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U.S. Defense Contracts During the Tax Expenditure Battles of the 1980s

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U.S. DEFENSE CONTRACTS DURING THE TAX EXPENDITURE BATTLES OF THE 1980s

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This paper considers the impact of the tax treatment of military contractors on the cost and timing of U.S. military procurement. Prior to the early 1980s, taxpayers were permitted to defer tax obligations on profits earned from long-term contracts. Legislation passed in 1982, 1986, and 1987 required that at least 70 percent of the profits earned on long-term contracts be taxed as accrued, thereby significantly reducing the tax benefits associated with long term contracting. Comparing contracts that were ineligible for these tax benefits with those that were eligible, it appears that between 1981–1989 the duration of U.S. Department of Defense contracts shortened by an average of between one and two months, or somewhere between 10 and 23 percent of average contract length. This pattern implies that the tax benefits associated with long term contracts promoted artificial contract lengthening in the 1980s, and suggests that the Department of Defense ignores the federal income tax consequences of its procurement actions, thereby indirectly rewarding contractors who benefit from tax expenditures.

I. INTRODUCTION

The U.S. government taxes the incomes earned by individuals and corporations, but the tax laws occasionally provide for deviations from strict income taxation, with these deviations loosely grouped in the category of "tax expenditures." Tax expenditure provisions commonly reduce tax obligations associated with the production and sale of goods and services, the benefits of which are ultimately shared between producers, who enjoy greater after-tax profits, and consumers, who benefit from lower prices.

U.S. federal and state governments are major consumers of goods and services, including in many cases goods and services whose prices are affected by applicable federal

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tax provisions. Often one part of the federal government offers tax subsidies to firms whose output is purchased by another part of the federal government. In this setting, it is not difficult to imagine outcomes in which the procurement arm of the government responds to lower prices by increasing its consumption of subsidized goods and services, unmindful of the fact that their low prices are due to benefits paid for by another part of the government. The importance of this tax-induced procurement substitution, and how it can be distinguished from other aspects of government purchasing decisions, are unclear.

This paper considers the impact of tax changes in 1982, 1986, and 1987 that reduced certain benefits associated with long-term contracting. These benefits arise when a low- or zero-tax entity (such as the government) purchases certain goods or services from high-tax providers using contracts that extend beyond a taxable year. Under the "completed contract" method of accounting, the income earned on such contracts is not taxed until the final year of the contract. The availability of this method of accounting was reduced in three separate tax reforms starting in 1982, and it appears that as a result the U.S. Department of Defense significantly reduced its procurement of goods and services that were formerly eligible for significant income tax deferral.

Firms providing goods and services under long term contracts often find that their ultimate revenue stream is uncertain, as production encounters unforeseen costs or obstacles, and mismatches with buyer expectations require that final products be modified subsequent to delivery. Hence, a firm might appear profitable in the early years of a long-term contract, as the buyer pays for partial completion, but upon concluding the contract the firm might find that it has taken a significant loss. Given these uncertainties, Congress prior to 1982 was unwilling to require taxpayers to include long-term contracting profits in income prior to contract completion and acceptance. Taxpayers electing to account for profits under this "completed contract" method of accounting did not include contract income, and buyers did not deduct contract payments, until contracts were complete. Since contracts are generally profitable, the tax deferral available from the use of the completed contract method of accounting effectively subsidized long-term contracts whenever those performing the contracts were subject to tax rates lower than or equal to the tax rates of buyers. This included most importantly cases in which taxable entities performed contract work for nonprofit organizations or the government, but was not limited to these situations.[1]

The completed contract method of accounting was modified and its benefits significantly curtailed in a series of legislative reforms in 1982, 1986, and 1987. These reforms were motivated by a perception on the part of Congress that use of the completed contract method of accounting excessively subsidized certain contractors, particularly those doing work for the U.S. Department of Defense (Joint Committee on Taxation, 1987). In the wake of the generous tax provisions of the Economic Recovery Tax Act

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[1] Tax rates may differ between buyers and contractors for numerous reasons — for example, if one is a corporation and the other a partnership, or if one of the parties has tax loss carryforwards, or if the tax treatment of contract income and expenses differs between the parties (e.g., contractors providing goods that buyers have to capitalize and depreciate for tax purposes).

of 1981, subsequent legislative developments in the 1980s were designed to reduce many of the tax expenditures in the Internal Revenue Code, including the completed contract method of accounting.

One of the notable features of the completed contract method of accounting is that the primary beneficiaries of this accounting method were believed to be taxpayers working on contracts for the U.S. Department of Defense. Since the U.S. federal government both subsidized these contracts with favorable tax accounting and financed the contracts with direct defense outlays, it is not entirely clear why the accounting method *per se* was considered to be a subsidy. If all parties are rational, and if those issuing the contracts on behalf of the U.S. government incorporate tax revenue losses due to favorable contract accounting, then the subsidy available from using the completed contract method of accounting would be entirely recouped in other contract terms, presumably in the form of lower prices paid on these contracts. If these conditions hold, then there would be no reason to expect that reducing the favorable treatment of long term contracts would be accompanied by changes other than higher prices for the goods and services provided under these contracts.

