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Lobbying in the Defense Aerospace Industry

(Business Administration Research Honors – Illinois Wesleyan University)

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Abstract

The purpose of this research paper is to identify the main variables that impact an aerospace defense firm's decision to lobby. This study focuses on important accounting and financial measures specific to each company. It also takes into account government and public variables such as the level of public scrutiny the company experiences and national defense spending. This study finds that cash flow and profitability are both negatively correlated with the decision to lobby. It also finds a positive correlation between inventory turnover and the decision to lobby the following year. Additionally, there is a positive relationship between public scrutiny and the decision to lobby.

Lobbying in the Defense Aerospace Industry

Introduction

The relationship between firms and the governments that regulate them has always been crucial to the success of society. Although companies need freedom to innovate and prosper, regulatory agencies must monitor them. Such monitoring aims to create a competitive environment, but it can also negatively affect an industry's operations and profits. In order to protest harmful legislation and champion positive legislation, companies fund lobbyists to express the company's views on proposed legislation. Lobbying is one of the many important parts of the relationship between firms and the government. Without lobbying, communication between companies and the government would be limited to press conferences and company publications. Lobbying allows a direct, constant, and updated relationship between firms and legislators.

Billions of dollars are spent on lobbying each year (See appendix Figure 1 for lobbying by industry). In 2011 a total of 3.33 billion dollars were spent so that lobbyists could represent their employer's interests regarding the passage of legislation including contracts, regulatory laws, and even budget cuts. The lobbyists are charged with making sure the representatives in charge of the relevant legislation understand the value and needs of the companies affected by that legislation. Lobbyists encourage representatives to support or oppose a piece of legislation depending on how it would affect their employer.

Despite the benefits of lobbying there are some who view it in a negative light. Some lobbyists have been thought to influence legislators unfairly. This view is supported by research such as that of Bertrand (2012), who found that political connections are more important than

subject expertise when it comes to being an effective lobbyist. This seems to indicate that lobbyists are trying to manipulate legislators by befriending them and then calling in favors for the companies they represent. The dark side of lobbying is a reality, because some bribery has been uncovered in different industries throughout the years (Polly, 1994).

On the other hand, several studies document the bright side of lobbying. Bertrand (2012), despite some of his findings indicating some unethical lobbying, also finds no evidence that a firm could buy consistent political influence by engaging in heavy lobbying. This contradicts Bertrand's original findings and supports lobbying as a legitimate practice and refutes suspicions of the corporate world buying legislator's votes in Washington. Coates (2012) finds that lobbying, while it does not pay off every time, generates significant return to shareholders. Despite its dark side, lobbying is still one of the best methods for companies to have a voice in Washington. The bright side to lobbying is that companies are not left out of the decision making process, whether their goals are accomplished or not; they at least get to voice their concerns.

The defense aerospace industry, and lobbying by its companies, has been around since planes were first used in World War I. However, several recent advances illustrate the increased role this industry is expected to play in the economy. The space frontier, which is part of the defense aerospace industry, has only recently become accessible to institutions other than governments. The first company to dock with the international space station only did so in 2012, and it has only existed since 2002 (SpaceX.com). Until then, only governments had docked with international space stations. For a company to accomplish this task, not only on its own, but of its own volition, indicates that the aerospace defense industry is finally at a point where the demand from the private sector adds to that from the public sector. These companies may soon rely less on defense contracts and more on consumer sales. This is not to say that military aerospace

defense will decrease. In fact, satellite and orbiting defense systems are being developed further. As this industry becomes more prevalent, both to the public for business and exploration and to the government for defense, it is increasingly important to understand its different facets. One of these facets is the lobbying relationship the aerospace defense industry has with the federal government.

This paper is the first to document the main factors explaining the decision of an aerospace defense company to engage in lobbying. The analysis shows that a unit increase in cash flow per share will significantly decrease the log odds that a company will engage in lobbying. At the same time, a unit increase in inventory turnover per year should boost the log odds of a defense aerospace company engaging in lobbying. Public scrutiny and size are also found to be positively related to lobbying to a significant degree. Finally, net profit margin and return on assets are both found to be negatively related to lobbying.

The remainder of this study reviews the recent literature on lobbying. Then the methodology, data, and variables are discussed, including justification for each variable and hypotheses. That is followed by the descriptive statistics and Logit regression results. The end of the paper holds the results section and a conclusion.

Literature Review

Despite the significant amount of available research on factors that affect lobbying in industries such as banking, financing, healthcare, and energy, there is an apparent lack of research focused on aerospace defense companies. This paper serves to help fill the gap in that area of lobbying research. The existing lobbying literature provides insight that helps determine the main factors affecting the changes in lobbying done by aerospace defense companies.

