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# The Financial Market, Governmental Policy Change, and Firms' Cost Performance

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**Abstract**

This study provides a first evidence on the relations between governmental policy change, firms' cost performance, and the financial market impact from the cost changes. More specifically, it examines whether the stock market cares about different cost structures of defense contractors in its firm valuations, relative to those of non-defense manufacturing firms when there is a significant government policy change. Using the Top Secret America database of The Washington Post this empirical study finds that the financial market cares, but in more subtle ways. Annual changes in the cost of goods sold and the changes in operating expenses affect the changes in the annual cumulative stock returns for the defense contractors more clearly than for the non-defense counterparts. The financial market, nevertheless, is insensitive to whether the cost changes occur in the product cost part or white-collar operations, as long as the cost performance improves.

**Keywords:** Government policy change, firm cost performance, financial market response, defense contractors

## I. Introduction

### I.1 Background

There has been a phenomenal development in the area of managerial and cost performance of government contractors in the defense industry and the impact on the profit and the cost structures of those firms. In September 2010, the U.S. Department of Defense (DOD) announced more than 20 changes in purchasing procedures in order to reduce the cost of weapon systems, military ships and planes (The New York Times, 2010). The DOD gave strong signals to the contracting firms that they will give preferential treatment to those with good cost-control records, and thus the favorable changes in cost structure can be an important indicator, to both analysts and investors, for winning the future biddings. In other words, the defense contractors who are able to increase productivity per the new procedures are more likely to win the bidding in the future, which in turn may bring prospective future cash flows.

Defense contracting firms were believed to receive cost-plus-fixed-fee contract, where the DOD reimburses them for all incurred costs and pays a negotiated fixed fee that is accounted as profit. The defense contracting firms may have increased revenues by increasing costs, especially when there are few competing bidders in the contracts. In other words, they used to have less incentive in improving productivity to increase profitability, compared to non-defense contracting firms. However, now that the DOD has restricted defense contractors' ability to pass increased costs to the government, the investors may be more interested in a firm's cost saving efforts as the indicator of competitiveness in their bidding.

No currently existing management accounting theory explains the relations, if any, among governmental policy change, firms' cost performance, and the financial market's responses to those. There has been very little research done, if any, in the public policy area of accounting research on the topic of firms' costs and the financial market responses. The few public policy studies that have been attempted thus far deal with the economic and social consequences of hospitals' cost control attempts (Evans et al., 2001); the public policy effects of a cash flow subsidy on defense contractors' capital expenditures and debt cost (Callahan et al., 2012); the degree of financial flexibility and cost inefficiency in private colleges (Mensah and Werner, 2003); the impact of governmental cost controls through changes in the Medicare reimbursement systems on the adoption of hospital costing systems (Hill, 2000); and fixed fee contracts versus cost reimbursement contracts in local government contracting practices (Thorne et al., 2001).

The issue of financial versus manufacturing performance in business research has been approached primarily in connection with either a firm's adoption of a new management technique, more specifically, the Just-in-Time (JIT) practice (Balakrishnan et al., 1996; Kinney and Wempe, 2002; Young and Selto, 1991) or the announcement of a national quality award (Corbett et al., 2005; Hendricks and Singhal, 2001; Przasnyski and Tai, 1999). The lean manufacturing environment has more recently been studied from the perspective of a management strategy or management control practices (Fullerton et al., 2013). Accounting researchers have examined firms' economic performance in connection with the influence of management control systems (Henri and Journeault, 2010) or the effect of CEO reputation and explanations of performance on investors' judgments (Cianci and Kaplan, 2010). In accounting research per se, however, the issue has been very narrowly focused on the relationship between JIT adoption and financial performance.[1]

Kinney and Wempe (2002) studied the relation between profit and cost performance of JIT adopters. The research results indicated that JIT adopters financially outperformed their non-adopting industry counterparts by improving operating profit margin. The financial improvement, however, didn't include a better asset turnover for JIT adopters. This finding was a surprise to many accounting researchers in this area because JIT's primary benefit was believed to be the radical reduction of inventory levels which would have improved the asset turnover for the adopters in the sample. Their contribution to the literature in this area was its reconciliation to the findings of Balakrishnan et al. (1996).

Balakrishnan et al. (1996) had attempted to validate the generally-held industry belief that JIT firms' improved inventory utilization would lead to a corresponding increase in their return on assets (ROA). The study found a superior ROA response for the JIT firms in the adoption year with lower inventory turnover for work-in-process inventory, but couldn't validate the above conventional wisdom in general. The research results of Kinney and Wempe (2002) suggested that the JIT adopter sample of Balakrishnan et al. (1996) included a greater proportion of small firms, and JIT adopters below a firm-size threshold did not show an improved financial performance in their sample analyses. The earlier study by Young and Selto (1991) made a contribution to the literature in this area based on a site-based examination of non-value-added costs. The research found the evidence that JIT adopters could successfully reduce non-value-added costs.