The contracting process used for Department of Defense procurement, however, reflects problems of hidden and incomplete information that influence many contracting situations. The government seeks to obtain the best value for its money in settings in which it cannot be certain just how costly it is for private firms to provide it with goods and services, while the providers, who may have better information on their own costs, nevertheless face considerable uncertainty over what their ultimate contract costs will be. In such settings even the most efficient contracts do not resolve all of the associated problems of moral hazard and adverse selection (Cummins, 1977; Laffont and Tirole, 1993; Rogerson, 1989, 1990, 1995), and in particular, ample scope remains for strategic manipulation of reported contract costs (Rogerson, 1992; Thomas and Tung, 1992; Naegelen and Mougeot, 1998). In practice, there appears to be little evidence of strategic cost shifting in defense contracts (McGowan and Vendrzyk, 2002), and the incompleteness of the contracts that the Department of Defense signs with private contractors is consistent with efficient accommodation to the underlying design and performance uncertainties of modern weapon systems (Crocker and Reynolds, 1993).

The scaling back of the tax benefits associated with long term contracting influences Department of Defense contracts in two ways. The first is that, for given contract specifications, providing goods and services under long term contracts becomes less attractive to contractors, who will require — and, in the course of the competitive bidding process, get — higher pretax prices. If the Department of Defense ignores the impact of its actions on federal income tax collections, then price increases will reduce its demand for the types of goods and services most affected by the tax change, which are those that tend to be provided with contracts of longest duration. Lichtenberg (1989) estimates that the average price elasticity of demand for Department of Defense weapon systems in the 1980s was 0.55, which implies that purchases of goods and services typically provided over long contract periods should decline relative to purchases of goods and services typically provided over short contract periods. The second effect of the tax change is

to reduce incentives for contractors and the Department of Defense jointly to lengthen contracts for any given goods and services in order to produce tax savings that they can share. The Department of Defense is generally willing to delay procurement in return for a sufficient discount, and contractors are similarly willing to delay production in return for tax and other benefits (Peck and Scherer, 1962; Scherer, 1964; and Hartley, 2007). Reducing the tax benefits associated with long term contracting should dampen the tendency to lengthen contracts artificially. Together, these two effects imply that the Department of Defense should face higher procurement prices for goods and services produced under long term contracts, and contracts of shorter average duration; Guthrie and Hines (2008) offer an analytic derivation of these implications. These predictions rely on the assumption that military contractors benefit from the completed contract method of accounting; contractors that are tax exempt or otherwise face low tax rates should be largely unaffected.

While it is difficult to compare prices of military contracts in different years, given the changing nature of goods and services demanded by the government, it is not difficult to compare contract lengths. This paper focuses on contracts entered into by the Department of Defense in 1981 and 1989. It finds that, after controlling for observable contract attributes, contracts that were likely to be affected by the accounting changes in 1982, 1986, and 1987 shortened by one to two months compared to contracts that were not likely to be affected, corresponding to a 10–23 percent reduction in contract length. This sensitivity of contract provisions to the federal income tax treatment of contractors suggests that the Department of Defense did not fully internalize its impact on federal tax revenues in making contracting decisions.

II. THE TAX EXPENDITURE BATTLES OF THE 1980s

Taxpayers with income earned from long term contracts can choose among alternative methods of accounting for their contract income and expenses. Long term contracts consist of building, installation, construction, and manufacturing contracts that span more than a single tax year. The types of manufacturing contracts that qualify for long-term status are further limited to those for the manufacture of unique items (e.g., those not normally carried in the contractor's finished good inventories), or for items that require more than 12 months to complete.

Prior to 1983, taxpayers with income derived from long-term contracts could choose from the percentage of completion method, the completed contract method, or any of the other more general accounting methods available for reporting contract income. Under the percentage of completion method, costs derived from the contract are deducted in the period in which they are incurred, while revenues are allocated over the life of the contract in proportion to the percent of the contract that is complete (measured either by percentage of physical completion or percentage of ultimate costs incurred). In contrast, under the completed contract method, revenue and costs that are directly allocable to the contract are reported in the year the contract is completed, and costs that are not

directly allocable to the contract are deducted in the period in which they are incurred.[2] Given the tax significance of contract completion, there were conspicuous disputes and inconsistent rulings between courts over the point at which expenses could be taken and contract income reported,[3] which created pressure on Congress to enact rules clarifying and possibly limiting application of the completed contract method.

Congress's first significant opportunity came in 1982, when reaction to the generous provisions of the 1981 tax cut prompted new legislation designed to raise revenue and reduce some of the perceived inequities in the tax system. The Tax Equity and Fiscal Responsibility Act of 1982 modified the completed contract method to align its measurement of income more closely with the economic income attributable to long term contracts. In the case of extended-period long term contracts (contracts that last more than 24 months), some previously defined period costs were reclassified as contract costs, thus requiring them to be carried forward and accounted for at the time the contract is completed. These modifications took effect December 31, 1982, with a phase-out of the deductibility of the newly classified contract costs over a three-year period.

