <u>(including all modifications)</u>				
Mean	45.5	28.6	42.8	30.4
Median	46.1	30.4	44.3	33.7
Range	21.4	19.0	15.6	19.3
Low	33.8	17.7	33.4	18.6
High	55.2	36.7	49.0	37.9
Std. Dev.	5.577	5.931	4.219	6.714

APPENDIX 6-1

RESULTS OF STATISTICAL TESTS FOR DIFFERENCES BETWEEN GROUPS

TOTAL PRIME CONTRACT AWARDS: 1966 - 1987

VARIABLE	MEAN		STD. ERR.		F-Test p(F)	t-Test		
	Pre	Post	Pre	Post		t-Value	p(t)	

COMPETITIVE (w/ mods.)								
Dollars	41.6	51.5	1.405	0.900	.325	-2.23	.038	
Actions	47.2	60.2	1.163	1.200	.517	-3.53	.002*	
COMPETITIVE (mods. only)								
Dollars	14.6	22.2	0.511	1.400	1.000	-4.59	.000*	
Actions	9.5	18.1	0.309	1.050	.571	-8.51	.000*	
COMPETITIVE (w/o mods.)								
Dollars	27.0	29.4	1.476	0.450	.155	-0.51	.613	
Actions	37.8	42.2	1.236	0.150	.062	-1.13	.273	
NONCOMPETITIVE (w/ mods.)								
Dollars	39.3	28.7	0.859	0.950	.552	3.91	.001*	
Actions	43.3	33.2	1.547	0.800	.263	2.07	.052	
NONCOMPETITIVE (mods. only)								
Dollars	15.0	13.9	0.465	1.100	1.000	0.76	.459	
Actions	11.0	9.7	0.348	0.200	.291	1.15	.263	
NONCOMPETITIVE (w/o mods.)								
Dollars	24.3	14.8	0.760	0.150	.101	3.96	.001*	
Actions	32.8	23.6	1.024	0.650	.322	2.87	.010*	

* Significant @ .01

NOTE:

N=19 in Pre-CICA (1966-1984)

N=2 in Post-CICA (1986-1987)

df=19

p(F) less than or equal to .05 = Separate-Variance t-Test

p(F) greater than .05 = Pooled-Variance t-Test

NOTE: figures may not add correctly due to rounding

APPENDIX 6-1

VARIABLE	MEAN		STD. Pre	ERR. Post	F-Test p(F)	t-Test		
	Pre	Post				t-Value	p(t)	

FOLLOW-ON								
(w/ mods.)								
Dollars	19.1	19.9	1.513	1.850	.608	-0.16	.878	
Actions	9.0	6.6	0.223	0.400	.863	3.35	.003*	
FOLLOW-ON								
(mods. only)								
Dollars	10.5	11.9	1.050	2.350	1.000	-0.41	.683	
Actions	3.8	3.3	0.152	0.200	.652	1.07	.297	
FOLLOW-ON								
(w/o mods.)								
Dollars	8.7	8.0	0.535	0.500	.469	0.39	.700	
Actions	5.2	3.4	0.133	0.550	.395	4.12	.001*	
TOTAL								
MODIFICATIONS								
Dollars	40.1	48.0	1.016	0.150	.075	-2.44	.025	
Actions	24.2	31.0	0.436	1.100	1.000	-4.82	.000*	
TOTAL								
NONCOMPETITIVE								
(including all mods)								
Dollars	64.4	62.7	1.180	0.000	1.000	0.45	.656	
Actions	57.1	54.6	1.256	0.450	.183	0.64	.530	

* Significant @ .01

APPENDIX 6-2

RESULTS OF STATISTICAL TESTS FOR DIFFERENCES BETWEEN GROUPS

AWARDS FOR MAJOR HARD GOODS: 1966 - 1987

VARIABLE	MEAN		STD. ERR.		F-Test p(F)	t-Test		
	Pre	Post	Pre	Post		t-Value	p(t)	

PROPORTION OF ALL AWARDS								
Dollars	65.4	70.3	0.828	0.600	.367	-1.89	.075	
Actions	44.4	44.7	0.501	1.100	1.000	-0.20	.843	
COMPETITIVE (w/ mods.)								
Dollars	29.6	41.9	1.368	1.950	.701	-2.81	.010*	
Actions	33.0	50.0	0.867	1.650	.911	-6.12	.000*	
COMPETITIVE (mods. only)								
Dollars	15.8	23.8	0.801	1.650	.975	-3.10	.006*	
Actions	9.8	17.1	0.258	1.200	.297	-8.50	.000*	
COMPETITIVE (w/o mods.)								
Dollars	13.8	18.1	1.152	0.300	.133	-1.18	.254	
Actions	23.3	32.9	0.916	0.450	.250	-3.31	.004*	
NONCOMPETITIVE (w/ mods.)								
Dollars	42.6	30.4	1.102	0.950	.434	3.52	.002*	
Actions	49.1	36.9	0.945	1.150	.605	4.09	.001*	
NONCOMPETITIVE (mods. only)								
Dollars	19.2	16.0	0.829	1.150	.684	1.22	.236	
Actions	16.3	12.4	0.657	0.300	.232	1.87	.076	
NONCOMPETITIVE (w/o mods.)								
Dollars	23.4	14.4	0.613	0.200	.166	4.68	.000*	
Actions	32.8	24.5	0.660	0.850	.638	4.00	.001*	

* Significant @ .01

NOTE:

N=19 in Pre-CICA (1966-1984)

N=2 in Post-CICA (1986-1987)

df=19

p(F) less than or equal to .05 = Separate-Variance t-Test

p(F) greater than .05 = Pooled-Variance t-Test

APPENDIX 6-2

VARIABLE	MEAN		STD. ERR.		F-Test p(F)	t-Test	
	Pre	Post	Pre	Post		t-Value	p(t)
FOLLOW-ON (w/ mods.)							
Dollars	27.7	27.7	2.171	2.900	.660	0.00	.996
Actions	17.8	13.2	0.343	0.500	.716	4.26	.000*
FOLLOW-ON (mods. only)							
Dollars	15.0	16.5	1.529	3.500	1.000	-0.31	.761
Actions	7.4	6.4	0.326	0.550	.817	0.97	.346
FOLLOW-ON (w/o mods.)							
Dollars	12.7	11.2	0.755	0.600	.401	0.64	.527
Actions	10.5	6.9	0.235	1.050	.328	4.63	.000*
TOTAL MODIFICATIONS							
Dollars	50.0	56.3	1.111	0.700	.319	-1.80	.088
Actions	33.4	35.9	0.674	1.450	1.000	-1.12	.275
TOTAL NONCOMPETITIVE (including all mods)							
Dollars	73.5	70.7	0.797	0.900	.563	1.08	.292
Actions	66.2	60.2	0.918	0.600	.331	2.05	.054

* Significant @ .01

APPENDIX 6-3

RESULTS OF STATISTICAL TESTS FOR DIFFERENCES BETWEEN GROUPS

AWARDS FOR NON-MAJOR HARD GOODS: 1966 - 1987

VARIABLE	MEAN		STD. Pre	ERR. Post	F-Test p(F)	t-Test	
	Pre	Post				t-Value	p(t)