### I.2. Towards a theory of the relation among governmental policy change, firms' cost performance, and the financial market impact

In this paper, we aim to make a contribution to the management accounting literature in the area of the relations among government policy change, firms' cost performance, and the financial market impact from the performance change. In the absence of a credible management accounting theory explaining the relations, an effort to provide an early evidence of any such relations would help the discipline make a progress towards building a theory. In our efforts to contribute any early evidence one way or another, we apply an empirical test of firms' cost performance following a significant governmental policy change. We investigate firms' adjustment on different cost structures involving manufacturing versus other overhead and administrative costs. We introduce a new type of sample firms' category for our study: U.S. Defense Department's elite defense contractors doing very selective governmental contracting work.

In the empirical testing of our cost structure-financial market-related hypotheses developed later in our paper, we examine the profit and cost performance of defense contracting firms by investigating how the stock market reacts to changes in the cost structures of defense contractors. We investigate whether it matters at all, if the profit comes from improvements in cost performance or only the profit increases per se in the case of defense contractors. In order to compare the differential market reaction to cost performance or profit changes, this study matches the defense contracting firms with non-defense manufacturing firms of a similar size. Those non-defense manufacturing firms are selected as the firms whose total assets are the closest to the defense contractors in the same industry (based on the 4-digit SIC code). We look at the stock market's reactions to the changes in cost performance of the defense contractors, as an additional reaction to a significant change in the relevant governmental policy change.

The remainder of our paper is organized as follows. We develop our hypotheses in the next section. Then we describe the sample selection, testing models, and variables used for our empirical testing. The empirical test results are presented next. The last section summarizes the conclusions and future research implications.

## II. Hypotheses

The studies on the financial impact of total quality management (TQM) or JIT adoption, including the studies cited earlier, have reported no conclusive evidence although some limited improvement in profitability has been suggested (Corbett et al., 2005; Hendricks and Singhal, 2001; Przasnyski and Tai, 1999; Kumar et al., 2009). The mixed results from prior studies on the financial impact of manufacturing improvement efforts do not provide clear guidance on the market's discerning ability in the following context: Does the market care whether defense contractors increased profits through manufacturing cost performance improvement or just profit increase per se by shifting the cost increases to customers?

The cost-shift-to-the-customer practice by the firms that have the down-stream ability in the market has been a well-known industry issue, especially among the U.S. defense contractors. However, the 2010 announcement by the then secretary of DOD, Robert M. Gates, on the changes in defense purchasing procedures "intended to rein in the ballooning cost of weapons systems" has re-focused the issue (The New York Times, 2010). The procurement procedures changes "would cut waste, set goals for what weapons should cost and give military contractors greater financial incentives to complete projects on budget," according to the newspaper. The contracting changes reflect the Defense Department's new practice of turning to fixed-price contracts from the cost-plus contracts that have been the usual practice for a long time. Under the cost-plus contracts, the DOD covered all the expenses and guaranteed contractors a profit. The type of fixed-price contracts would force the DOD and the contractor to share equally in cost overruns. Under the new plan from the fiscal year 2010, the DOD would give preferential treatment to suppliers with good cost-control records.

The preceding discussion leads us to expect that, as far as the defense contractors are concerned, the stock market may or may not discriminate against those firms that improve the productivity by cutting cost of operating expenses rather than shifting the cost increases to customers relying on the conventional payment practices using the cost-plus basis (i.e., not

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maximize their cost improvement efforts), and hypothesize the following:

There is a strong association between the changes in cost structures of defense contractors and their stock returns, and their association is stronger than the non-defense manufacturing firms which are not subject to the DOD's scrutiny. We explain the different cost structures as the sample firms' manufacturing cost ratio versus the white-collar cost ratio, and look at the ratio of cost of goods sold to sales ($CGSS_t$) as the manufacturing cost performance indicator of a period $t$ , and the ratio of operating expenses (i.e., selling and administrative expenses to sales) as the white-collar cost performance indicator of a period $t$ , $OES_t$ . Our discussions lead us to hypothesize the following in an alternative form:

**$H_1$:** Stock returns of a sample firm $i$ in a period $t$, $FSR_{it}$ , are closely related to the changes in the manufacturing cost performance, in addition to the earnings ($EPS_t$) and earnings changes ($CEPS_t$) of the firm $i$ per se in the case of defense contractors. We also expect to observe higher correlations of stock returns, $FSR_{it}$ , to $CGSS_t$ , for the defense contractors than for non-defense manufacturing firms.