Chen's, Parsley's, and Yang's (2012) work examines corporate lobbying activities in the finance and banking industry from a financial perspective. Chen et al (2012) find that accounting and market measures of financial performance are positively related to the amount of lobbying that companies engage in. These indicators include total assets, cash flow, net profit margin, and return on assets. Total assets measure a company's size and, according to Chen et al, the bigger a company is the more likely it is to lobby. In addition, their results indicate that more profitable firms are more likely to spend on lobbying the following year. Chen's et al (2012) empirical analysis also shows that the portfolio of companies with the highest lobbying intensity outperforms their benchmarks for the three years immediately following the portfolio formation.

There are several differences between Chen's approach and the analysis of the aerospace defense industry. The aerospace defense industry has a fundamentally different inventory turnover than other industries. It takes companies in this industry longer to complete the large projects they obtain contracts for. Once these firms secure contracts they are less likely to lobby again right away. They instead only lobby again when new contracts are needed. In this case, the impact of variables such as cash flow, net profit margin, and return on assets will be to decrease lobbying the following year. This means that an aerospace defense company with a lower level of profitability is more likely to lobby for contracts in order to improve margins.

Alexander (2012) shows that lobbying is not only beneficial, but that it is also becoming more utilized by domestic companies. Alexander's study shows that lobbying has experienced exponential growth over the last decade. In that study, the coalition of lobbyists who supported a specific tax holiday provision received \$220 dollars in return for every dollar spent on lobbying. Though not every instance of lobbying is so beneficial, it is clear from Alexander's study that lobbying can generate significant wealth for a company's shareholders. Alexander suggests that

the exponential growth in lobbying will not slow down anytime soon. Her results add weight to the importance of understanding modern lobbying trends. According to Alexander, such trends are expected to shape the decisions made by lobbying firms, including those in the aerospace and defense industry.

Alexander (2012) also discusses the significance of transparent legislation in lobbying activity by firms. She defines transparent legislation as legislation for which the implications of the bill are easy to foresee. For example, a contract for a new jet is considered to be transparent legislation because firms can accurately determine the value added by lobbying efforts for that contract. In turn, complex healthcare legislation, for which the implications may be more difficult to predict, is considered less transparent legislation. The tax holiday legislation Alexander studies is relatively transparent and the profit from the enactment of tax legislation is foreseeable to almost the exact amount. She suggests that as the transparency decreases for a piece of legislation, the level of return on lobbying may decrease as well. She argues that this is due to the increased difficulty in calculating the optimal level of lobbying to engage in since the results of the legislation, while clearly positive or negative, are not as clear in dollar value terms. Taking this into consideration, and knowing much of the aerospace lobbying targets transparent contract legislation coming from the military for defense purposes, it is important to control for yearly government spending.

Coates' (2012) research concludes that heavily-regulated industries, or industries that rely heavily on the government, both of which are true of the aerospace defense industry, tend to have higher corporate value and stronger shareholder power. This indicates that a shift in relevant government activity, such as total spending, military spending, or aerospace spending directly, may warrant an increase in lobbying by public aerospace defense companies. That may be due

either to the need to lobby to maintain a high corporate value and strong shareholder support, or due to the fact that such companies tend to lobby as a result of the high corporate value and the strong shareholder standing. Regardless, a significant relationship between military activity and lobbying by the companies in this paper's sample may lead to important conclusions.

Kong's (2011) analysis of corporate lobbying indicates a significant correlation between lobbying intensity and public scrutiny. According to Kong, there is a high positive relationship between the amount of lobbying a company engages in and the amount of attention focused on it by the public and media. Kong says the timely public recognition of good news will lead to a downturn in lobbying and vice versa. Kong also says that this downturn that follows good publicity is only present in companies with high media exposure. This paper utilizes media exposure as a form of public scrutiny to test Kong's argument that public scrutiny is an important factor in explaining why aerospace defense companies decide to lobby. The public scrutiny variable is taken on a domestic basis; the international aspects are not accounted for in this analysis. In theory, the amount of media exposure will positively correlate with the chances of lobbying by an aerospace defense firm.

Several more studies that analyze lobbying prompt this study to include additional independent variables. Padovani and Gibson (2011) document the relationship between the credit of banks and the amount of lobbying they engage in. They find that as the credit of a bank decreases, the lobbying activity increases. Based on this finding, interest coverage is included as an independent variable to account for credit rating. In addition, a study by Blau, Brough, and Thomas, (2011) focuses on the relationship between lobbying and the amount of TARP bailouts received. Blau's et al study enforces the principle that firms facing scarce resources must lobby harder for those resources. This principle transfers to the aerospace and defense industry

regarding government funding and contracts. In this study, military spending as a factor of government spending is included as an independent variable.