PROPORTION OF ALL AWARDS							
Dollars	34.6	29.7	0.820	0.600	.370	1.89	.074
Actions	55.6	55.3	0.501	1.100	1.000	0.20	.843
COMPETITIVE (w/ mods.)							
Dollars	64.6	74.3	2.050	0.850	.211	-1.48	.154
Actions	58.6	68.6	1.561	0.400	.131	-1.99	.062
COMPETITIVE (mods. only)							
Dollars	12.6	18.4	0.473	0.750	.773	-3.80	.001*
Actions	9.3	18.8	0.376	0.900	1.000	-7.91	.000*
COMPETITIVE (w/o mods.)							
Dollars	52.0	55.9	2.045	1.600	.395	-0.60	.555
Actions	49.4	49.6	1.604	0.500	.159	-0.05	.963
NONCOMPETITIVE (w/ mods.)							
Dollars	33.0	24.5	2.124	0.800	.192	1.27	.219
Actions	39.4	30.3	1.615	0.350	.111	1.80	.087
NONCOMPETITIVE (mods. only)							
Dollars	7.4	9.0	0.323	0.800	1.000	-1.55	.137
Actions	6.7	7.5	0.244	0.000	1.000	-0.99	.337
NONCOMPETITIVE (w/o mods.)							
Dollars	25.6	15.5	1.919	0.000	1.000	1.67	.111
Actions	32.7	22.8	1.478	0.350	.121	2.13	.046

* Significant @ .01

NOTE:

N=19 in Pre-CICA (1966-1984)

N=2 in Post-CICA (1986-1987)

df=19

p(F) less than or equal to .05 = Separate-Variance t-Test

p(F) greater than .05 = Pooled-Variance t-Test

APPENDIX 6-3

VARIABLE	MEAN		STD. Pre	ERR. Post	F-Test p(F)	t-Test	
	Pre	Post				t-Value	p(t)

FOLLOW-ON (w/ mods.)							
Dollars	2.3	1.3	0.321	0.050	.079	1.06	.302
Actions	1.9	1.3	0.093	0.100	.539	2.15	.044
FOLLOW-ON (mods. only)							
Dollars	1.5	0.9	0.252	0.150	.302	0.87	.394
Actions	1.0	0.8	0.030	0.000	.000	7.13	.000*
FOLLOW-ON (w/o mods.)							
Dollars	0.8	0.4	0.099	0.050	.257	1.06	.304
Actions	0.9	0.5	0.089	0.100	.562	1.50	.150
TOTAL MODIFICATIONS							
Dollars	21.6	28.2	0.729	1.650	1.000	-2.82	.010*
Actions	17.0	27.2	0.581	0.950	.795	-5.48	.000*
TOTAL NONCOMPETITIVE (including all mods)							
Dollars	47.2	43.7	2.075	1.650	.401	0.54	.595
Actions	49.7	49.9	1.646	0.600	.186	-0.04	.972

* Significant @ .01

APPENDIX 6-4

RESULTS OF STATISTICAL TESTS FOR DIFFERENCES BETWEEN GROUPS

MAJOR HARD GOODS AWARDED TO SMALL BUSINESS: 1966 - 1987

VARIABLE	MEAN		STD. Pre	ERR. Post	F-Test p(F)	t-Test		
	Pre	Post				t-Value	p(t)	

PROPORTION OF ALL AWARDS								
Dollars	4.5	5.4	0.273	0.050	.093	-0.98	.342	
Actions	10.3	13.3	0.273	0.350	.634	-3.36	.003*	
COMPETITIVE (w/ mods.)								
Dollars	65.3	74.3	1.053	0.550	.265	-2.70	.014	
Actions	66.2	77.6	0.862	0.000	1.000	-4.21	.000*	
COMPETITIVE (mods. only)								
Dollars	13.6	19.8	0.824	0.000	1.000	-2.40	.027	
Actions	12.8	19.3	0.463	1.600	.555	-4.32	.000*	
COMPETITIVE (w/o mods.)								
Dollars	51.8	54.5	1.387	0.550	.202	-0.61	.550	
Actions	53.4	58.4	1.086	1.650	.744	-1.43	.170	
NONCOMPETITIVE (w/ mods.)								
Dollars	29.3	23.6	0.904	0.050	.028	6.37	.000*	
Actions	28.8	20.2	0.786	0.100	.065	3.45	.003*	
NONCOMPETITIVE (mods. only)								
Dollars	8.8	8.4	0.416	0.200	.244	0.31	.758	
Actions	7.5	5.3	0.330	0.050	.077	2.12	.048	
NONCOMPETITIVE (w/o mods.)								
Dollars	20.6	15.3	0.616	0.250	.206	2.77	.012	
Actions	21.4	15.0	0.546	0.050	.047	11.69	.000*	

* Significant @ .01

NOTE:

N=19 in Pre-CICA (1966-1984)

N=2 in Post-CICA (1986-1987)

df=19

p(F) less than or equal to .05 = Separate-Variance t-Test

p(F) greater than .05 = Pooled-Variance t-Test

APPENDIX 6-4

VARIABLE	MEAN		STD. Pre	ERR. Post	F-Test p(F)	t-Test		
	Pre	Post				t-Value	p(t)	

FOLLOW-ON								
(w/ mods.)								
Dollars	5.4	2.2	0.252	0.700	1.000	3.90	.001*	
Actions	5.1	2.2	0.098	0.100	.510	9.25	.000*	
FOLLOW-ON								
(mods. only)								
Dollars	2.3	1.1	0.179	0.600	.583	2.08	.051	
Actions	1.7	0.7	0.049	0.000	.000	19.76	.000*	
FOLLOW-ON								
(w/o mods.)								
Dollars	2.9	1.0	0.186	0.050	.137	3.34	.003*	
Actions	3.4	1.5	0.104	0.050	.245	5.96	.000*	
TOTAL								
MODIFICATIONS								
Dollars	24.7	29.4	1.053	0.350	.169	-1.40	.176	
Actions	21.9	25.3	0.597	1.650	1.000	-1.76	.094	
TOTAL								
NONCOMPETITIVE								
(including all mods)								
Dollars	45.3	44.6	1.353	0.600	.226	0.17	.867	
Actions	43.2	40.2	1.007	1.700	.819	0.95	.356	

* Significant @ .01

APPENDIX 6-5

RESULTS OF STATISTICAL TESTS FOR DIFFERENCES BETWEEN GROUPS

NON-MAJOR HARD GOODS AWARDED TO SMALL BUSINESS: 1966 - 1987

VARIABLE	MEAN		STD. Pre	ERR. Post	F-Test p(F)	t-Test		
	Pre	Post				t-Value	p(t)	

PROPORTION OF ALL AWARDS								
Dollars	11.2	9.9	0.451	0.000	.000	2.82	.010*	
Actions	23.7	25.5	0.224	0.500	1.000	-2.51	.021	
COMPETITIVE (w/ mods.)								
Dollars	84.5	84.4	1.622	0.400	.126	0.02	.987	
Actions	81.6	84.1	1.246	0.550	.225	-0.63	.533	
COMPETITIVE (mods. only)								
Dollars	13.3	15.2	0.392	0.550	.691	-1.52	.145	
Actions	11.6	21.4	0.521	0.250	.244	-5.95	.000*	
COMPETITIVE (w/o mods.)								
Dollars	71.3	69.3	1.459	0.950	.330	0.43	.669	
Actions	70.0	62.7	1.554	0.850	.278	1.50	.151	
NONCOMPETITIVE (w/ mods.)								
Dollars	14.8	15.3	1.604	0.450	.143	-0.09	.932	
Actions	17.5	15.5	1.236	0.500	.206	0.52	.606	
NONCOMPETITIVE (mods. only)								
Dollars	3.7	5.7	0.350	0.550	.768	-1.75	.097	
Actions	4.0	4.6	0.315	0.000	1.000	-0.65	.522	
NONCOMPETITIVE (w/o mods.)								
Dollars	11.1	9.6	1.310	0.100	.039	0.37	.718	
Actions	13.6	10.9	0.944	0.500	.269	0.90	.381	