**$H_2$:** Stock returns of a sample firm $i$ in a period $t$, $FSR_{it}$ , are closely related to the changes in the white-collar cost performance, in addition to the earnings ($EPS_t$) and earnings changes ($CEPS_t$) of the firm $i$ per se in the case of defense contractors. We also expect to observe higher correlations of stock returns, $FSR_{it}$ , to the $OES_t$ for the defense contractors than for non-defense manufacturing firms.

**$H_3$:** Stock returns of a sample firm $i$ in a period $t$, $FSR_{it}$ , are closely related to the changes in the sum of the manufacturing and the white-collar costs, in addition to the earnings ($EPS_t$) and earnings changes ($CEPS_{it}$) of the firm $i$ per se for defense contractors. We also expect to observe higher correlations of stock returns, $FSR_{it}$ , to the sum of costs of goods sold and operating expenses scaled by sales ($TES_{it}$ ) and changes in the variable ($CTES_{it}$) for the defense contractors than for non-defense manufacturing firms.

## III. Sample selection, data, testing model, and variables definitions

### III.1 Sample selection and data

The selection of the sample firms in this study takes on a particular significance based on the different conclusions drawn from the previous studies of Balakrishnan et al. (1996) and Kinney and Wempe (2002). The between-study differences in sample firms contributed to the different conclusions of the previous studies. For our sample of defense contractors, we have chosen *The Top Secret America (TSA)* database as the original data source, because of the perceived ability of the TSA project contractors to shift product development and manufacturing cost increases to the customers (defense contractors).

The TSA database was compiled by *The Washington Post* based on the two-year review of hundreds of thousands of public records of defense organizations and private-sector companies (Top Secret America Blog, 2011). *The Washington Post* identified 45 separate defense organizations with 1,271 subdivisions that contracted top-secret work to 1,931 different private-sector companies. From the database, a sample of 113 publicly traded firms was identified by selecting only the firms with ticker symbols available in the database.[2] These are private-sector firms whose stocks are listed on the stock exchanges that are engaged in top-secret work for the U.S. Out of them, 84 of these firms are found in Compustat with 251 firm-year observations from 2010 to 2012.

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This study matches the defense contractors in the sample with non-defense manufacturing firms whose total asset sizes are closest to those sampled firms in the same industry based on 4-digit SIC code. Often defense-contracting firms are the largest firms in their industry, and we have had to choose the firms that are smaller than the defense contractors to include in the control sample. We couldn't find matching firms for 11 defense contractors, because either all members in the industry were defense contractors or the firms that are closest in size (either larger or smaller) also had defense contracts. This inability further reduced the sample size from the initial 95 to 84. Out of the total 84 control firms, 55 control firms are smaller, and 29 firms are larger in size, than the defense contractors in the sample. The defense contractors are, in general, observed to be the larger ones in their industry.

We require data availability from stock returns, and financial variables, such as net earnings, cost of goods sold, selling and administrative expenses, and their year-to-year changes, to be present in the data base. Financial statement data were obtained from the 2013 edition of COMPUSTAT database. Stock returns for the sample firms and market returns are obtained from CRSP 2013 database. We use CRSP equally-weighted market index as the return for the market. Daily returns are used to compute the annual cumulative returns for each firm and the market index.

**III.2 Test models and definition of variables**

The first two multivariate models (models 1 and 2) are suggested as our basic models before testing the changes in costs of goods sold and operating expenses as shown below:

Model 1: $FSR_{it} = a_0 + a_1EPS_{it} + a_2CEPS_{it} + a_3MSR_t + a_4SIZE_{it} + a_5DTA_{it} + a_6GR_{it} + a_7BETA_{it}$

Model 2: $FSR_{it} = a_0 + a_1EPS_{it} + a_2CEPS_{it} + a_3D\_EPS_{it} + a_4D\_CEPS_{it} + a_5MSR_t + a_6SIZE_{it} + a_7DTA_{it} + a_8GR_{it} + a_9BETA_{it}$

$FSR_{it}$ is firm *i*'s compounded daily stock (market) returns for the period from 90 days after prior fiscal year-end to 90 days after the current fiscal year-end *t*. $EPS_{it}$ is firm *i*'s earnings per share read from the Compustat, and $CEPS_{it}$ is firm *i*'s year-to-year change in earnings per share. Both $EPS_{it}$ and $CEPS_{it}$ take an interactive dummy D, which is equal to '1 (0),' for defense contractors (for non-defense control firms). The other control variables are explained as the following:

$MSR_t$ is the equally-weighted average daily market stock returns for the CRSP stock portfolio during the same period *t*. $SIZE_{it}$ is measured as firm *i*'s total assets, and $DTA_{it}$ is debt-to-total assets ratio, and $GR_{it}$ is firm *i*'s year-to-year sales growth, and $BETA_{it}$ is firm *i*'s systematic risk measured from the market model during the same 360-day period after the fiscal year-end.