Gao and Huang (2011) show that hedge funds which are connected to lobbyists engage in a higher percentage of trading in politically sensitive stock than do non-connected hedge funds. Gao and Huang also find that lobbying funds outperform by 1.6 to 2.5 percent per month on politically sensitive stocks than their non-political holdings. Gao and Huang also find that there may be some unethical information dissemination because of the clear trends found between successful firms in certain politically sensitive areas and lobbying firms.

The literature on lobbying provides the foundation for developing this study's hypotheses and identifying the variables expected to significantly impact aerospace defense lobbying. These dependent variables include firm-specific accounting measures, macroeconomic levels, and social indicators. By utilizing variables from each of these categories this study identifies the main factors affecting an aerospace defense firm's decision to lobby.

Methodology, Data, and Variables

Logit Regression Model:

This study aims to determine how the firm-specific, macroeconomic, and social factors impact a firm's decision to lobby. The dependent variable is lobbying, measured as whether a firm decides to engage in lobbying (1) or not (0).

This study runs several Logit regressions, to identify which variables are better suited to accurately determining the chances of the aerospace and defense firms engaging in lobbying or

not. The models are represented in this singular equation given with the interchanged variables in their respective places.

$$\text{Lobby}_t = \ln(\pi/1-\pi)_t = \beta_0 + \beta_1\text{Size}_{t-1} + \beta_2\text{CF}_{t-1} + \beta_3\text{InvTurn}_{t-1} + \beta_4\text{MilSpend}_{t-1} + \beta_5\text{PubScrut}_{t-1} + \beta_6(\text{GDP, Unemployment, Inflation})_{t-1} + \beta_7(\text{NPM, ROA})_{t-1} + \beta_8(\text{Debt, IntCov})_{t-1} + e$$

The dependent variable takes on either 1 or 0 as its value in the model with probabilities of π and $\pi - 1$ respectively. $(\pi/1-\pi)$ in this model is referred to as the odds ratio. Unit changes in each independent variable cause shifts in the log of odds ratio, which represents the possibility of an aerospace and defense firm engaging in lobbying. When the Logit regressions are analyzed a one unit change in any positively correlated significant independent variable causes an increase in the log odds of lobbying by the independent variables coefficient. A one unit change in any negatively correlated significant variable will cause a decrease in the log odds of lobbying by the independent variables coefficient.

Data:

The companies analyzed in this study contain not only the largest aerospace and defense firms in the country but some of the smaller ones as well (see appendix for list of companies included in study). Boeing, Lockheed Martin, and United Technologies are by far the largest lobbying contributors, as far as this industry goes (see figure appendix Figure 3). This industry affects the whole country, not only by contributing to national defense, but by contributing billions to the economy too; which makes its analysis is important.

The data in this analysis comes from several sources. The lobbying activity for each firm, used for the dependent variable, appears in [opensecrets.org](http://www.opensecrets.org)¹. The data for the dependent variable is used on a yearly basis for the span of 2005-2011. The dependent variable has a value of 1, meaning lobbying occurred, 94 times in the study; it has a value of 0, meaning the firm did not lobby that year, a total of 32 times.

The book value of total assets used to determine the size of each company appears in the Damodaran Online database. The data for variables cash flow per share, inventory turnover, net profit margin, return on assets, total debt/total assets, and interest coverage after taxes, was gathered from the annual ratio reports provided by the Standard and Poor's Net Advantage. Public scrutiny data comes from the Wall Street Journal archives provided through the ProQuest database. The data for public variables military spending/total government spending, GDP growth rate, unemployment rate, and inflation variables was gathered from the World Data Bank database. The data for the independent variables are included on a yearly basis for the span of 2004-2010.

It is important to note the expected effect of the political party in power during this study. This analysis only consists of seven years of data for each of the variables so analyzing the trends of political party is difficult since only one political party was in power for the majority of the study. In recent years, since the Democrats took power in Congress, lobbying by defense aerospace companies has decreased. This is because the Democratic Congress is less likely to pass defense bills. That important factor is unfortunately not included in the study due to time constraints on the data. All that can be done is to acknowledge the limitations of the study and interpret the variables available while keeping this principle in mind.

¹ <http://www.opensecrets.org/lobby/indusclient.php?id=D01&year=2010>

Table 1: Variables and Expected Signs

Variable	Formula/Description	Expected Sign
Size	Book value of total assets	+
Cash Flow	(Net income + depreciation + depletion + amortization) / # of shares	-
Inventory Turnover	How many time a firm sells their entire inventory per year.	+
NPM After Tax	Net profit margin after taxes / Total sales	-/+
Return On Assets	Net income / Total Assets	-/+
Debt	Total debt / Total Assets	+
Interest Coverage	Earnings after tax / Interest expense	-
Military Spending	Military Spending/Government Spending	-
Public Scrutiny	# of WSJ articles published about each company per year	+
GDP Growth Rate	GDP growth rate per year	-
Unemployment Rate	Unemployed / Labor force	+
Inflation	Calculated as change in the Consumer Price Index	+

Size is the book value of total assets for each firm. Chen et al (2012) and Brandon (2011) document the importance of accounting for the size of a firm when analyzing lobbying activity. This variable is somewhat more important when analyzing the actual amount of lobbying that each firm does. However, size remains a crucial variable since it may still influence how often a firm lobbies, or whether they decide to lobby at all. This study hypothesizes that size is positively correlated with lobbying.