* Significant @ .01

NOTE:

N=19 in Pre-CICA (1966-1984)

N=2 in Post-CICA (1986-1987)

df=19

p(F) less than or equal to .05 = Separate-Variance t-Test

p(F) greater than .05 = Pooled-Variance t-Test

APPENDIX 6-5

VARIABLE	MEAN		STD. Pre	ERR. Post	F-Test p(F)	t-Test	
	Pre	Post				t-Value	p(t)
FOLLOW-ON							
(w/ mods.)							
Dollars	0.7	0.4	0.043	0.050	.580	2.42	.026
Actions	0.9	0.4	0.055	0.000	1.000	2.92	.009*
FOLLOW-ON							
(mods. only)							
Dollars	0.4	0.3	0.019	0.050	1.000	2.18	.042
Actions	0.5	0.3	0.023	0.050	1.000	2.79	.012
FOLLOW-ON							
(w/o mods.)							
Dollars	0.3	0.1	0.027	0.000	1.000	2.09	.050
Actions	0.4	0.2	0.041	0.050	.610	2.27	.035
TOTAL							
MODIFICATIONS							
Dollars	17.3	21.0	0.449	1.000	1.000	-2.56	.019
Actions	16.0	26.2	0.764	0.250	.167	-4.22	.000*
TOTAL							
NONCOMPETITIVE							
(including all mods)							
Dollars	28.5	30.6	1.457	0.900	.313	-0.47	.646
Actions	29.5	37.1	1.556	0.750	.245	-1.53	.143

* Significant @ .01

APPENDIX 7

DOD CLAIMANT PROGRAMS
SUMMARY OF DESCRIPTIVE PARAMETERS
PRIME CONTRACT AWARDS: 1966 - 1987
(all figures are percentages)

DOD CLAIMANT PROGRAM

DESCRIPTION OF THE VARIABLE & DESCRIPTIVE PARAMETER	DOLLAR AWARDS	PROCUREMENT ACTIONS
<u>AIRCRAFT (A-1)</u>		
<u>PROPORTION OF ALL AWARDS</u>		
Mean	20.7	15.7
Median	20.8	15.7
Range	18.8	6.4
Low	6.4	12.7
High	25.2	19.1
Std. Dev.	3.781	1.457
 <u>PROPORTION OF AWARDS FOR MAJOR HARD GOODS</u>		
Mean	31.1	35.2
Median	31.5	35.1
Range	23.6	10.9
Low	11.4	29.0
High	35.0	39.9
Std. Dev.	4.734	2.477
 <u>COMPETITIVE</u>		
Mean	9.6	18.0
Median	8.4	16.8
Range	38.0	14.6
Low	4.5	13.4
High	42.5	28.0
Std. Dev.	7.823	4.162
 <u>FOLLOW-ON</u>		
Mean	21.6	21.9
Median	22.4	22.4
Range	63.3	11.8
Low	-27.0	14.7
High	36.3	26.5
Std. Dev.	12.550	3.418

NOTE: Figures may not add correctly due to rounding

APPENDIX 7

DESCRIPTION OF THE VARIABLE & DESCRIPTIVE PARAMETER	DOLLAR AWARDS	PROCUREMENT ACTIONS
<u>NONCOMPETITIVE</u>		
Mean	68.8	60.2
Median	68.9	59.9
Range	26.0	15.6
Low	58.8	52.7
High	84.8	68.3
Std. Dev.	6.607	4.214
 <u>TOTAL MODIFICATIONS</u>		
Mean	48.4	27.8
Median	51.4	28.2
Range	72.3	23.8
Low	-7.4	14.9
High	64.9	38.7
Std. Dev.	14.184	5.841

Continued on next page

APPENDIX 7

DESCRIPTION OF THE VARIABLE & DESCRIPTIVE PARAMETER	DOLLAR AWARDS	PROCUREMENT ACTIONS
<u>MISSILES and SPACE SYSTEMS (A-2)</u>		
<u>PROPORTION OF ALL AWARDS</u>		
Mean	13.4	4.4
Median	13.1	4.5
Range	9.4	2.4
Low	6.6	3.2
High	16.0	5.6
Std. Dev.	1.916	0.562
<u>PROPORTION OF AWARDS FOR MAJOR HARD GOODS</u>		
Mean	20.1	10.0
Median	19.8	10.0
Range	11.9	5.5
Low	11.7	7.3
High	23.6	12.8
Std. Dev.	2.436	1.413
<u>COMPETITIVE</u>		
Mean	6.2	12.3
Median	4.5	11.9
Range	14.1	12.3
Low	2.6	8.1
High	16.7	20.4
Std. Dev.	4.004	3.104
<u>FOLLOW-ON</u>		
Mean	14.3	8.8
Median	12.0	7.7
Range	15.0	17.0
Low	9.9	4.6
High	24.9	21.6
Std. Dev.	4.853	3.966
<u>NONCOMPETITIVE</u>		
Mean	79.8	79.0
Median	83.6	80.6
Range	25.6	19.3
Low	61.5	65.3
High	87.1	84.6
Std. Dev.	7.394	4.848
<u>TOTAL MODIFICATIONS</u>		
Mean	57.4	53.2
Median	57.9	53.6
Range	27.4	15.2
Low	39.2	44.6
High	66.6	59.8
Std. Dev.	6.785	4.033

APPENDIX 7

 DESCRIPTION OF THE VARIABLE
 &
 DESCRIPTIVE PARAMETER
DOLLAR
AWARDSPROCUREMENT
ACTIONSSHIPS (A-3)PROPORTION OF ALL AWARDS

Mean	7.8	5.8
Median	8.4	5.9
Range	7.0	4.2
Low	3.9	3.8
High	10.9	8.0
Std. Dev.	2.263	1.401

PROPORTION OF AWARDS
FOR MAJOR HARD GOODS

Mean	11.9	13.1
Median	12.1	13.6
Range	11.5	9.3
Low	5.8	8.8
High	17.3	18.1
Std. Dev.	3.558	3.109

COMPETITIVE

Mean	25.9	29.1
Median	25.5	29.0
Range	41.9	17.8
Low	7.2	21.7
High	49.1	39.5
Std. Dev.	11.514	5.449

FOLLOW-ON

Mean	4.0	0.8
Median	2.7	0.5
Range	9.7	1.8
Low	0.2	0.3
High	9.9	2.1
Std. Dev.	3.096	.609

NONCOMPETITIVE

Mean	70.1	70.1
Median	69.1	70.7
Range	42.3	19.0
Low	48.1	58.9
High	90.4	77.9
Std. Dev.	11.849	5.960

TOTAL MODIFICATIONS

Mean	50.2	39.8
Median	50.7	41.0
Range	48.5	21.8
Low	30.2	30.2
High	78.7	52.0
Std. Dev.	12.644	5.552

APPENDIX 7

 DESCRIPTION OF THE VARIABLE
 &
 DESCRIPTIVE PARAMETER
DOLLAR
AWARDSPROCUREMENT
ACTIONSTANKS & AUTOMOTIVE (A-4)PROPORTION OF ALL AWARDS

Mean	3.6	2.5
Median	3.7	2.5
Range	3.9	1.3
Low	2.1	2.1
High	6.0	3.4
Std. Dev.	.901	.340

PROPORTION OF AWARDS
FOR MAJOR HARD GOODS

Mean	5.5	5.7
Median	5.5	5.7
Range	7.4	2.8
Low	3.1	4.7
High	10.5	7.5
Std. Dev.	1.579	.691

COMPETITIVE

Mean	26.0	57.5
Median	22.9	56.4
Range	38.8	26.5
Low	11.8	45.9
High	50.6	72.4
Std. Dev.	10.785	5.840