To test the hypotheses 1 and 2, the next two multivariate models (Models 3 and 4) include the expense variables, such as cost of goods sold and operating expenses and their year-to-year changes, with the interactive dummy variables identifying defense contractors as follows:

Model 3: $FSR_{it} = a_0 + a_1EPS_{it} + a_2CEPS_{it} + a_3MSR_t + a_4SIZE_{it} + a_5DTA_{it} + a_6GR_{it} + a_7BETA_{it} + a_8CGSS_{it} + a_9CCGSS_{it} + a_{10}D\_CCGSS_{it} + a_{11}OES_{it} + a_{12}COES_{it} + a_{13}D\_COES_{it}$

Model 4: $FSR_{it} = a_0 + a_1EPS_{it} + a_2CEPS_{it} + a_3D\_EPS_{it} + a_4D\_CEPS_{it} + a_5MSR_t + a_6SIZE_{it} + a_7DTA_{it} + a_8GR_{it} + a_9BETA_{it} + a_{10}CGSS_{it} + a_{11}CCGSS_{it} + a_{12}D\_CCGSS_{it} + a_{13}OES_{it} + a_{14}COES_{it} + a_{15}D\_COES_{it}$

$CGSS_{it}$ is measured as firm *i*'s cost of goods sold to sales, and $CCGSS_{it}$ is its annual changes. $OES_{it}$ is the operating expenses (i.e., selling and general administrative expenses) scaled by sales (OES), and $COES_{it}$ is its annual changes. Both $CCGSS_{it}$ and $COES_{it}$ are tested using an interactive dummy D to see if the changes (i.e., productivity improvement) in the expenses are more reflected in the defense contractor *i*'s daily stock returns, compared to the non-defense control firms.

To test hypothesis 3, the next two multivariate models (Models 5 and 6) are employed, by combining cost of goods sold and operating expenses and their year-to-year changes with the interactive variables identifying defense contractors as follows:

Model 5: $FSR_{it} = a_0 + a_1EPS_{it} + a_2CEPS_{it} + a_3MSR_t + a_4SIZE_{it} + a_5DTA_{it} + a_6GR_{it} + a_7BETA_{it} + a_8TES_{it} + a_9CTES_{it} + a_{10}D\_TES_{it} + a_{11}D\_CTES_{it}$

Model 6: $FSR_{it} = a_0 + a_1EPS_{it} + a_2CEPS_{it} + a_3D\_EPS_{it} + a_4D\_CEPS_{it} + a_5MSR_t + a_6SIZE_{it} + a_7DTA_{it} + a_8GR_{it} + a_9BETA_{it} + a_{10}TES_{it} + a_{11}CTES_{it} + a_{12}D\_TES_{it} + a_{13}D\_CTES_{it}$

$TES_{it}$ is measured as the sum of the cost of goods sold ($CGS_{it}$) and operating expenses ($OE_{it}$) divided by sales, and $CTES_{it}$ is its annual changes. Both variables take a dummy variable D to test hypothesis 3 as was the case in the variables, $CCGSS_{it}$ and $COES_{it}$.

## IV. Results

### IV.1 Characteristics of defense contractors

Defense contractors are, in general, the largest firms in their industry. Despite the matching efforts of selecting control firms of the comparable size, Table 1 shows that defense contractors are larger than their non-contractor counterparts in assets, revenues, net income, and the total number of employees, confirming the industry-wide general belief. The means and medians of total assets are not statistically different, but in terms of sales revenues, the difference is statistically significant. However, contrary to the commonly held belief in the defense industry that defense contractors are capital intensive, these defense contractors are shown to have relatively less property, plant and equipment in their total assets and less capital expenditure per dollar of sales. They spend about the same amount of R&D per dollar sales as the non-contractors do.

**Refer Table 1**

Table 2 shows that defense contractors are typically more profitable than non-contractors. They show more sales per dollar of assets as well as higher returns on assets and equity. The differences in means are not significant, possibly due to the nature of a skewed distribution of the data, but differences in medians are significant. The descriptive statistics also show the defense contractors' lower debt-to-asset ratios, compared to their non-defense counterparts in manufacturing. Defense contractors also tend to present lower market-to-book ratios, but it's not statistically significant. This univariate result suggests a typical defense contractor enjoys a higher assets turnover and accompanying profitability with a lower leverage and market-to-book ratios than a typical non-contractor in the same industry.