Four years later, the Tax Reform Act of 1986 made sweeping changes to the U.S. federal income tax, generally in the direction of drastically reducing tax expenditures, broadening the tax base, and lowering marginal tax rates (U.S. Government Accountability Office, 2005). Many favorable accounting methods were swept up in these reforms, which included broad changes in the use of the percentage of completion and completed contract accounting methods for reporting income derived from long-term contracts. One year prior to passage of the Tax Reform Act of 1986, the Joint Committee on Taxation (1985) estimated that the annual tax expenditure (foregone revenue) from use of the completed contract method of accounting would be $4.9 billion in 1986, rising to $7.0 billion by 1990. These are sizable tax expenditures, exceeding in magnitude the contemporaneous tax expenditures for the favorable tax treatment of capital gains held by individuals until death (step-up of basis, which permanently exempts all accrued gains from tax). Changes to the percentage of completion method reflected that "the Congress recognized the use of the percentage of completion method may produce harsh results for taxpayers in some cases, for example, where an overall loss is experienced on the contract, or where actual profits are significantly less than projected" (Joint Committee on Taxation, 1987, p. 527). Changes to the completed contract method, on the other hand, came from a perception in Congress that use of this method led to low or negative tax rates and unjustified income deferral, especially among large defense contractors.

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[2] Costs that are not directly allocable to the contract are often referred to as period costs. They are most naturally thought of as overhead or common costs that cannot be specifically assigned to the activities of any one contract. Guthrie and Hines (2008) offer additional details of changes to the tax treatment of completed contracts during the 1980s.

[3] These issues are reviewed Griswold and Graetz (1976, pp. 588–589).

The revisions to the percentage of completion method enacted in 1986 removed the option of calculating the percentage of completion based on physical completion. Furthermore, the percentage of completion calculation must be based on all costs for which capitalization is required. A "look-back" adjustment to the tax liability of past years was also adopted, permitting taxpayers to receive tax credit to compensate them for excess tax payments that may have arisen from calculations based on expected income that did not ultimately materialize.

In name, the completed contract method is no longer an option for reporting long term contract income. The completed contract method was replaced by the Percentage of Completion-Capitalized Cost method (PCCC). In reality, the PCCC method is a hybrid of the "old" completed contract method and the "new" percentage of completion method. Under the PCCC method, 40 percent of contract income and costs were reported based on percentage of completion with a look-back adjustment procedure; the remaining 60 percent of contract income and costs were reported when the contract is completed.[4] Thus, only 60 percent of the taxable income from the contract could be deferred until the contract was completed. The Joint Committee on Taxation (1987) estimated that this accounting change alone would augment federal tax revenues by $2.9 billion in 1987, $3.3 billion in 1988, $2.3 billion in 1989, and less than $1 billion per year thereafter. Furthermore, the Tax Reform Act of 1986 reduced the corporate tax rate from 46 percent to 34 percent, and reduced individual tax rates as well, thereby reducing the value of accounting methods that defer tax liabilities. The Revenue Act of 1987 reduced the percentage of contract income eligible for deferral to 30 percent, so after 1987 at least 70 percent of contract income was taxed based on percentage of completion.

The effects of these changes to the completed contract method on incentives to adjust contract length are illustrated in the following example. Consider a corporation that earns $200,000 in profits from a contract that takes just one day to complete, and that all the costs are incurred and payments received on that day. At the 1981 corporate tax rate of 46 percent, the firm owes $92,000 in taxes on the profits of $200,000; however, under the pre-1983 completed contract accounting rules, if the contractor could arrange to perform 99 percent of the contract on the first day, and the remaining one percent of the contract a year later, then all the taxes would be deferred into the second year. At a discount rate of 10 percent, and assuming the contractor incurs 99 percent of its costs and receives 99 percent of its payment on the first day, deferral of $91,080 of taxes on the first-day profits reduces the present value of tax obligations by $9,108. Deferring one percent of the contract also means deferring one percent of its after-tax profits for a year, but in present value this costs the firm just $108 (0.54*$2,000*0.1), so the firm gains $9,000 by deferring the bulk of its tax liability. In 1989, under the PCCC method and a 34 percent corporate tax rate, a contractor who performs 99 percent of a contract on the first day and the remaining one percent of the contract a year later is eligible to

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4   The PCCC method is to be applied to all contracts that are not accounted for using the straight percentage of completion method. Taxpayers who had previously used the more traditional methods, such as the accrual shipment method, were also required to use the PCCC method for their long-term contracts.

defer taxes on only 30 percent of its $198,000 first-day profits, which at a 10 percent discount rate is worth $2,190.60; after subtracting the cost of deferring its after-tax profits of $1,320 on the remaining one percent of the contract, the firm gains only $2,058.60. Since the net benefit associated with extending the contract for a year has declined from $9,000 under 1981 rules to $2,058.60 under 1989 rules, it is reasonable to expect that by 1989 contract lengths might have adjusted in response to the tax law changes.[5]

III. DEPARTMENT OF DEFENSE CONTRACTS

The data for the empirical analysis come from the Department of Defense *Defense Contract Action Data System*, for fiscal years 1981 and 1989. The data consist of all contracting actions within the Department of Defense in excess of $10,000 in fiscal year 1981 and in excess of $25,000 in fiscal year 1989. These data include information on the contracting office, action date, type of contract action (e.g., cancellation or modification), the type of contract, contractor, type of good or service, place of performance, weapon system to which the contract belongs, the expected completion date, and the contract value. Nominal dollar contract values were converted to 1987 constant dollars using the aggregate price index for government purchases of goods and services for national defense. In 1981 there were 374,804 contract actions totaling over $119 billion; in 1989 there were 222,597 actions worth over $122 billion.