FOLLOW-ON

Mean	4.6	1.3
Median	1.6	1.2
Range	17.6	2.8
Low	0.2	0.2
High	17.8	3.0
Std. Dev.	5.799	.792

NONCOMPETITIVE

Mean	68.8	41.2
Median	70.0	41.6
Range	33.5	26.2
Low	48.8	26.5
High	82.3	52.7
Std. Dev.	9.557	5.872

TOTAL MODIFICATIONS

Mean	49.4	25.9
Median	51.6	26.5
Range	33.0	18.9
Low	31.7	14.6
High	64.7	33.5
Std. Dev.	9.658	4.760

APPENDIX 7

DESCRIPTION OF THE VARIABLE & DESCRIPTIVE PARAMETER	DOLLAR AWARDS	PROCUREMENT ACTIONS
<u>WEAPONS (A-5)</u>		
<u>PROPORTION OF ALL AWARDS</u>		
Mean	1.6	1.5
Median	1.6	1.5
Range	1.3	0.4
Low	1.0	0.4
High	2.3	1.7
Std. Dev.	.380	.113
<u>PROPORTION OF AWARDS FOR MAJOR HARD GOODS</u>		
Mean	2.4	3.4
Median	2.4	3.4
Range	2.4	0.9
Low	1.5	2.9
High	3.9	3.8
Std. Dev.	.599	.247
<u>COMPETITIVE</u>		
Mean	22.1	38.7
Median	20.6	37.7
Range	36.9	35.5
Low	6.7	25.3
High	43.6	60.8
Std. Dev.	10.767	8.700
<u>FOLLOW-ON</u>		
Mean	1.9	0.7
Median	1.2	0.5
Range	6.4	2.9
Low	0.1	0.2
High	6.5	3.1
Std. Dev.	1.759	.618
<u>NONCOMPETITIVE</u>		
Mean	76.0	60.2
Median	77.9	61.6
Range	35.8	44.2
Low	55.3	29.9
High	91.1	74.1
Std. Dev.	10.235	9.976
<u>TOTAL MODIFICATIONS</u>		
Mean	37.1	31.2
Median	36.8	32.1
Range	32.2	20.7
Low	22.8	18.5
High	55.0	39.2
Std. Dev.	8.697	5.420

DESCRIPTION OF THE VARIABLE & DESCRIPTIVE PARAMETER	APPENDIX 7	
	DOLLAR AWARDS	PROCUREMENT ACTIONS
<u>AMMUNITION (A-6)</u>		
<u>PROPORTION OF ALL AWARDS</u>		
Mean	5.5	1.4
Median	3.5	1.1
Range	13.3	2.0
Low	2.3	0.6
High	15.6	2.6
Std. Dev.	3.841	.647
<u>PROPORTION OF AWARDS FOR MAJOR HARD GOODS</u>		
Mean	8.7	3.1
Median	5.1	2.4
Range	23.8	4.1
Low	3.8	1.4
High	27.6	5.5
Std. Dev.	6.215	1.390
<u>COMPETITIVE</u>		
Mean	22.6	26.9
Median	20.8	26.2
Range	29.4	23.5
Low	9.6	21.2
High	39.0	44.7
Std. Dev.	7.563	5.406
<u>FOLLOW-ON</u>		
Mean	3.0	1.8
Median	2.3	1.9
Range	8.4	2.5
Low	0.6	0.3
High	9.0	2.8
Std. Dev.	2.126	.626
<u>NONCOMPETITIVE</u>		
Mean	74.4	71.3
Median	74.9	72.7
Range	28.6	23.9
Low	59.9	53.3
High	88.5	77.2
Std. Dev.	7.189	5.332
<u>TOTAL MODIFICATIONS</u>		
Mean	53.9	52.7
Median	55.3	52.7
Range	24.1	29.4
Low	42.7	35.2
High	66.8	64.6
Std. Dev.	6.463	5.638

APPENDIX 7

DESCRIPTION OF THE VARIABLE & DESCRIPTIVE PARAMETER	DOLLAR AWARDS	PROCUREMENT ACTIONS
<u>ELECTRONICS & COMMUNICATION EQUIPMENT (A-7)</u>		
<u>PROPORTION OF ALL AWARDS</u>		
Mean	13.4	13.2
Median	13.5	12.8
Range	6.8	7.2
Low	10.4	12.0
High	17.2	16.2
Std. Dev.	2.018	1.263
<u>PROPORTION OF AWARDS FOR MAJOR HARD GOODS</u>		
Mean	20.2	29.7
Median	21.2	29.1
Range	14.2	9.5
Low	13.3	26.3
High	27.5	35.8
Std. Dev.	3.495	2.529
<u>COMPETITIVE</u>		
Mean	16.5	26.1
Median	15.6	23.6
Range	20.6	22.3
Low	10.5	19.3
High	31.1	41.6
Std. Dev.	5.479	7.453
<u>FOLLOW-ON</u>		
Mean	8.8	4.4
Median	8.2	4.3
Range	12.1	3.9
Low	4.5	2.5
High	16.6	6.4
Std. Dev.	2.900	1.056
<u>NONCOMPETITIVE</u>		
Mean	74.7	69.5
Median	76.0	72.1
Range	23.2	22.8
Low	60.1	53.8
High	83.3	76.6
Std. Dev.	5.390	7.471
<u>TOTAL MODIFICATIONS</u>		
Mean	43.4	29.7
Median	43.9	30.1
Range	29.6	11.7
Low	24.2	23.7
High	53.8	35.4
Std. Dev.	7.165	3.094

APPENDIX 7

 DESCRIPTION OF THE VARIABLE
 &
 DESCRIPTIVE PARAMETER
DOLLAR
AWARDSPROCUREMENT
ACTIONSFUELS & LUBRICANTS (A-8)PROPORTION OF ALL AWARDS

Mean	6.9	1.4
Median	7.0	1.4
Range	11.6	1.6
Low	3.1	0.1
High	14.7	1.7
Std. Dev.	2.636	.313

PROPORTION OF AWARDS
FOR NON-MAJOR HARD GOODS

Mean	19.9	2.6
Median	20.2	2.6
Range	28.2	1.6
Low	10.7	1.4
High	38.9	3.0
Std. Dev.	6.905	.324

COMPETITIVE

Mean	63.9	62.3
Median	75.4	64.3
Range	76.1	54.8
Low	17.7	22.7
High	93.8	77.5
Std. Dev.	24.457	11.647

FOLLOW-ON

Mean	0.0	0.2
Median	0.0	0.1
Range	0.5	0.9
Low	0.0	0.0
High	0.5	0.9
Std. Dev.	.108	.283

NONCOMPETITIVE

Mean	36.1	37.5
Median	24.6	35.5
Range	76.2	54.6
Low	6.1	22.5
High	82.3	77.1
Std. Dev.	24.452	11.579

TOTAL MODIFICATIONS

Mean	13.6	23.8
Median	11.8	23.5
Range	23.7	19.2
Low	4.4	14.9
High	28.1	34.1
Std. Dev.	5.892	5.442

APPENDIX 7

 DESCRIPTION OF THE VARIABLE
 &
 DESCRIPTIVE PARAMETER
DOLLAR
AWARDSPROCUREMENT
ACTIONS

TEXTILES, CLOTHING, and EQUIPAGE (A-9)
PROPORTION OF ALL AWARDS

Mean	1.5	1.2
Median	1.2	1.0
Range	4.3	1.9
Low	0.8	0.5
High	5.1	2.4
Std. Dev.	1.015	0.462