**Refer Table 2**

Table 3 reports on the correlations among the variables in the models. As expected, the cost of goods sold to sales (CGSS) and operating expenses to sales (OES) are highly correlated in

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a negative direction, but their annual changes (such as CCGSS and COES) are not significantly correlated. The correlations between the other variables are not significantly high, except in the case of the correlation between the sum of cost of goods sold plus operating expenses and each expense in the sum. However, since these variables are not tested in the multivariate regression models simultaneously, we are not concerned about the potential multicollinearity here.

**Refer Table 3**

As indicated in all test models in Table 4, in all sample groups (test firms and matched control firms) the firms' annual cumulative stock returns ($FSR_t$) are well explained by earnings per share ($EPS_t$) and annual changes in EPS ($CEPS_t$), and the control variables, such as market annual cumulative stock returns ($MSR_t$) annual growth rate. The other control variables, such as firm size (SIZE), debt-to-total assets (DTA), and systematic risk (BETA), are not statistically significant in any models. As indicated in the models 2, 4, and 6, there is no difference in the explanatory power of earnings per share ($EPS_t$) and changes in earnings per share ($CEPS_t$) between defense contractors and non-defense manufacturers in their annual cumulative stock returns.

As shown in models 3 and 4, for both defense contractors and non-defense manufacturers, their annual cumulative returns ($FSR_t$) are not significantly influenced by the annual changes in cost of goods sold ($CGSS_t$) alone, while they are strongly affected by the operating expenses ($OES_t$) and their annual changes ($COES_t$). Both annual changes in the cost of goods sold and the changes in operating expenses explained more strongly the changes in the annual cumulative stock returns for the defense contractors than for the matched control firms. The dummy variable, interactive with changes in cost of goods sold ($D\_ CCGSS_t$), shows the statistical significance level of $p<0.05$ in a two-sided test, and the same variable, interactive with changes in operating expenses (D_COES), shows the significance level of $p<0.01$ in a two-sided test.

**Refer Table 4**

In models 5 and 6, we combined cost of goods sold and operating expenses, scaled by sales ($TES_t$), and tested their year-to-year changes ($CTES_t$ ), as well as their interactive dummy variables ($D\_TES_t$ and $D\_CTES_t$) for the two sample groups. Consistent with the findings in the tests of models 3 and 4, changes in total expenses for the defense contractors strongly influenced their annual cumulative stock returns, compared to their matching control firms. The result implies that the productivity increase (or decrease), in terms of annual changes in cost of goods sold and operating expenses scaled by sales, reflected positive (or negative) annual cumulative stock returns more evidently for the defense contractors, compared to non-defense manufacturers.[3] The financial market pays more attention to the cost performance, whether it's blue-collar costs (CoGS) or white-collar costs (SG&A), of defense contractors than in the case of non-defense firms.

The current study offers some additional explanations on the profit/cost performance and stock market reactions, when the levels of and the changes in the cost of goods sold and operating expenses are added, with their interactive dummy variables, for the defense contractors as the following:[4] (1) The levels of and the changes in earnings per share can explain total sample firms' annual cumulative stock returns fairly clearly, but the interactive dummy variable identifying defense contractors do not. This implies that there is no distinction between the two sample groups in terms of the explanatory power of the level of and the changes in earnings per share in relation to stock returns.[5] (2) The effects of the changes in the cost of goods sold or operating expenses on the annual stock returns are more pronounced in the case of defense contractors than in their non-defense counterparts.[6] In other words, costs and expenses of defense contractors matter in the explanation of annual stock returns, in addition to the levels of and the changes in EPS. (3) When we combine cost of goods sold and operating expenses, their annual changes plus their levels explain the changes in the annual stock returns more clearly in the case of defense contractors, compared to their non-defense counterparts, which is consistent with what the previous models indicated.[7]

## V. Conclusions and future research implications

We observe a clear financial market response to a significant change in the government policy. The market cares, however, in more subtle ways. For both defense contractors and non-defense manufacturers, their annual cumulative returns are not significantly influenced by the annual changes in the cost of goods sold alone, while they are strongly affected by the operating expenses and their annual changes. Both annual changes in the cost of goods sold and the changes in operating expenses affect the changes in the annual cumulative stock returns for the defense contractors more clearly than for the non-defense counterparts. The financial market, being the *financial* market, does not care too much about whether the cost changes occur in the blue-collar or white-collar operations, as long as the cost performance improves.

Since the data used in the current study involve the TSA projects dealing with very sensitive state secrets, it was not easy to attempt our testing of whether the findings on the cost performance were confined to the period of post-announcement by the Defense Department of the radical departure from the conventional way of paying cost-plus prices to defense contractors, or they were applicable to a more general case altogether. A future research could shed more light on this aspect of our findings on elite defense contractors.