The study uses a subset of the full sample from 1981 and 1989. The sample is limited to new contract awards that were negotiated by and for the Department of Defense in either 1981 or 1989. Because the data represent all contract actions, the selection criterion eliminates modifications to existing contracts that can take the form of terminations, cancellations, increases in the scope of work, and funding actions, as well as orders from contracts let by other Federal agencies or other contracting offices within the Department of Defense; contracts for sales to foreign governments or international institutions are also omitted. The sample in 1989 is further limited by the complication that information on the expected completion date was voluntarily supplied by the contracting office. Roughly half of the original sample of records contain this information and the sample means for the observations with and without the estimated completion date have similar values for other variables. Eliminating records with identifiable reporting errors (such as negative calculated lengths and dollar values less than zero) narrows the final sample size to 165,160 observations, consisting of 121,993 contracts from 1981, and 43,167 contracts from 1989. The difference between the sizes of these samples reflects several factors, including changes between 1981–1989 in the numbers of annual contract actions

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[5] This example takes the discount rate to be unchanging at 10 percent. In an environment in which the interest rate was unchanging, the reduction in the corporate tax rate from 46 percent to 34 percent might have been expected to raise discount rates; but it is noteworthy that nominal interest rates fell over the 1980s, further reducing the benefits of extending contract length for tax purposes. Annualized three-month Treasury bill rates in mid-1981 exceeded 16 percent, and in early 1982 exceeded 12 percent, whereas by 1989 they were well under 9 percent.

of the Department of Defense and the higher contract dollar value cutoff for inclusion in the 1989 data, which caused the number of contracts reported by the Department of Defense to decline by 41 percent between these years. Even more importantly, the contracting office was not required to record expected contract completion dates for the later contract actions, and did so for only about half of the 1989 contracts, further limiting the 1989 sample size. The sample means reported in Table 1 indicate that the mean length of a Department of Defense contract in 1989 was roughly 1.2 months longer than the mean contract length in 1981, reflecting the greater dollar value cutoff for contracts included in the 1989 data.[6]

The contracting data indicate the specific products or services provided in contracts, and separately note the broad Department of Defense procurement program with which any contract is identified. For example, the data include contracts to provide the Department of Defense with tubing to be used in new ships, contracts to provide tubing for use in non-combat vehicles, and other contracts to provide tubing to be used with various types of equipment. Ships, non-combat vehicles, and different equipment categories all constitute separate procurement programs known as "claimant groups;" by contrast, tubing is one of many "product and service" categories. Generally speaking, claimant groups correspond to different end uses, whereas product and service groups correspond to different categories of inputs.

IV. DETERMINANTS OF CONTRACT LENGTH

Numerous factors other than tax changes influenced the duration of defense contracts between 1981–1989. For example, changing defense budgets and the thawing of the cold war are likely to have altered acquisition policy in a way that systematically affected contract lengths between 1981–1989. Since it is impossible to control for all the factors that influence contract lengths, it is helpful to identify a treatment group of contracts that is most likely to have been affected, and to compare changes in the duration of those contracts with a control group of contracts that are unlikely to have been so strongly affected.

The nature of the tax changes of the 1980s suggests several different possible groups that might be used to test the effect of the tax changes on contracting behavior. Changes in allowable accounting methods applied only to long-term contracts, which are defined as building, installation, construction, and qualified manufacturing contracts that span more than one taxable year (since firms have different tax calendars, contracts as short

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[6] Restricting 1981 contracts to those with dollar values (in real terms) sufficient to meet the 1989 criterion for inclusion produces a sample with a mean contract length virtually identical to that for the 1989 sample (the sample mean lengths differ by less than half a day). Rerunning the regressions using this smaller sample of 1981 observations together with the 1989 observations produces results that are very similar to those presented in Tables 2–4.

Table 1

Sample Means By Year

Variable	1981	1989
Length (years)	0.57	0.67
Claimant group		
Airframes	3.55	2.80
Aircraft engines	1.75	2.10
Other aircraft equipment	4.67	4.68
Missile & space systems	2.46	3.23
Ships	6.16	4.32
Combat vehicles	1.76	1.35
Non-combat vehicles	1.72	2.05
Weapons	1.63	1.39
Ammunition	0.55	1.02
Electronics & communications equipment	13.27	10.49
Petroleum	2.35	2.00
Other fuels & lubricants	0.13	0.23
Containers & handling equipment	0.04	0.04
Textiles, clothing & equipage	1.55	1.41
Building supplies	0.98	0.83
Subsistence	9.98	12.66
Transportation equipment (railway)	0.01	0.01
Production equipment	0.60	0.51
Construction	14.21	18.79
Construction equipment	0.33	0.12
Medical & dental supplies & equipment	2.92	2.27
Photographic equipment	0.54	0.33
Material handling equipment	0.42	0.30
Other supplies & equipment	18.66	16.54
Services	9.75	10.56

Table 1 (Continued)