PROPORTION OF AWARDS
FOR NON-MAJOR HARD GOODS

Mean	4.2	2.0
Median	3.3	1.7
Range	9.1	3.4
Low	2.6	1.0
High	11.7	4.4
Std. Dev.	2.386	0.862

COMPETITIVE

Mean	81.1	74.9
Median	82.0	74.5
Range	29.6	21.9
Low	64.3	67.0
High	93.9	88.9
Std. Dev.	7.613	4.511

FOLLOW-ON

Mean	0.3	0.5
Median	0.1	0.2
Range	1.7	2.3
Low	0.0	0.0
High	1.7	2.3
Std. Dev.	0.556	0.675

NONCOMPETITIVE

Mean	18.6	24.6
Median	17.8	24.7
Range	29.6	21.9
Low	6.1	10.8
High	35.7	32.7
Std. Dev.	7.736	4.603

TOTAL MODIFICATIONS

Mean	12.0	15.4
Median	11.7	15.6
Range	21.6	14.0
Low	4.5	7.7
High	26.1	21.7
Std. Dev.	6.068	3.128

APPENDIX 7

DESCRIPTION OF THE VARIABLE & DESCRIPTIVE PARAMETER	DOLLAR AWARDS	PROCUREMENT ACTIONS
<u>SUBSISTENCE (B-2)</u>		
<u>PROPORTION OF ALL AWARDS</u>		
Mean	2.4	11.3
Median	2.6	12.4
Range	4.7	9.5
Low	0.8	5.3
High	5.5	14.8
Std. Dev.	1.097	3.298
<u>PROPORTION OF AWARDS FOR NON-MAJOR HARD GOODS</u>		
Mean	6.9	20.3
Median	7.5	22.5
Range	9.8	16.2
Low	2.8	9.4
High	12.6	25.6
Std. Dev.	2.715	5.672
<u>COMPETITIVE</u>		
Mean	69.0	59.3
Median	64.5	56.9
Range	34.7	30.6
Low	55.1	47.0
High	89.8	77.6
Std. Dev.	11.311	9.140
<u>FOLLOW-ON</u>		
Mean	0.1	0.1
Median	0.0	0.0
Range	0.2	0.2
Low	0.0	0.0
High	0.2	0.2
Std. Dev.	0.067	0.073
<u>NONCOMPETITIVE</u>		
Mean	30.9	40.7
Median	35.5	43.1
Range	34.7	30.6
Low	10.2	22.3
High	44.9	52.9
Std. Dev.	11.325	9.152
<u>TOTAL MODIFICATIONS</u>		
Mean	0.4	0.7
Median	0.3	0.8
Range	1.8	1.2
Low	-0.3	0.3
High	1.5	1.5
Std. Dev.	0.546	0.305

APPENDIX 7

DESCRIPTION OF THE VARIABLE & DESCRIPTIVE PARAMETER	DOLLAR AWARDS	PROCUREMENT ACTIONS
<u>CONSTRUCTION (C-2)</u>		
<u>PROPORTION OF ALL AWARDS</u>		
Mean	7.4	9.8
Median	7.5	9.5
Range	8.9	5.7
Low	2.0	7.3
High	10.9	13.0
Std. Dev.	1.819	1.698
<u>PROPORTION OF AWARDS FOR NON-MAJOR HARD GOODS</u>		
Mean	22.2	17.7
Median	22.9	16.7
Range	25.1	10.9
Low	4.5	13.2
High	29.6	24.1
Std. Dev.	5.075	3.193
<u>COMPETITIVE</u>		
Mean	73.6	62.9
Median	68.8	62.7
Range	136.8	16.7
Low	46.2	55.3
High	183.0	72.0
Std. Dev.	25.385	4.391
<u>FOLLOW-ON</u>		
Mean	0.1	0.2
Median	0.1	0.2
Range	0.5	0.6
Low	0.0	0.1
High	0.5	0.7
Std. Dev.	0.128	0.156
<u>NONCOMPETITIVE</u>		
Mean	26.2	36.9
Median	31.0	37.2
Range	136.7	16.6
Low	-83.0	27.9
High	53.7	44.5
Std. Dev.	25.374	4.382
<u>TOTAL MODIFICATIONS</u>		
Mean	21.1	30.4
Median	25.8	31.0
Range	157.1	15.8
Low	-107.0	22.1
High	50.1	37.9
Std. Dev.	29.488	4.359

APPENDIX 7

 DESCRIPTION OF THE VARIABLE
 &
 DESCRIPTIVE PARAMETER
DOLLAR
AWARDSPROCUREMENT
ACTIONSSERVICES (S-1)PROPORTION OF ALL AWARDS

Mean	10.8	16.9
Median	10.9	16.4
Range	3.8	10.5
Low	8.8	13.7
High	12.6	24.2
Std. Dev.	1.201	2.625

PROPORTION OF AWARDS
FOR NON-MAJOR HARD GOODS

Mean	32.2	30.5
Median	32.3	28.9
Range	15.4	17.3
Low	23.8	25.6
High	39.2	42.9
Std. Dev.	3.827	4.888

COMPETITIVE

Mean	28.2	29.2
Median	26.2	28.6
Range	32.1	18.4
Low	16.2	23.2
High	48.3	41.6
Std. Dev.	8.193	5.260

FOLLOW-ON

Mean	1.4	2.0
Median	1.0	1.6
Range	5.8	3.3
Low	0.2	0.7
High	6.0	4.0
Std. Dev.	1.158	1.068

NONCOMPETITIVE

Mean	70.4	68.8
Median	72.7	68.0
Range	31.3	18.3
Low	51.5	57.0
High	82.8	75.3
Std. Dev.	8.642	5.445

TOTAL MODIFICATIONS

Mean	32.5	29.1
Median	30.7	28.5
Range	27.1	12.0
Low	20.5	23.9
High	47.6	35.9
Std. Dev.	6.768	2.828

APPENDIX 7

 DESCRIPTION OF THE VARIABLE
 &
 DESCRIPTIVE PARAMETER
DOLLAR
AWARDSPROCUREMENT
ACTIONS

 MISCELLANEOUS HARD GOODS (B-1, B-3, B-9, and C-9)
PROPORTION OF ALL AWARDS

Mean	4.9	15.0
Median	4.3	14.7
Range	8.8	7.1
Low	3.5	12.4
High	12.3	19.5
Std. Dev.	1.884	1.883

PROPORTION OF AWARDS
FOR NON-MAJOR HARD GOODS

Mean	14.4	27.1
Median	13.0	25.9
Range	17.5	12.4
Low	10.7	23.0
High	28.2	35.4
Std. Dev.	4.205	3.324

COMPETITIVE

Mean	49.1	52.3
Median	48.9	49.6
Range	28.7	29.2
Low	36.5	43.7
High	62.5	72.9
Std. Dev.	7.764	8.427

FOLLOW-ON

Mean	1.8	0.8
Median	1.9	0.8
Range	3.5	1.6
Low	0.4	0.2
High	3.9	1.8
Std. Dev.	1.060	0.357

NONCOMPETITIVE

Mean	49.1	46.9
Median	50.2	49.3
Range	28.9	29.1
Low	32.3	26.3
High	61.2	55.4
Std. Dev.	7.562	8.432

TOTAL MODIFICATIONS

Mean	20.8	10.5
Median	20.7	9.9
Range	17.9	10.4
Low	13.4	7.0
High	31.3	17.4
Std. Dev.	4.956	2.696

APPENDIX 8

DOD CLAIMANT PROGRAMS
RESULTS OF STATISTICAL TESTS FOR DIFFERENCES BETWEEN GROUPS

PRIME CONTRACT AWARDS: 1966 - 1987

VARIABLE	MEAN		STD. ERR.		F-Test p(F)	t-Test	
	Pre	Post	Pre	Post		t-Value	p(t)