Because of the very nature of the research on the current topic, the empirical studies, to a large extent, have been confined to small-sample studies. The earlier studies of Kinney and Wempe (2002) and Balakrishnan et al. (1996) served as new attempts at empirical testing of the hypotheses on firms' cost performance, despite the inherent limitations in the research design and usefulness of the empirical findings. Those two studies, nevertheless, opened the door to a large-scale empirical testing for research in this area. The nature of the data, sample firms, and the capital market research methodology employed in the current study may play a small role in expanding the scope of future empirical research design in this area of research on accounting and public policy. In the absence of any credible management accounting theory explaining the relations, if any, among governmental policy change, firms' cost performance, and the financial market's responses to those, our initial findings provide the starting point towards building a theory in this area.

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**Table 1: Firm characteristics: defense contractors and control firms (2010 – 2012)**

| | Defense Contractor | Control Sample | Differences | t-statistic / Wilcoxon Z statistic | P-value |
|---|---|---|---|---|---|
| Firm | 84 | 84 | | | |
| Firm-year | 251 | 251 | | | |
| Total Assets ($million) | 21,609<br>3,107 | 15,471<br>3,083 | 6,138<br>24 | 1.62<br>0.56 | 0.1056<br>0.5738 |
| Sales Revenue ($million) | 15,714<br>2,783 | 9,487<br>2,326 | 6,227<br>457 | 2.79<br>-2.45 | 0.0056<br>0.0144 |
| Net Income ($million) | 1,404<br>146 | 843<br>147 | 561<br>-1 | 2.04<br>-0.49 | 0.0414<br>0.6216 |
| Number of Employees (000) | 47.74<br>10.31 | 27.24<br>10.08 | 20.5<br>5 | 2.68<br>1.96 | 0.0076<br>0.0499 |
| Property Plant Equipment to Assets | 0.1052<br>0.0736 | 0.1391<br>0.097 | -0.0339<br>-0.0234 | -3.10<br>-2.61 | 0.0020<br>0.0091 |
| Capital Expenditure to Sales | 0.0348<br>0.0227 | 0.0583<br>0.0352 | -0.0235<br>-0.0125 | -3.85<br>5.90 | 0.0001<br><0.0001 |
| R&D Expense to Sales | 0.0876<br>0.0612 | 0.0817<br>0.0593 | 0.0059<br>0.0019 | 0.79<br>0.85 | 0.4313<br>0.3981 |

First (second) row for each variable represents the mean (median) values. Test of differences for the mean is based on a t-test for two-sample differences. Test of differences for the median is based on Wilcoxon two-sample Z-test.

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**Table 2: Financial performance: defense contractors and control firms (2010 – 2012)**

| | Defense Contractor | Control Sample | Differences | t-statistic / Wilcoxon Z statistic | P-value |
|---|---|---|---|---|---|
| Firm | 84 | 84 | | | |
| Firm-year | 251 | 251 | | | |
| Return on Equity | 0.1304<br>0.1217 | 0.1330<br>0.1250 | -0.0026<br>-0.0157 | -0.04<br>-0.59 | 0.9694<br>0.5543 |
| Debt to Assets | 0.1571<br>0.1354 | 0.1955<br>0.1670 | -0.0384<br>-0.0316 | -2.70<br>-1.52 | 0.0071<br>0.1294 |
| Market to Book Ratio | 2.0860<br>1.9965 | 3.3376<br>2.1506 | -1.2516<br>-0.1541 | -1.51<br>-1.27 | 0.1308<br>0.2032 |

First (second) row for each variable represents the mean (median) values. Test of differences for the mean is based on a t-test for two-sample differences. Test of differences for the median is based on Wilcoxon two-sample Z-test.

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**Table 3: Correlations between the variables**