Sample Means By Year

Variable	1981	1989
Type of contract		
Fixed price, redetermination	0.03	0.15
Firm fixed price	88.51	91.26
Fixed price, economic price adjustment	5.71	2.71
Fixed price, incentive	0.15	0.17
Cost plus, award fee	0.05	0.25
Cost contract	0.93	1.07
Cost sharing	0.16	0.11
Cost plus, fixed fee	4.02	3.76
Cost plus, incentive fee	0.12	0.09
Time & materials	0.24	0.38
Labor hours	0.08	0.05
Type of contracting action		
Letter	0.44	1.00
Definitive, superseding letter	0.30	0.30
Definitive	99.26	98.70
Type of business[1]		
Small	58.00	59.46
Large	33.62	28.76
Non-profit	1.7	1.85
Foreign	6.67	9.93
Place of performance[1]		
Domestic	93.33	90.09
U.S. territory	0.34	0.38
Foreign	6.33	9.53
Subject matter of contract		
Research, development, test & evaluation (RDTE)	4.86	7.22
Service	23.90	28.68
Product	71.23	64.10
Dollars ($87 million)	0.413	0.648
N =	121,993	43,167

Notes: Units are percentages of sample unless otherwise indicated. The sample means in the first column are for the 121,993 new 1981 contracts of $10,000 or more, whereas the sample means in the second column are for the 43,167 new 1989 contracts of $25,000 or more. Mean contracting amounts reported in the table are converted to 1987 dollars.

(1) Small, Large and Non-profit refer to domestic firms performing the work in the United States. Foreign refers to *any* firm performing the work outside the United States (in a U.S. territory, possession, or foreign country) as well as domestic firms performing outside the United States.

as one month can qualify). Consequently, information on the subject matter of the contracts can be used to identify those contracts that are potentially eligible for long-term contract treatment. One group of potentially affected contracts is defined by their underlying products and services, specifically contracts for: supply; research, development, test and evaluation; and a subset of service and construction contracts involving the installation of equipment, maintenance, repair and rebuilding of equipment, construction of structures and facilities, maintenance, repair or alteration of real property, and modification of equipment.[7] It is possible to estimate the extent to which the durations of contracts for these products and services changed between 1981–1989, compared to contracts providing other products and services. This comparison can control for observable contract attributes, including dollar values of the contracts and identities of claimant groups in the contracts.

Information on the tax status of the contractor provides another way of identifying the effect of tax changes on contract length. Domestic firms with taxable earnings from work performed in the United States should be most sensitive to U.S. tax changes, whereas nonprofit organizations, foreign firms, and domestic firms performing work outside the United States should be the least sensitive.[8] Hence, a second set of treatment and control groups can be defined as tax sensitive and tax insensitive firms.

A third potential classification of treatment and control groups relies on differences between claimant groups. Some claimants, such as missile and space systems, tend to have large value contracts; large value contracts are on average lengthier than others, and therefore more likely to benefit from the completed contract method of accounting. By comparing contracts for specified products (e.g., tubing used in missile and space systems) with contracts for the same products used by different claimants (e.g., tubing used in other supplies and equipment), it is possible to infer the effects of tax changes in a way that abstracts from general changes in markets for these products and services.

The regression reported in the first column of Table 2 estimates contract length (in years) as a function of whether its product or service category made the contract likely to be eligible for long-term contracting treatment; also included in the regression are a 1989 year dummy variable, and various characteristics of the contract and contractor. The variables measuring contract and contractor characteristics are designed to control for that portion of the contract length that can be explained by different mixes of these characteristics over the two years. Such explanatory characteristics include: the type

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[7] The appendix of Guthrie and Hines (2008) lists the Department of Defense classification of service and construction contracts.

[8] Some foreign firms doing business in the United States are subject to taxation by their home countries, which permit them to claim tax credits for income taxes paid to the United States. For these firms, U.S. taxes are not entirely costs, since they create offsetting credits, which explain the patterns of investment in the United States identified by Hines (1996). American firms doing business abroad are permitted to defer U.S. taxation of their foreign income until it is repatriated to the United States, which reduces effective U.S. taxation of this income (Hines, 1994; Desai, Foley and Hines, 2003).

Table 2

Contract Lengths for Eligible Products and Services, 1981 and 1989

	(1)	(2)	(3)
Eligible item	−0.078		−0.152
	(0.007)		(0.014)
Year 1989	0.173	0.207	0.060
	(0.010)	(0.009)	(0.020)
Tax-sensitive		0.099	0.041
Contractor		(0.013)	(0.015)
Eligible item*	−0.067		0.185
1989	(0.0010)		(0.022)
Tax-sensitive*		−0.109	0.149
1989		(0.009)	(0.023)
Tax-sensitive*			0.084
Eligible item			(0.014)
Tax-sensitive*			−0.303
Eligible item*1989			(0.025)
Dollars	6.699	6.691	6.715
	(0.175)	(0.175)	(0.175)
Claimant dummies	Y	Y	Y
Contract attribute dummies	Y	Y	Y
R-squared	0.25	0.25	0.25
Observations	165,160	165,160	165,160