AIRCRAFT (A-1)							
PROPORTION OF ALL AWARDS							
Dollars	20.3	22.4	0.883	1.500	.823	-0.74	.466
Actions	15.9	13.8	0.313	1.050	.581	2.12	.048
PROPORTION OF AWARDS FOR MAJOR HARD GOODS							
Dollars	30.8	31.9	1.137	2.400	.996	-0.30	.767
Actions	35.8	30.7	0.443	1.650	.486	3.53	.002*
COMPETITIVE							
Dollars	9.5	11.2	1.931	1.400	.367	-0.28	.786
Actions	16.6	27.6	0.580	0.400	.349	-5.98	.000*
FOLLOW-ON							
Dollars	22.5	13.1	3.030	2.200	.367	0.98	.341
Actions	22.3	17.1	0.729	2.350	.619	2.20	.040
NONCOMPETITIVE							
Dollars	68.0	75.7	1.537	0.800	.264	-1.58	.131
Actions	61.1	55.4	0.843	2.700	.625	2.09	.051

* Significant @ .01

NOTE:

N=19 in Pre-CICA (1966-1984)

N=2 in Post-CICA (1986-1987)

df=19

p(F) less than or equal to .05 = Separate-Variance t-Test

p(F) greater than .05 = Pooled-Variance t-Test

NOTE: figures may not add correctly due to rounding

APPENDIX 8

VARIABLE	MEAN		STD. ERR.		F-Test p(F)	t-Test	
	Pre	Post	Pre	Post		t-Value	p(t)

<u>MISSILES & SPACE SYSTEMS (A-2)</u>							
<u>PROPORTION OF ALL AWARDS</u>							
Dollars	13.1	15.1	0.451	0.250	.281	-1.35	.192
Actions	4.5	4.2	0.135	0.150	.554	0.47	.641
<u>PROPORTION OF AWARDS FOR MAJOR HARD GOODS</u>							
Dollars	20.0	21.5	0.593	0.150	.129	-0.80	.433
Actions	10.1	9.5	0.336	0.500	.731	0.55	.587
<u>COMPETITIVE</u>							
Dollars	4.8	15.3	0.389	1.400	.516	-8.29	.000*
Actions	11.3	19.2	0.421	1.250	1.000	-5.75	.000*
<u>FOLLOW-ON</u>							
Dollars	13.5	17.0	1.046	1.850	.853	-1.03	.318
Actions	9.2	5.7	0.946	0.600	.321	1.16	.259
<u>NONCOMPETITIVE</u>							
Dollars	81.7	71.3	1.287	3.950	1.000	2.51	.021
Actions	79.5	75.5	1.133	2.200	.927	1.11	.280
 <u>SHIPS (A-3)</u>							
<u>PROPORTION OF ALL AWARDS</u>							
Dollars	7.9	7.7	0.557	0.802	.707	0.10	.925
Actions	5.7	6.3	0.344	0.150	.222	-0.48	.639
<u>PROPORTION OF AWARDS FOR MAJOR HARD GOODS</u>							
Dollars	12.1	11.0	0.870	1.050	.600	0.41	.688
Actions	12.9	14.0	0.766	0.000	1.000	-0.44	.667
<u>COMPETITIVE</u>							
Dollars	25.2	31.8	2.808	2.100	.378	-0.74	.468
Actions	29.1	28.4	1.347	0.500	.189	0.16	.877
<u>FOLLOW-ON</u>							
Dollars	3.6	5.6	0.673	3.450	.227	-0.85	.408
Actions	0.9	0.4	0.147	0.000	1.000	0.98	.340
<u>NONCOMPETITIVE</u>							
Dollars	71.2	62.6	2.824	5.600	.944	0.95	.352
Actions	70.1	71.2	1.473	0.500	.173	-0.24	.811

* SIGNIFICANT @ .01

APPENDIX 8

VARIABLE	MEAN		STD.	ERR.	F-Test p(F)	t-Test	
	Pre	Post	Pre	Post		t-Value	p(t)
<u>TANKS & AUTOMOTIVE (A-4)</u>							
<u>PROPORTION OF ALL AWARDS</u>							
Dollars	3.6	3.8	0.222	0.100	.229	-0.34	.739
Actions	2.6	2.2	0.078	0.100	.637	1.60	.126
<u>PROPORTION OF AWARDS FOR MAJOR HARD GOODS</u>							
Dollars	5.5	5.4	0.391	0.200	.260	0.08	.940
Actions	5.8	5.0	0.155	0.050	.165	1.78	.092
<u>COMPETITIVE</u>							
Dollars	27.2	21.2	2.525	1.700	.341	0.75	.460
Actions	57.7	57.3	1.430	1.550	.542	0.10	.921
<u>FOLLOW-ON</u>							
Dollars	2.8	17.6	0.797	0.200	.128	-5.89	.000*
Actions	1.3	0.7	0.191	0.100	.266	1.04	.311
<u>NONCOMPETITIVE</u>							
Dollars	69.3	61.2	2.277	1.550	.345	1.14	.269
Actions	41.0	42.1	1.436	1.650	.573	-0.24	.816
<u>WEAPONS (A-5)</u>							
<u>PROPORTION OF ALL AWARDS</u>							
Dollars	1.5	1.8	0.091	0.050	.278	-0.70	.490
Actions	1.5	1.7	0.023	0.000	1.000	-2.94	.008*
<u>PROPORTION OF AWARDS FOR MAJOR HARD GOODS</u>							
Dollars	2.4	2.5	0.147	0.050	.173	-0.18	.863
Actions	3.3	3.8	0.052	0.000	1.000	-2.79	.012
<u>COMPETITIVE</u>							
Dollars	22.9	19.0	2.598	1.800	.351	0.48	.637
Actions	38.9	37.0	2.150	0.600	.142	0.28	.781
<u>FOLLOW-ON</u>							
Dollars	2.0	1.8	0.407	1.700	.385	0.14	.890
Actions	0.7	0.5	0.149	0.300	.235	0.46	.648
<u>NONCOMPETITIVE</u>							
Dollars	75.1	79.2	2.446	0.100	.021	-1.69	.108
Actions	59.9	62.6	2.462	0.950	.196	-0.34	.736

* SIGNIFICANT @ .01

APPENDIX 8

VARIABLE	MEAN		STD. ERR.		F-Test p(F)	t-Test		
	Pre	Post	Pre	Post		t-Value	p(t)	
<u>AMMUNITION (A-6)</u>								
<u>PROPORTION OF ALL AWARDS</u>								
Dollars	5.8	3.5	0.929	0.050	.027	2.54	.021	
Actions	1.4	1.1	0.156	0.050	.163	0.77	.449	
<u>PROPORTION OF AWARDS FOR MAJOR HARD GOODS</u>								
Dollars	9.3	5.0	1.491	0.050	.017	2.92	.009*	
Actions	3.2	2.3	0.335	0.100	.152	0.85	.404	
<u>COMPETITIVE</u>								
Dollars	21.7	29.7	1.779	0.850	.243	-1.41	.174	
Actions	26.5	28.3	1.291	2.000	.757	-0.45	.660	
<u>FOLLOW-ON</u>								
Dollars	2.9	2.9	0.517	1.250	1.000	0.05	.961	
Actions	2.0	0.3	0.094	0.000	1.000	5.61	.000*	
<u>NONCOMPETITIVE</u>								
Dollars	75.3	67.5	1.683	0.400	.121	1.47	.159	
Actions	71.6	71.4	1.284	2.000	.761	0.04	.971	
<u>ELECTRONICS & COMMUNICATION EQUIPMENT (A-7)</u>								
<u>PROPORTION OF ALL AWARDS</u>								
Dollars	13.0	16.1	0.412	1.150	1.000	-2.29	.034	
Actions	12.8	15.5	0.175	0.100	.289	-4.91	.000*	
<u>PROPORTION OF AWARDS FOR MAJOR HARD GOODS</u>								
Dollars	19.8	22.9	0.818	1.450	.856	-1.18	.253	
Actions	28.9	34.8	0.343	1.050	1.000	-5.28	.000*	
<u>COMPETITIVE</u>								
Dollars	16.1	20.3	1.321	0.500	.193	-1.02	.321	
Actions	24.4	34.9	1.455	2.200	.741	-3.25	.004*	
<u>FOLLOW-ON</u>								
Dollars	8.9	7.2	0.702	0.700	.500	0.76	.454	
Actions	4.6	2.6	0.218	0.100	.233	2.88	.009*	
<u>NONCOMPETITIVE</u>								
Dollars	75.0	72.5	1.317	0.250	.097	0.63	.539	
Actions	71.0	58.0	1.558	2.050	.651	2.64	.016	