| | FSR | MSR | EPS | CEPS | CGSS | CCGSS | OES | COES | TES | CTES | SIZE | DTA | GR | BETA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FSR | 1.000 | 0.362[a] | 0.115[a] | 0.182[a] | -0.049 | -0.104[a] | 0.015 | -0.110[b] | -0.072[b] | -0.138[a] | 0.013 | -0.047 | 0.117[a] | -0.056 |
| MSR | 0.379[a] | 1.000 | 0.031 | 0.069 | -0.030 | -0.082 | 0.048 | -0.041 | -0.024 | 0.069 | -0.094 | -0.001 | -0.023 | 0.011 |
| EPS | 0.164[a] | -0.024 | 1.000 | 0.068 | 0.059 | -0.056 | -0.102 | -0.004 | -0.042 | -0.030 | 0.131 | -0.030 | 0.040 | -0.052 |
| CEPS | 0.265[a] | 0.045 | 0.280[a] | 1.000 | 0.005 | -0.018 | 0.011 | -0.108[b] | 0.025 | -0.093 | -0.022 | -0.006 | 0.064 | -0.018 |
| CGSS | -0.076 | -0.032 | 0.109[b] | -0.009 | 1.000 | 0.056 | -0.862[a] | 0.073[c] | 0.619[a] | 0.085[c] | -0.067 | 0.115[a] | -0.094[b] | 0.107[b] |
| CCGSS | -0.192[a] | -0.120[a] | -0.070 | -0.264[a] | 0.014 | 1.000 | -0.038 | 0.186[a] | 0.051 | 0.638[a] | 0.081 | 0.003 | -0.293[a] | -0.054 |
| OES | 0.032 | 0.054 | -0.287[a] | -0.029 | -0.889[a] | 0.0143 | 1.000 | 0.028 | -0.136[a] | 0.004 | -0.140[a] | -0.203[a] | -0.030 | -0.054 |
| COES | -0.212[a] | -0.033 | -0.061 | -0.443[a] | 0.026 | -0.167[a] | 0.018 | 1.000 | 0.188[a] | 0.875[a] | 0.101[a] | 0.085[c] | -0.618[a] | -0.081[c] |
| TES | -0.127[a] | 0.007 | -0.269[a] | -0.046 | 0.702[a] | 0.044 | -0.356[a] | 0.035 | 1.000 | 0.172[a] | -0.348[a] | -0.089[b] | -0.231[a] | 0.126[a] |
| CTES | -0.310[a] | -0.087 | -0.093 | -0.560[a] | 0.025 | 0.615[a] | 0.006 | 0.552[a] | 0.035 | 1.000 | 0.119[a] | 0.068 | -0.618[a] | -0.081[c] |
| SIZE | 0.073 | 0.001 | 0.542[a] | 0.044 | -0.063 | 0.026 | -0.110[b] | 0.071 | -0.383[a] | 0.080 | 1.000 | 0.204[a] | -0.055[c] | -0.112[b] |
| DTA | -0.067 | -0.017 | 0.080 | -0.015 | 0.117[a] | -0.036 | -0.194[a] | 0.099[b] | -0.089[b] | 0.017 | 0.281[a] | 1.000 | 0.035 | 0.162[c] |
| GR | 0.213[a] | -0.026 | 0.033 | 0.285[a] | -0.112[b] | 0.015 | 0.028 | -0.427[a] | -0.187[a] | -0.287[a] | -0.046 | -0.055 | 1.000 | 0.194[a] |
| BETA | -0.089[b] | -0.064 | -0.199[a] | -0.019 | 0.128[a] | -0.007 | -0.060 | -0.003 | 0.221[a] | -0.018 | -0.175[a] | 0.064 | 0.149[a] | 1.000 |

* Numbers in upper-right of the table are Pearson correlation coefficients, and lower-left Spearman correlation coefficients. Significance level: [a] significant at 1% level, [b] 5% level, and [c] 10% level.

**Variable Definitions:**

FSR is a firm's compounded daily stock returns for the period from 90 days after the prior fiscal year-end to 90 days after the current fiscal year-end.
MSR is the equally weighted average daily market stock returns for the CRSP stock portfolio during the same period.
EPS is a firm's earnings per share, and CEPS is a firm's year-to-year change in earnings per share.
CGSS is measured as the cost of goods sold to sales, and CCGSS is the annual changes in CGSS.
OES is the operating expenses (i.e., selling and general administrative expenses) scaled by sales, and COES is the annual changes in OES.
TES is measured by the cost of goods sold (CGS) plus the operating expenses (OE) divided by sales, and CTES is the annual changes in TES.
SIZE is measured as a firm's total assets.
DTA is the debt-to- total assets ratio.
GR is a firm's year-to-year sales growth.
BETA is a firm's systematic risk measured from the market model during the annual period.