Notes: The dependent variable in these regressions is contract length (in years). "Eligible item" refers to product and service categories most likely to be eligible for the completed contract method of accounting. "Year 1989" is a dummy variable that takes the value one in 1989 and zero in 1981. "Tax-sensitive contractors" are those other than nonprofits, foreign contractors, and others who are unlikely to be fully affected by U.S. tax changes. "Dollars" is the dollar value of a contract in billions of 1987 dollars. All the regressions include dummy variables for claimant groups and contract attributes listed in Table 1. Standard errors are in parentheses.

of contract, classified by the remuneration and, where relevant, the incentive terms of the contract; the kind of contract action, or the nature of the first binding document of the contract; the type of business or contractor; the geographic place of performance; the subject matter of the contract, or the good or service the contract covers; and the claimant group for the contract. Since contract characteristics and contract length are jointly determined by the contracting parties, a regression that estimates the effect of tax provisions on contract length while controlling for other contract terms effectively estimates the extent to which parties are willing to exchange one characteristic for another.[9]

The estimated coefficient of –0.078 in the first column of Table 2 indicates that contracts for the categories of goods and services generally eligible for completed contract treatment were somewhat shorter in duration in 1981 than the other contracts, doubtless reflecting the underlying nature of their production processes. The coefficient of 0.173 on the 1989 year dummy indicates that contracts generally lengthened between 1981–1989, and the coefficient of –0.067 on the interaction of eligible goods and services and the 1989 dummy variable implies that contracts potentially affected by the tax change showed a smaller increase, the difference being 0.067 years (roughly 3.5 weeks), or 10 percent of mean contract length. This regression also includes dummy variables for all of the claimant groups and contract attributes (e.g., type of contract and type of contracting action) listed in Table 1,[10] and contract value (in billions of 1987 dollars); the 6.699 coefficient on contract dollar value indicates that an additional one billion dollars of contract value is associated with a 6.699 year lengthening of contract duration.

There is potential imprecision in the classification of the treatment group in this regression, particularly in the case of service contracts. To address this issue, the regressions were re-estimated using differing definitions of the treatment and control groups. Based on the listing of broad service and construction contract groups in the appendix of Guthrie and Hines (2008), the control group was changed to include: research, development, test and evaluation contracts; maintenance, repair and rebuilding of equipment contracts; repair or alteration of real property contracts; and contracts that deal with the construction-related work of architects and engineers. The sign of the estimated tax effect remained the same in all of these regressions, with the estimated effect on contract duration varying from 0.027–0.126 years.

Column 2 of Table 2 reports coefficient estimates from a regression in which the treatment group is contracts with tax-sensitive contractors, and the control group is contracts with tax insensitive contractors, including nonprofit contractors, foreign contractors, and others who are unlikely to be able to benefit from the completed contract method of accounting. The coefficient of 0.099 in column 2 indicates that tax-sensitive firms generally had longer contracts than others in 1981, and the coefficient of –0.109 implies that this difference disappeared (and slightly reversed) by 1989. The coefficient

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[9] Estimated tax effects remain significant when contract dollar values and contract type variables are omitted from the regressions.

[10] Coefficient estimates on these dummy variables are reported in Guthrie and Hines (2008).

of –0.109 corresponds to a shortening of roughly five weeks for contracts with taxable contractors, representing a difference of 16 percent of mean contract length in 1989.

Column 3 of Table 2 reports estimated coefficients from a regression that uses both contract content and the tax status of contractors to identify the treatment group. The coefficient of –0.303 indicates that contracts shortened significantly in duration between 1981–1989 for tax-sensitive contractors in the product and service categories most amenable to completed contract treatment, compared to contracts with tax-insensitive contractors in the same product and service categories. This is against a background in which defense contracts generally increased in length between 1981–1989, though this contract lengthening was more pronounced for contracts unaffected by the tax change. Among tax-sensitive firms, contracts for products and services eligible for completed contract treatment fell in length between 1981–1989 by 0.118 years (0.303 – 0.185 = 0.118) compared to contracts for products and services less likely to be eligible for special tax treatment, a difference of roughly 1.4 months, or 18 percent of mean contract length.[11]

The regressions presented in Table 2 identify the effects of changes in the tax treatment of completed contracts by comparing contracts likely to have been affected with those that are unlikely to have been affected. This comparison implicitly assumes that changes in other features of the economic and contracting environment influence both groups equally, and this assumption may or may not be valid; furthermore, it is untested. It is possible that conditions changed between 1981–1989 for nonprofit and foreign contractors in a manner different from the way in which they changed for other contractors, or that the markets for the products and services most eligible for completed contract treatment changed systematically relative to markets for other products and services — and that these changes were unrelated to the tax developments. The regressions in Table 2 include dummy variables that control for Department of Defense claimant groups, so the estimates are based on changes in contract length between different products being supplied under (for example) missile and space system contracts, but that does not entirely address the issue that the markets for the underlying products may change differently over this time period.