Cash Flow per Share is the sum of net income, plus depreciation, depletion and amortization per share. According to Chen et al (2012) this variable is an indicator of how financially strong a company is. The literature supports using financial and accounting measures when analyzing lobbying and cash flow per share is the most widely used measure. The evidence provided by previous studies indicates that a high level of cash flow per share is associated with more lobbying expenses the following year. However, this study also hypothesizes that cash flow per share is negatively correlated with lobbying. The difference in the hypothesis associated with cash flow per share is explained by fundamental differences between the aerospace and defense

industry and other industries. An aerospace defense company that experiences high cash flow will not lobby as much, if at all, the following year because firms generate the desired level of cash flow after they receive funding or contracts. This means that the firm will not need to lobby for an extended period of time, while it completes the current contracts. Thus, an increase in cash flow will decrease the log odds of a company lobbying the following year.

Inventory Turnover is another indicator of each firm's financial activity. It differs from cash flow per share in that it shows whether a company runs mostly off of selling a few big ticket items each year, or off of going through a lot of smaller products each year. Firms with a high turnover may need to lobby more than those with lower inventory turnover, as a continuous pipeline of contracts is more important to firms with a high turnover. This study hypothesizes that a higher inventory turnover will positively impact a firm's decision to lobby.

Net Profit Margin and Return on Assets are both utilized as profitability indicators for the firms herein. NPM is after tax profits as a percentage of total assets. ROA is net income to total assets. These two independent variables will help to determine the relationship between a firm's most recent yearly profitability and the decision to engage in lobbying. Chen et al (2012) and Brandon (2011) both find that future profitability is positively correlated with lobbying. However, it is also possible that underperforming firms might engage in lobbying to boost their future performance.

Debt and Interest Coverage both deal with a company's ability to cover its debts. Debt is measured as total debt to total assets and interest coverage is earnings after tax to interest expense. In the literature, Brandon (2011) finds that the credit rating of a firm greatly impacts the amount of lobbying engaged in by the firm. This study measures a company's creditworthiness

with the debt and interest coverage. It is hypothesized that debt will be positively correlated with a company's lobbying activity. It is also hypothesized that interest coverage will be negatively correlated with a company's lobbying.

Military Spending as a percentage of total Government Spending is crucial in this study because of how closely the aerospace and defense industry is tied to the military activity of the country. As technology advances, the aerospace industry becomes an important provider of equipment and expertise in national defense. Drones, planes, satellites, and orbiting defense systems are all products of this industry and become more heavily demanded as defense spending increases, presumably during a conflict or as precautionary steps. Regardless of the cause, higher military spending positively impacts the aerospace and defense industry. It is hypothesized that as military spending increases, lobbying activity will decrease. Similarly Blau's study finds that lobbying activity by financial firms increased during the great recession, when government TARP bailouts were much needed by banks. Similarly if a the aerospace and defense industry find themselves in need of scarce government funds then lobbying will, in theory, increase. Thus, during times of increased military spending the firms do not have to fight for contracts or funding as much as when military spending is down.

Public Scrutiny is used to test the hypothesis that companies subject to higher levels of public scrutiny play a significant role in lobbying. Kong (2011) finds that public scrutiny is a significant factor in explaining lobbying by companies in the financial industry. In this analysis the public scrutiny variable is based on the Wall Street Journal's coverage of each company. As a premier leader in the business news industry, the Wall Street Journal will serve as the proxy for all media coverage. This variable simply represents how many articles the Wall Street Journal published about each company per year. In aerospace and defense the public scrutiny plays a less

critical role on each firm's actions as they are on the banking industry. However, the public, especially shareholders, still play an important role in the shaping major decisions made by firms. And while the critical judgment associated with banks does not transfer to aerospace and defense firms, positive media coverage still boosts stock prices. Based on Kong's findings, the public scrutiny variable is hypothesized to positively impact lobbying. This is in part due to the assumption that companies with a large media following are larger companies that want to present confidence by embracing the greater public exposure that comes from lobbying. That is due to the legal requirements for extensive disclosure that accompany lobbying of any kind. Alternatively a small company will not embrace the unnecessary disclosure.