**Table 4: Regression analysis**

| Independent Variables | FDSR Model 1 | FDSR Model 2 | FDSR Model 3 | FDSR Model 4 | FDSR Model 5 | FDSR Model 6 |
|---|---|---|---|---|---|---|
| Intercept | -0.01523 | -0.03201 | 0.25041 | 0.24114 | 0.19091 | 0.18003 |
| EPS | 0.00257[b] | 0.00298[b] | 0.00264[b] | 0.00299[b] | 0.00260[b] | 0.00270[b] |
| CEPS | 0.28294[a] | 0.14043[c] | 0.26215[a] | 0.22233[b] | 0.23185[a] | 0.17455[c] |
| D_EPS | | -0.00702 | | -0.00586 | | -0.00180 |
| D_CEPS | | 0.38338 | | 0.13416 | | 0.14647 |
| MDSR | 1.17906[a] | 1.18279[a] | 1.19980[a] | 1.19971[a] | 1.19607[a] | 1.19566[a] |
| SIZE | 0.00032 | 0.00289 | -0.00409 | -0.00185 | -0.00299 | -0.00227 |
| DTA | -0.03882 | -0.03021 | -0.05440 | -0.05758 | -0.06478 | -0.05906 |
| GR | 0.14615[b] | 0.14893[b] | 0.15812[b] | 0.15756[b] | 0.12636[b] | 0.12369[b] |
| BETA | -0.03007 | -0.02847 | -0.01158 | -0.01415 | -0.02125 | -0.02043 |
| CGSS | | | -0.30018[b] | -0.29753[b] | | |
| CCGSS | | | 0.04287 | 0.01437 | | |
| D_ CCGSS | | | -2.28739[b] | -2.16234[b] | | |
| OES | | | -0.32789[b] | -0.32963[b] | | |
| COES | | | -0.18677 | -0.27423 | | |
| D_COES | | | -3.55716[a] | -3.38312[a] | | |
| TES | | | | | -0.17303 | -0.16732 |
| CTES | | | | | 0.38488[c] | 0.34344 |
| D_ TES | | | | | -0.09855[a] | -0.09629[a] |
| D_ CTES | | | | | -3.22018[a] | -3.05460[a] |
| F-Value | 13.20 | 10.93 | 9.15 | 8.04 | 11.54 | 9.78 |
| Adjusted $R^2$ | 0.1560 | 0.1622 | 0.1866 | 0.1861 | 0.2006 | 0.1981 |

Significance level: [a] significant at 1% level, [b] 5% level, and [c] 10% level.

**Definition of variables:**

FDSR is a firm's compounded daily stock (market) returns for the period from 90 days after prior fiscal year-end to 90 days after the current fiscal year-end.

MDSR is the equally weighted average daily market stock returns for the CRSP stock portfolio during the same period.

EPS is a firm's earnings per share, and CEPS is a firm's year-to-year change in earnings per share.
D is an interactive dummy variable, '1' if the firms are defense contractors, '0' if non-defense manufacturer.
BETA is a firm's systematic risk measured from the market model during the annual period.
CGSS is measured as the cost of goods sold to sales, and CCGSS is the annual changes in CGSS.
OES is the operating expenses (i.e., selling and general administrative expenses) scaled by sales (OES), and COES is the annual changes in OES.
TES is measured by the cost of goods sold (CGS) plus the operating expenses (OE) divided by sales, and CTES is the annual changes in TES.
SIZE is measured as a firm's total assets.
DTA is the debt-to- total assets ratio.
GR is a firm's year-to-year sales growth.

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**Notes**

[1] The operations and quality studies have measured the financial impact and stock market reaction to the adoption of a new quality management technique or the national quality award announcement. All these studies are event-based studies that focus on whether the adoption of a new quality management technique or the announcement of a national quality award merits the efforts the firms must make in time and money. Please refer to Przasnyski and Tai (1999), Hendricks and Singhal (2001), Corbett et al. (2005), Foster (2007), Fullerton and Wempe (2008), and Kumar et al. (2009).

[2] The initial sample contains 143 firms whose divisions and subsidiaries were awarded the TSA contracts. After deleting duplicates and firms with blank ticker, it comes to a total of 113.

[3] It shows that the sum of cost of goods sold and operating expenses for the defense contractors provided more significant explanations, according to the models 5 and 6 (D_TES), compared to their matched-sample firms. When we separate the expenses, each expense, such as cost of goods sold and operating expenses, is not significantly different between two groups (not reported in the models 3 and 4).

[4] Each F-test, comparing models 1 and 2 to models 3, 4, 5, and 6, shows the significance level of $p<0.05$.

[5] A test of pre-2010 data, in comparison to the post-policy change data, would increase the reliability of the findings in this respect. Comparing the effect of cost structure changes on the firm valuations between pre-2010 and post-2010, however, was not of a primary interest in the tests. The primary focus of our tests was on the differential value-relevance between defense contractors and non-defense contractors after the new policy was implemented by the DOD in

September 2010. If we tested the pre-2010 data, we would hypothesize that the value-relevance of cost structure changes after the DOD's new policy implementation would be stronger than that for the pre-2010 period.

[6] If the current study examines the value changes associated with any immediate stock market reaction to the DOD decision, then a short-window event study might be helpful. Most prior studies that deal with relative or incremental association in the value-relevance of financial statements, however, tend not to employ a short-window event study, and rather use a long window, such as annual stock returns or 3-months returns after earnings announcement.

[7] If the short-window impact between the two groups (defense contractors and non-defense contractors) was expected to be different in our study, then the dummy 'D' variable must be included in the model n. We reasoned that the dummy testing should be based on a different hypothesis: our two groups should have different annual stock returns, which is not the case.