The Department of Defense data allow the use of a different method of identifying treatment and control groups, one based on claimants rather than products and services. Larger value contracts tend to have longer duration, as reflected in the consistently positive coefficients on the dollar values of contracts in the contract length regressions. It is

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[11] Only contracts for manufactured goods must exceed 12 months to qualify for long-term status; all other eligible contracts qualify if the contract spans more than one taxable year. Hence, it is possible that contracts as short as 2 months might qualify for long-term status and would be sensitive to the change in allowable accounting methods. Longer contracts are, however, more likely than others to span taxable years, and longer contracts, with their greater average dollar values, offer greater benefits from extensions into subsequent tax years. Guthrie and Hines (2008) report quantile regressions intended to test whether the lengths of longer contracts are most sensitive to the tax changes; while there is some evidence that they are, the results suggest that tax effects persist for all contract lengths.

possible to rank Department of Defense claimant groups by the median dollar values of their contracts in 1981, and to compare changes between 1981–1989 in the lengths of contracts by claimant groups that tend to have high dollar values with those that tend to have low dollar values. The contracts for claimant groups with high dollar values are the most likely to benefit from the completed contract method of accounting in 1981, and therefore exhibit larger changes between 1981–1989. One of the benefits of defining the treatment group in this way is it permits the inclusion of dummy variables for both 1981 and 1989 for the products and services that contractors supply the claimants, thereby controlling for product- and service-specific market changes between 1981–1989.

The regressions presented in Table 3 include observations of contracts for those Department of Defense claimant groups with median contract values in the top one-third and the bottom one-third of all claimant groups in 1981. As a result, the sample size is reduced to 118,879 observations. The more expensive contracts appeared among claimant groups for petroleum, other fuels and lubricants, construction, ammunition, missile and space systems, textiles, production equipment, and containers and handling equipment; the least expensive contracts appeared among claimant groups for airframes, ships, aircraft engines, weapons, other aircraft equipment, other supplies and equipment, medical and dental supplies, building supplies, and subsistence. It is noteworthy that large-ticket items such as airframes and ships entail low-value (and also shorter) contracts, but this reflects the nature of Department of Defense contracting, in which the majority of the contracts for these projects represent small pieces of the total enterprise. Contracts for the more expensive claimant groups are treated as eligible for tax benefits in 1981, and contracts for the less expensive claimant groups are the control variables. The dependent variable in these regressions is again contract length, and they include the same controls for contract type, business type, subject matter, and the real value of the contract amount as those used in the regressions reported in Table 2; however, instead of dummy variables for claimant groups, the regressions include dummy variables for the 102 different product and service categories in each of the two sample years, or 204 product and service dummy variables altogether. Since time-specific product and service dummy variables are included, the 1989 year dummy variable is not included as a regressor in the regressions reported in Table 3.

The estimated coefficient of –0.362 in the first column of Table 3 indicates that, controlling for contract value, contract type, product type, and other contract characteristics, as well as the underlying product or service, contracts were 0.362 of a year shorter for high value claimant groups than for low value claimant groups in 1981. This clearly does not reflect tax incentives, which create incentives for the opposite pattern, but instead reflect the differing nature of the product and service composition of these contracts. The coefficient of –0.0314 in the first column of Table 4 indicates that contracts in the high value claimant group shortened in length between 1981–1989 by a small amount, 3.14 percent of a year, or about 11 days, relative to those in the control group.

The estimates reported in column 2 of Table 3 are based on the distinction between tax-sensitive and tax-insensitive contractors. The coefficient of –0.286 in column 2

Table 3

Contract Lengths for Expensive Claimants, 1981 and 1989

	(1)	(2)	(3)
Eligible contract	−0.362		−0.342
	(0.063)		(0.064)
Tax-sensitive contractor		−0.098	−0.093
		(0.011)	(0.011)
Eligible contract* 1989	−0.0314		0.382
	(0.0160)		(0.030)
Tax-sensitive* 1989		−0.286	−0.031
		(0.013)	(0.021)
Tax-sensitive* eligible contract			−0.032
			(0.012)
Tax-sensitive* eligible contract* 1989			−0.434
			(0.027)
Dollars	4.686	4.674	4.661
	(0.178)	(0.177)	(0.177)
Product-year dummies	Yes	Yes	Yes
Contract attribute dummies	Yes	Yes	Yes
Observations	118,879	118,879	118,879

Notes: The dependent variable in these regressions is contract length (in years), and the sample is restricted to contracts with high value claimant groups and low value claimant groups. "Eligible contract" refers to contracts for high value claimant groups that are most likely to be eligible for the completed contract method of accounting. "Tax-sensitive contractors" are those other than nonprofits, foreign contractors, and others who are unlikely to be fully affected by U.S. tax changes. "Dollars" is the dollar value of a contract in billions of 1987 dollars. All the regressions include dummy variables for 102 separate product groups by year, and dummies for contract attributes listed in Table 1. Standard errors are in parentheses.

suggests that, controlling for contract attributes and product categories, the average lengths of contracts in this sample with tax-sensitive contractors were shortened by 3.4 months between 1981–1989 compared to the lengths of contracts with tax-insensitive contractors. This is more than twice the magnitude of the corresponding coefficient in the second column of Table 2, reflecting the impact of controlling for product-year specific