GDP, Unemployment, and Inflation are used in this study to account for the economic state of the country and how that affects the aerospace and defense industry. Blau (2011) discusses how lobbying allowed financial firms to receive more bail out money during the great recession. Aerospace and defense companies have never and likely will never receive bailouts, but these companies do receive contracts and funding. This study will use GDP, unemployment, and inflation to see how economic downturns impacted aerospace and defense lobbying. It is hypothesized that increases in GDP growth rate will be negatively correlated with lobbying and the increases in unemployment and inflation will be positive correlated with lobbying. This is based on the more generic hypothesis, supported by Chen et al (2012), that economic booms will allow firms to be more successful without having to lobby.

Results

Descriptive Statistics: The mean and standard deviation for Lobby (1) and Lobby (0) are lagged one year. These statistics reflect data for (t-1) when lobbying occurs at time (t). Table 2 presents

the descriptive statistics for the variables used in this study. The mean and standard deviation are presented for each independent variable in two groups. The first group, Lobby (1), represents the instances where companies engaged in lobbying. The second group, Lobby (0), represents instances where companies decided not to lobby in a given year. The T-Test identifies four variables that are significantly different between the Lobby 1 and Lobby 0 group.

Table 2: Descriptive Statistics

	Lobby (1)		Lobby (0)		T -Test	Mann-Whitney
	Mean	Std. Dev.	Mean	Std. Dev		
Size	9.617642	0.907934	9.647617	0.776068	.198	Retain
CF	3.628379	3.006003	5.277052	3.297941	.344	Reject**
InvTurn	6.254488	4.499511	5.478588	3.737821	.607	Retain
PubScrut	95.8617	156.9891	51.4375	58.49397	.005	Retain
NPM	0.018674	0.141989	0.069362	0.045323	.077	Reject**
ROA	0.034557	0.076829	0.065204	0.04484	.235	Reject**
Debt	24.64355	13.77766	16.01461	8.314479	.001	Reject***
IntCov	6.201686	7.3227	10.69226	17.32992	.002	Reject***
MilSpend	18.5571	0.37054	18.48793	0.401937	-	-
GDP	1.509106	2.349081	1.336497	2.457401	-	-
Unplmnt	6.268085	1.965904	6.61875	2.134424	-	-
Inflation	2.502275	1.308272	2.365174	1.382394	-	-

Size is the size of the firm, measured by log of total assets; CF is cash flow per share measured as net income plus depreciation, depletion and amortization, divided by shares; InvTurn is inventory turnover measured by how many times a company's inventory is sold and replaced each year; MilSpend is military spending as a percentage of total government spending; PubScrut is public scrutiny measured by number of WSJ articles published on each company per year; IntCov is interest coverage after tax calculated by earnings after tax to interest expense; GDP is the national gross domestic product growth rate per year; Unplmnt is the national unemployment rate; Inflation is inflation measured by changes in the consumer price index; NPM is net profit margin measured as after tax profits as a percentage of total sales; ROA is return on assets calculated as net income to total assets; ROE is return on equity calculated as net income to average common equity (average common equity is the average of common equity at year beginning and year end); ROI is return on investments calculated as gain from investing minus cost of investing to cost of investing.

The PubScrut, NPM, Debt, and IntCov variables are each statistically different enough between the two lobby groups that these variables are especially suited to impact the lobbying activities of aerospace and defense companies. Next to the T-Test, the Mann-Whitney test is used to

document which independent variables are distributed differently in lobby 1 compared to lobby 0. This means that the size variable is distributed the same across the lobby 1 group and the lobby 0 group. According to the Mann-Whitney test InvTurn and PubScrut are also distributed like size, however the significance level of these results is not high enough to utilize these results. The results for CF, NPM, ROA, Debt, and IntCov are all distributed differently from Lobby 1 to Lobby 0. See Figure 4 in the appendix for the correlation matrix of variables.

Logit Regression Results:

The results from the GDP Logit regressions are shown in Table 4 (see appendix figures 5 and 6 for unemployment and inflation models). Table 4 shows that there are only three independent variables that consistently and significantly impact the lobbying activity of the companies in the study. These variables are CF, InvTurn, and PubScrut. Each is significant at the .01 level, indicating a very high level of certainty that these log odds coefficients are accurate.

Among these three variables, the cash flow per share has the most impact on the chances that a company will engage in lobbying. Based on the CF coefficient, it can be seen that a one unit change in cash flow per share will lead to a decrease of anywhere from .611 to .706 in the log odds of a firm engaging in lobbying. Looking at inventory turnover the results show a one unit increase will cause an increase in the log odds of a company lobbying by .336 to .387. The results for public scrutiny indicate that every additional article will increase the log odds of a firm lobbying by .009. The coefficient for public scrutiny is much smaller than the coefficients of the other variables. This means that the public scrutiny variable could increase by many more

unites from year to year where as CF and inventory turnover change in smaller, more impactful, increments. The results for these three variables support the hypotheses made for each variable.