* SIGNIFICANT @ .01

APPENDIX 8

VARIABLE	MEAN		STD. ERR.		F-Test p(F)	t-Test	
	Pre	Post	Pre	Post		t-Value	p(t)
<u>FUELS & LUBRICANTS (A-8)</u>							
<u>PROPORTION OF ALL AWARDS</u>							
Dollars	7.1	5.0	0.617	1.900	1.000	1.05	.308
Actions	1.5	0.7	0.029	0.600	.000	1.27	.424
<u>PROPORTION OF AWARDS FOR NON-MAJOR HARD GOODS</u>							
Dollars	20.1	16.8	1.623	6.050	.484	0.64	.531
Actions	2.6	2.0	0.047	0.550	.002	1.24	.429
<u>COMPETITIVE</u>							
Dollars	60.2	89.4	5.575	4.450	.403	-1.65	.115
Actions	60.6	70.4	2.634	5.700	1.000	-1.16	.260
<u>FOLLOW-ON</u>							
Dollars	0.0	0.0	0.027	0.000	1.000	0.38	.710
Actions	0.0	0.0	0.067	0.000	1.000	1.22	.239
<u>NONCOMPETITIVE</u>							
Dollars	39.7	10.6	5.572	4.450	.403	1.66	.114
Actions	39.1	29.6	2.623	5.700	1.000	1.14	.270
<u>TEXTILES, CLOTHING, and EQUIPAGE (A-9)</u>							
<u>PROPORTION OF ALL AWARDS</u>							
Dollars	1.5	0.8	0.244	0.000	.000	3.07	.007*
Actions	1.1	0.6	0.104	0.050	.245	1.82	.084
<u>PROPORTION OF AWARDS FOR NON-MAJOR HARD GOODS</u>							
Dollars	4.4	2.7	0.576	0.000	.000	2.89	.010*
Actions	2.1	1.1	0.198	0.050	.129	1.65	.115
<u>COMPETITIVE</u>							
Dollars	81.6	76.1	1.824	3.350	.882	0.96	.349
Actions	75.4	69.0	1.000	1.950	.930	2.04	.056
<u>FOLLOW-ON</u>							
Dollars	0.4	0.1	0.135	0.050	.188	0.75	.480
Actions	0.5	0.3	0.165	0.050	.155	0.50	.622
<u>NONCOMPETITIVE</u>							
Dollars	18.0	23.9	1.851	3.300	.860	-1.00	.331
Actions	24.0	30.8	1.019	1.915	.915	-2.06	.053

* SIGNIFICANT @ .01

APPENDIX 8

VARIABLE	MEAN		STD.	ERR.	F-Test p(F)	t-Test		
	Pre	Post	Pre	Post		t-Value	p(t)	
<u>SUBSTANCE (B-2)</u>								
PROPORTION OF ALL AWARDS								
Dollars	2.6	1.0	0.226	0.050	.113	2.38	.028	
Actions	12.2	5.4	0.555	0.050	.046	12.32	.000*	
PROPORTION OF AWARDS FOR NON-MAJOR HARD GOODS								
Dollars	7.5	3.2	0.548	0.000	1.000	2.51	.021	
Actions	21.9	9.7	0.926	0.300	.165	4.18	.001*	
COMPETITIVE								
Dollars	70.6	59.4	2.164	2.500	.480	1.35	.192	
Actions	59.7	55.7	2.240	1.750	.394	0.57	.573	
FOLLOW-ON								
Dollars	0.1	0.0	0.016	0.000	1.000	1.16	.262	
Actions	0.1	0.0	0.018	0.000	1.000	0.85	.407	
NONCOMPETITIVE								
Dollars	29.4	40.6	2.615	2.500	.480	-1.36	.190	
Actions	40.2	44.4	2.243	1.750	.394	-0.58	.566	
<u>CONSTRUCTION (C-2)</u>								
PROPORTION OF ALL AWARDS								
Dollars	7.5	7.3	0.448	0.351	.184	0.13	.896	
Actions	9.4	12.3	0.333	0.467	.525	-3.29	.004*	
PROPORTION OF AWARDS FOR NON-MAJOR HARD GOODS								
Dollars	21.7	25.2	1.207	1.386	.372	-1.11	.282	
Actions	16.9	22.3	0.623	0.939	.593	-3.32	.003*	
COMPETITIVE								
Dollars	73.2	76.2	6.285	0.208	.000	-0.47	.642	
Actions	63.3	60.6	1.045	1.425	.502	1.01	.326	
FOLLOW-ON								
Dollars	0.1	0.2	0.024	0.133	.041	-0.91	.455	
Actions	0.2	0.2	0.038	0.033	.223	-0.18	.862	
NONCOMPETITIVE								
Dollars	26.7	23.0	6.279	0.346	.001	0.58	.567	
Actions	36.5	39.2	1.043	1.450	.518	-0.98	.338	

* SIGNIFICANT @ .01

APPENDIX 8

VARIABLE	MEAN		STD. ERR.		F-Test p(F)	t-Test		
	Pre	Post	Pre	Post		t-Value	p(t)	
<u>SERVICES (S-1)</u>								
<u>PROPORTION OF ALL AWARDS</u>								
Dollars	10.9	10.8	0.271	0.600	1.000	0.16	.872	
Actions	16.1	23.0	0.357	1.250	.543	-5.90	.000*	
<u>PROPORTION OF AWARDS FOR NON-MAJOR HARD GOODS</u>								
Dollars	31.8	36.5	0.860	2.700	.644	-1.68	.110	
Actions	28.9	41.5	0.684	1.450	.999	-5.72	.000*	
<u>COMPETITIVE</u>								
Dollars	28.4	27.2	2.023	1.200	.301	0.19	.850	
Actions	28.2	35.9	1.150	0.700	.309	-2.11	.049	
<u>FOLLOW-ON</u>								
Dollars	1.5	0.8	0.281	0.251	.448	0.80	.435	
Actions	2.1	0.9	0.245	0.200	.412	1.60	.126	
<u>NONCOMPETITIVE</u>								
Dollars	70.1	72.1	2.132	0.960	.227	-0.29	.778	
Actions	69.6	63.3	1.249	0.450	.184	1.62	.122	
<u>MISCELLANEOUS HARD GOODS (B-1, B-3, B-9, and C-9)</u>								
<u>PROPORTION OF ALL AWARDS</u>								
Dollars	5.0	4.6	0.464	0.200	.219	0.25	.804	
Actions	15.3	13.5	0.434	0.300	.350	1.32	.202	
<u>PROPORTION OF AWARDS FOR NON-MAJOR HARD GOODS</u>								
Dollars	14.2	15.6	1.033	1.000	.486	-0.43	.675	
Actions	27.6	24.4	0.772	1.100	.701	1.29	.214	
<u>COMPETITIVE</u>								
Dollars	48.8	52.3	1.898	2.350	.615	-0.58	.569	
Actions	51.2	59.5	1.978	1.000	.257	-1.32	.202	
<u>FOLLOW-ON</u>								
Dollars	1.9	0.5	0.237	0.100	.215	1.90	.072	
Actions	0.9	0.3	0.073	0.050	.348	2.90	.009*	
<u>NONCOMPETITIVE</u>								
Dollars	49.3	47.3	1.858	2.500	.665	0.35	.733	
Actions	47.8	40.3	1.996	1.000	.255	1.19	.247	

* SIGNIFICANT @ .01

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G L O S S A R Y

COMPETITIVE AWARDS: Include all awards resulting from the following forms of solicitation:

FORMALLY ADVERTISED -- Awards made as a result of formally advertised or sealed bid solicitations.