Table 4

Contract Lengths for Ammunition and Weapon Claimants, 1981 and 1989

	(1)	(2)	(3)
Ammunition Contract	0.040 (0.039)		0.015 (0.089)
Tax-sensitive contractor		−0.115 (0.049)	−0.122 (0.055)
Ammunition* 1989	−0.172 (0.069)		0.265 (0.193)
Tax-sensitive* 1989		−0.196 (0.121)	0.016 (0.148)
Tax-sensitive* ammunition			0.026 (0.086)
Tax-sensitive* ammunition*1989			−0.457 (0.190)
Dollars	10.04 (1.449)	10.05 (1.449)	10.09 (1.448)
Product-year dummies	Yes	Yes	Yes
Contract attribute dummies	Yes	Yes	Yes
Observations	3,736	3,736	3,736

Notes: The dependent variable in these regressions is contract length (in years), and the sample is restricted to contracts for ammunition and weapon claimant groups. "Ammunition contract" refers to contracts for the ammunition claimant group, which are likely to be eligible for the completed contract method of accounting. "Tax-sensitive contractors" are those other than non-profits, foreign contractors, and others who are unlikely to be fully affected by U.S. tax changes. "Dollars" is the dollar value of a contract in billions of 1987 dollars. All the regressions include dummy variables for 102 separate product groups by year, and dummies for contract attributes listed in Table 1. Standard errors are in parentheses.

effects (and possibly the different sample composition). The estimates reported in the third column of Table 4 include interactions among the variables used in the regressions reported in columns 1 and 2; the estimated coefficient of −0.434 indicates that the relative shortening of contract lengths among tax-sensitive contractors between 1981–1989 was strongly concentrated among those providing contracts to claimant groups whose contracts were most likely to have been eligible for long-term tax treatment in 1981.

Among tax-sensitive firms, contracts for high value claimant groups fell in length by 0.083 years (0.434 + 0.031 – 0.382 = 0.083) compared to contracts with conatractors less likely to be eligible for special tax treatment, a difference of one month, or 12 percent of mean contract length.

It is possible to use subsets of the contracting data to compare changes in contract length between roughly comparable claimant groups that differ in the average dollar values, and therefore the average lengths, of their contracts. Ammunition and weapons offer one such breakdown; the median ammunition contract in 1981 exceeded $94,000 in 1987 dollars, whereas the median weapons contract was less than $36,000. (A significant fraction of weapons contracts are for limited quantities of small arms, whereas ammunition contracts tend to be for greater dollar amounts, reflecting bulk purchases of ammunition.) Table 4 presents estimated coefficients from regressions that repeat the specifications used in Table 3, but for this much smaller (3,736 observations) set of contracts. The coefficient of 0.040 in the first column indicates that, conditional on contract value, contract type, product content, and other characteristics, ammunition contracts were half a month longer than those for weapons in 1981. The coefficient of –0.172 implies that contracts among ammunition claimants fell in length by two months relative to those for weapons claimants between 1981–1989. The regression reported in column 2 of Table 4 identifies tax effects based on contractor tax status. The coefficient of –0.196 in that column indicates that the lengths of taxable contracts declined by 2.4 months compared to those of more lightly taxed contracts between 1981–1989, though this effect is not statistically significant.

Column 3 presents estimated coefficients from a regression that includes a full range of interactions among the independent variables. The coefficient of –0.457 indicates that the combination of tax-sensitive status, ammunition contracts, and 1989 timing is associated with significantly shorter contracts. The coefficient estimates in this equation imply that, controlling for other factors, ammunition contracts with tax-sensitive providers were 0.186 years longer in 1981 than they were in 1989 (0.457 – 0.265 – 0.016 = 0.186). Since the independent variables include product-year categories, this comparison controls for any lengthening of contracts attributable to underlying product categories. The resulting difference of 2.2 months is 23 percent of the average length (0.823 years) of ammunition and weapons contracts in this sample.

V. CONCLUSION

The experience of the 1980s strongly suggests that Department of Defense contract provisions are sensitive to their federal income tax treatment. In response to reductions in the favorable tax treatment of long term contracts, average contract length fell by between one to two months, or 12–23 percent of mean contract length. From this evidence it appears that the Department of Defense does not fully incorporate the effect of its procurement decisions on federal income tax revenue, and as a result, consciously or unconsciously encourages provision modes that benefit from favorable tax treatment.

The sizable tax expenditure associated with long term contracting prior to the 1980s represented a significant subsidy to military procurement that was not captured in standard budget entries for federal outlays. Whether it is better for the federal government to finance programs through tax subsidies or direct budgetary outlays is an ages-old question, given new life in recent decades by the work of Stanley Surrey (e.g., Surrey, 1973) in promoting the tax expenditure budget. More recent scholarship (e.g., Dharmapala, 1999; Weisbach and Nussim, 2004) offers mixed assessments of tax expenditures and outlay alternatives, noting the advantages and disadvantages of each in different settings. There could be circumstances in which outcomes are unaffected by whether the government uses tax expenditures or direct outlays to finance its programs, and if ever there were to be such a case, it is likely to be one in which the government itself is the ultimate consumer. Yet the evidence is that military procurement is affected by the form that tax benefits take, very likely reflecting the decentralized behavior of military agencies pursuing objectives without fully incorporating their effects on other parts of the government. Hence as a practical matter tax expenditures and direct outlays are not equivalent even from the standpoint of government procurement, and the failure of this equivalence implies that there are real consequences to alternative methods of financing government programs.

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