Table 4: Logit Regression Results with GDP as Economic Indicator

	R 1	R 2	R 3	R 4
Constant	15.618 (.262)	14.195 (.306)	15.764 (.274)	12.670 (.362)
MilSpend	-.953 (.198)	-.821 (.256)	-1.094 (.157)	-.873 (.238)
PubScrut	.009*** (.008)	.009*** (.006)	.009*** (.009)	.009*** (.007)
GDP	-.064 (.582)	-.068 (.555)	-.069 (.555)	-.081 (.479)
Size	.348 (.429)	.211 (.625)	.713* (.097)	.588 (.157)
CF	-.636*** (.000)	-.611*** (.000)	-.706*** (.000)	-.676*** (.000)
InvTurn	.339*** (.002)	.336*** (.002)	.375*** (.001)	.387*** (.001)
NPM	-10.557 (.146)		-18.639* (.055)	
ROA		-8.197 (.262)		-20.753* (.099)
Debt	.034 (.149)	.037 (.128)		
IntCov			.024 (.444)	.032 (.380)

Size is the size of the firm, measured by log of total assets; CF is cash flow per share measured as net income plus depreciation, depletion and amortization, divided by shares; InvTurn is inventory turnover measured by how many times a company's inventory is sold and replaced each year; MilSpend is military spending as a percentage of total government spending; PubScrut is public scrutiny measured by number of WSJ articles published on each company per year; IntCov is interest coverage after tax calculated by earnings after tax to interest expense; GDP is the national gross domestic product growth rate per year; Unplmnt is the national unemployment rate; Inflation is inflation measured by changes in the consumer price index; NPM is net profit margin measured as after tax profits as a percentage of total sales; ROA is return on assets calculated as net income to total assets.

*Statistically Significant at 10% Level

**Statistically Significant at 5% Level

***Statistically Significant at 1% Level

The results are especially interesting because CF and InvTurn are indicators of financial strength and activity. The different impact of these variables on lobbying is explained by the differences between the aerospace industry and other industries. All else being equal, the cash flow increases after the aerospace defense company receives a contract and the need to lobby decreases

significantly because the firm now works on a multi-year contract. Once the firm finishes the project, it turns over its inventory, and intensifies its lobbying activity for additional contracts.

Although the coefficients of the size variable are all positive, only Model R3 indicates that size plays a significant role on a company's decision to lobby. Net profit margin (NPM) is also significant in R 3, which shows that an increase in NPM causes a reduction of 18.639 in the log odds that lobbying will take place. In R 4 the ROA variable is significant with a -20.753 coefficient. These results are consistent with the hypothesis that firms with higher profitability are less likely to lobby than their less profitable competitors.

This study checks the robustness of the results by using two alternative proxies for economic activity in addition to GDP which are unemployment and inflation. The results obtained when using unemployment and inflation are consistent with the evidence provided by the GDP Logit regression which indicates that the results found are indeed robust.

Conclusion

This study finds that cash flow, inventory turnover, and public scrutiny significantly impact a firm's decision to lobby the following year. We document a negative impact on lobbying when cash flow increases and a positive impact on lobbying when inventory turnover increases. Thus, one of the implications of this study is that companies will need to monitor their inventory turnover carefully. This analysis also shows that there is a positive impact on lobbying when public scrutiny increases. In addition to these three variables, the analysis shows that size positively impacts the log odds of a firm lobbying, while NPM and ROA have a negative impact.

This study helps advance the understanding of the aerospace defense industry's operations and of their relationship with the government. Additional research is needed to

understand how these firms will help shape regulation as space travel becomes more prevalent for the government and the public. Additional areas for future research include utilizing international aspects of this industry to help explain lobbying in this sector and using a Tobit model to investigate the impact of these factors on the amount companies spend on lobbying.

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SpaceX.com (April, 2013)

Appendix

Companies included in study: AAR Corp., Ball Corp, Boeing, Circor International, Danaher Corp., Ducommun Inc., Environmental Tectonics Corp., GenCorp Inc., General Dynamics,

Honeywell International, L-3 Communications Holdings Inc., Lockheed Martin, Precision Castparts Corp., Raytheon Co, Teledyne Technologies, Textron Inc., Triumph Group, United Technologies.