PRICE COMPETITION -- Awards made on the basis of the lowest evaluated price from offers solicited from two or more prospective contractors.

DESIGN OR TECHNICAL COMPETITION -- Awards made based, primarily, on design or technical factors, rather than on a price basis. Awards must have followed the solicitation of offers from two or more prospective contractors. See definition of design competition.

DEFENSE INDUSTRY: The market segment of defense contractors that supply major hard goods (weapon systems) to DOD.

DESIGN COMPETITION: Competition between two or more prospective contractors to select the best technical approach within a range of acceptable costs. Design competition usually occurs early in the development of an acquisition program for major hard goods.

DUAL SOURCING: An acquisition strategy whereby two or more contractors are awarded contracts for the same or similar items, so that a competitive environment exists for subsequent purchases. It also may be used to support industrial mobilization requirements. Dual sourcing is also called second sourcing or split buying. It includes the use of such techniques as contractor teaming, direct licensing, leader-follower, technical data packages, and form, fit, and function acquisition strategies.

FOLLOW-ON AWARDS: Follow-on awards continue or augment specific military programs, such as major weapon systems. An example of a follow-on contract is one awarded to a particular contractor for production of a system he developed under an earlier competitively awarded research and development contract. Other examples include awards for support equipment, maintenance support, technical representatives or spare parts for equipment originally acquired as a result of a competitive solicitation. Follow-on awards include:

FOLLOW-ON AFTER PRICE COMPETITION -- A new contract placed with a particular contractor to continue or augment a specific military program, when the selection of the contractor at the inception of the program (original contract) was on the basis of price competition.

FOLLOW-ON AFTER DESIGN OR TECHNICAL COMPETITION -- A new contract placed with a particular contractor to continue or augment a specific military program, when the selection of the contractor at the inception of the program (original contract) was on the basis of design or technical competition.

FULL AND OPEN COMPETITION: Pursuant to CICA (P.L. 98-369, Sec.2731) full and open competition means that all reasonable sources are permitted to submit sealed bids or competitive proposals in response to proposed government procurements. See definition of a reasonable source.

MAJOR HARD GOODS: Also called major weapon systems in this study. Includes aircraft, missile and space systems, ships, tanks, automotive vehicles, weapons, ammunition, electronics and communication equipment. Also included are the assemblies and spare parts for these major hard goods, when the planned use of such items is known at the time of purchase.

MODIFICATION: Any change (unilateral or bilateral) of an existing contract regardless of the classification of the original contract award, i.e., competitive, noncompetitive, or follow-on. All contract modifications are considered noncompetitive awards, for purposes of this study.

MONOPSONY: A market condition in which there is only one buyer for the goods or services produced.

NONCOMPETITIVE AWARDS: Include all awards resulting from the following forms of solicitation:

SOLE SOURCE -- Awards resulting from solicitation of offers from only one source, and other forms of noncompetitive awards not specifically mentioned below.

MODIFICATIONS -- Any change to an existing contract. See definition of a modification.

CATALOG OR MARKET PRICE -- Awards in this category result from noncompetitive solicitations, where the subsequent basis of the reasonableness of the price is based on an established catalog or market price of commercial items sold in substantial quantities to the general public. Not included would be awards involving catalog or market prices where competitive solicitations were issued.

NOT APPLICABLE -- Awards in this category are classified as "Not Applicable" because they were never candidates for competition due to existing statutory or regulatory exemptions. They include:

1. Awards for brand name items for commissary resale.
2. Awards to nonprofit organizations, including educational institutions.
3. Awards to regulated monopolies for utilities, where the price negotiated is based on prices set by law or regulation.
4. Awards made pursuant to Section 8(a), Small Business Act [15 U.S.C. 637(a)].
5. Awards requiring investment of government funds for the purpose of establishing a competitive second source.

NON-MAJOR HARD GOODS: All goods and services not classified as major hard goods. Includes fuels, lubricants, textiles, clothing, equipage, subsistence, building supplies, transportation equipment, production equipment, construction equipment, medical and dental supplies and equipment, material handling equipment, and services. Also included are spare parts and assemblies for non-major hard goods. Spare parts and assemblies for major hard goods are also included, when the planned use of such parts and assemblies is not known at the time of purchase.

"PRE" POST-CICA AWARDS: The post-CICA awards governed by the laws and regulations that existed prior to the implementation of CICA, i.e., prior to April 1, 1985.

"POST" POST-CICA AWARDS: The post-CICA awards that are governed by the provisions of CICA.

PRIME CONTRACT AWARD: A legally binding agreement executed by a department or agency of the DOD to obtain supplies, services, or construction. Not included in this definition are awards classified as "small purchases." See definition of small purchases.

PROCUREMENT ACTION: The obligation or deobligation of funds which officially award or changes a contract. A procurement action may include the award of a new contract, a debit or credit change (modification) to an existing contract, or an order written against an indefinite delivery-type contract or basic ordering agreement.

REASONABLE SOURCE: Pursuant to CICA (P.L. 98-369, Sec. 2731), a reasonable source means a prospective contractor who:

- (a) has adequate financial resources to perform the contract or the ability to obtain such resources.
- (b) is able to comply with the required or proposed delivery schedule, taking into consideration all existing commercial and government business commitments.
- (c) has a satisfactory performance record.
- (d) has a satisfactory record of integrity and business ethics.

- (e) has the necessary organization experience, accounting and operational controls, and technical skills or the ability to obtain such experience, controls, and skills.
- (f) has the necessary production, construction, and technical equipment and facilities or the ability to obtain such equipment and facilities: and
- (g) is otherwise qualified and eligible to receive an award under applicable laws and regulations.

SMALL BUSINESS: Defined by the Small Business Administration (SBA) in the Federal Register (Title 13, Chapter 1, Part 121). Also defined in the FAR 19.101. Generally, a small business is independently owned and operated, is not dominant in its field of operations, and with its affiliates, does not employ more than a specified number of employees (usually not more than 500, 750, or 1,000, depending on the type of product or service called for in the contract). For construction and some service industries, the criterion is a specified annual dollar volume of sales or receipts, rather than the number of employees.

SMALL PURCHASES: A federal procurement term for contract awards below a specified dollar threshold. Prior to fiscal year 1983, awards less than \$10,000 distinguished small purchases from other DOD awards. In fiscal year 1983, the small purchase threshold for DOD procurements was increased to awards less than \$25,000. Modifications of original small purchase awards are also considered to be small purchases unless the dollar value of the modification exceeds the small purchase threshold. In this case, a new prime contract award is executed.