Figure 1: Lobbying Industry Overview

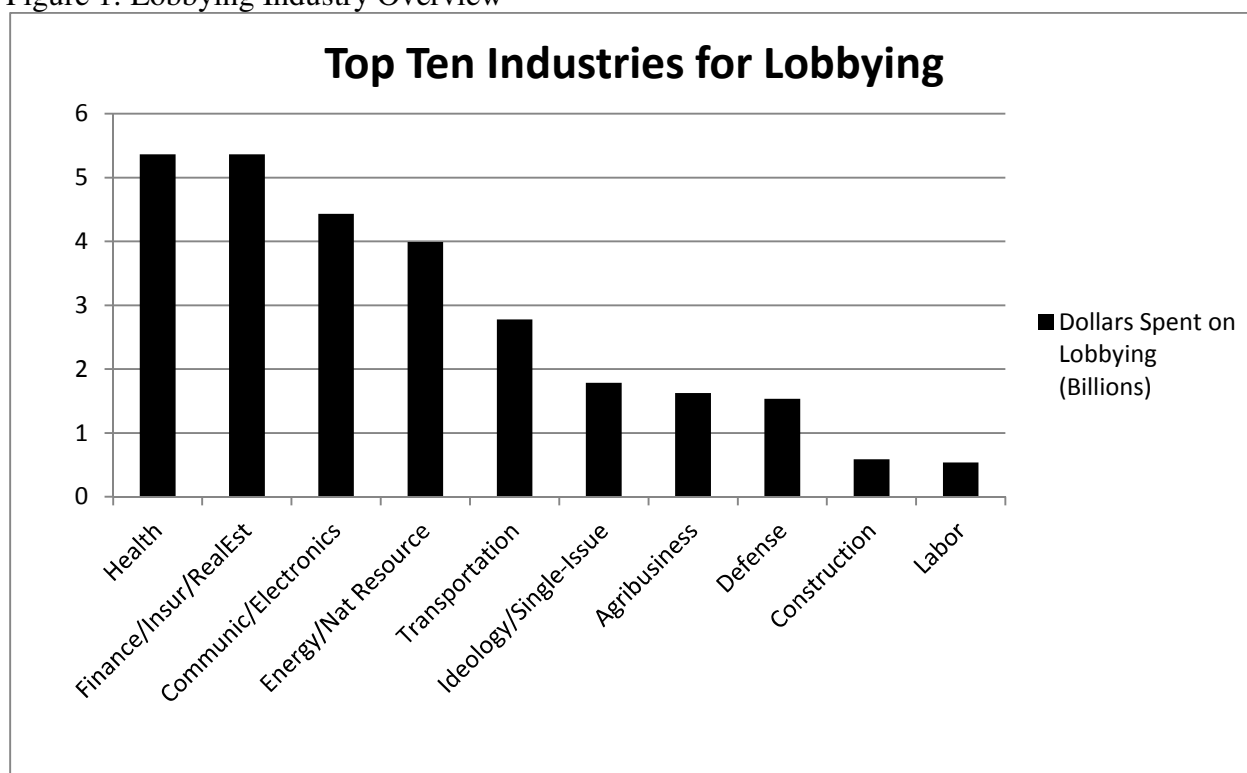
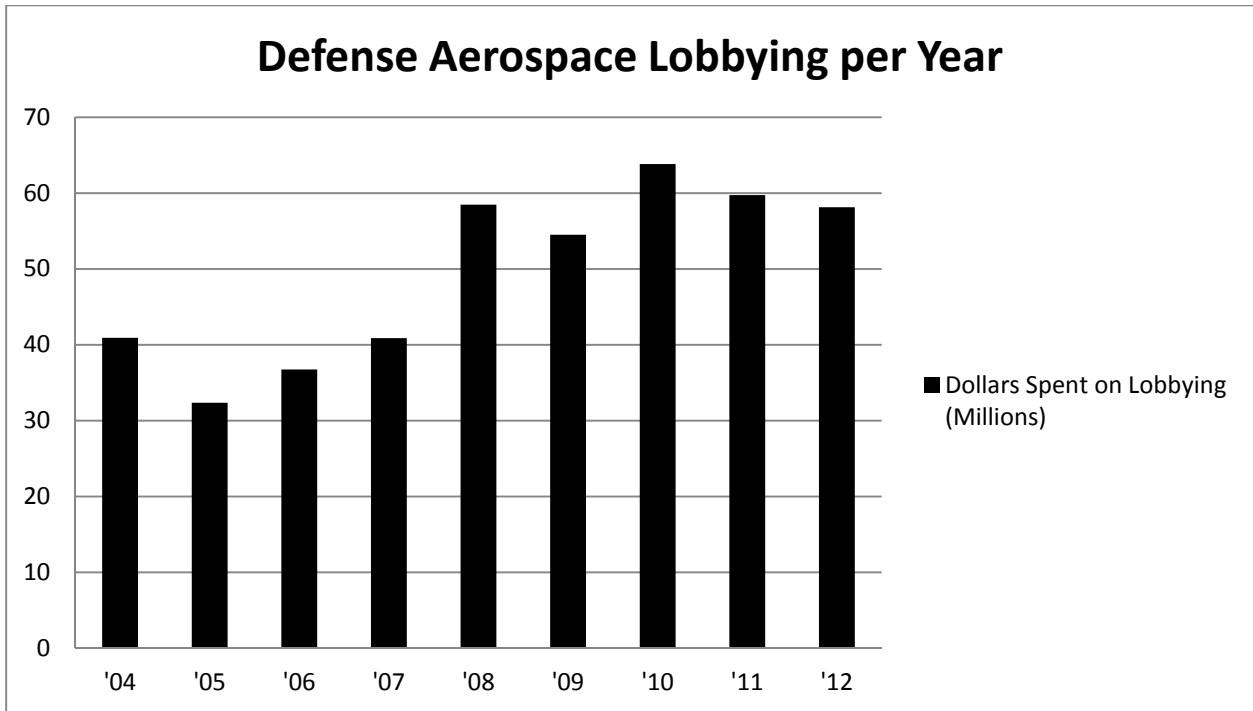


Figure 2: Defense Aerospace Lobbying



Note: Other companies in study lobbied zero dollars in 2011 and are excluded from Figure 2

Figure 3: Lobbying by Aerospace Defense Firm (2011)

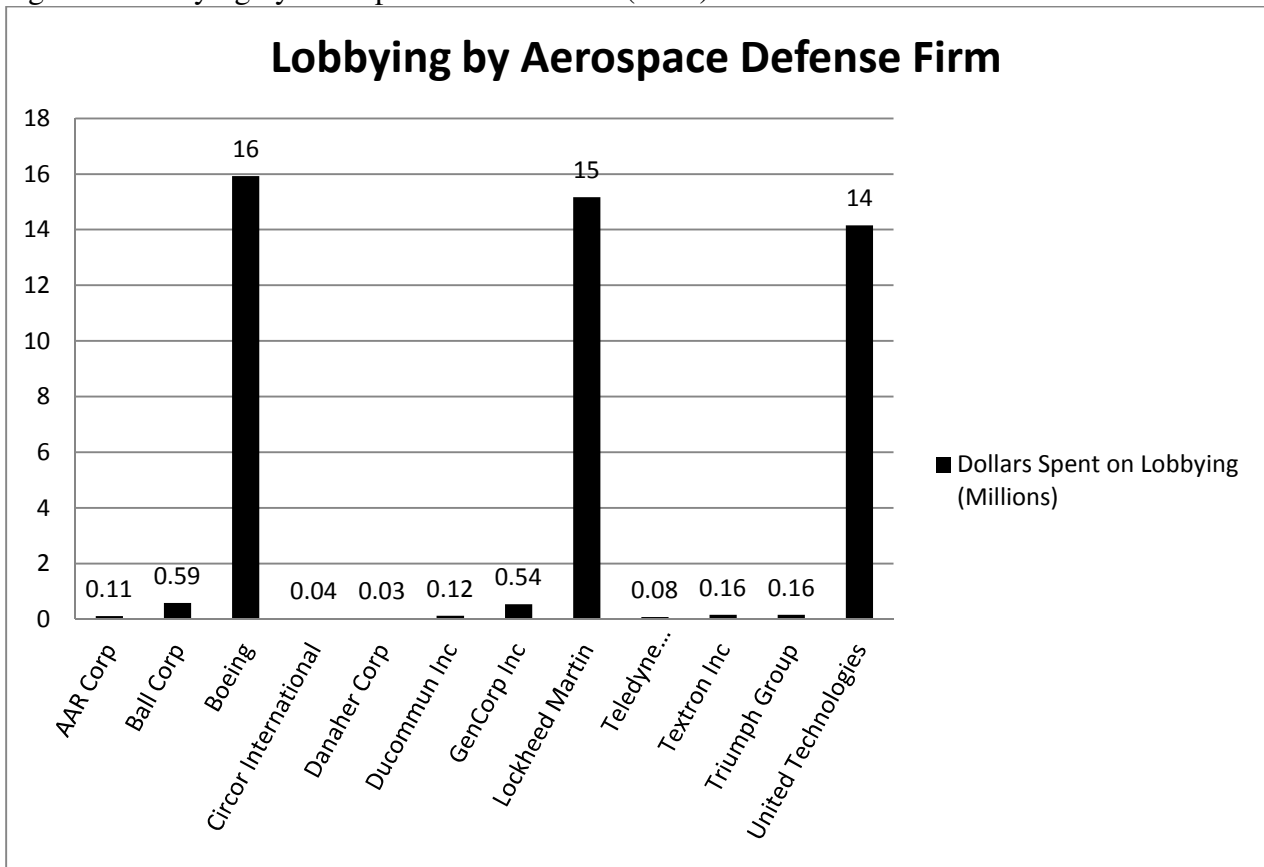


Figure 4: Correlation Matrix of Variables

	Lobby	IntCov	Debt	ROA	NPM	Inflation	Unplmnt	GDP	PubScrut	MilSpend	InvTurn	CF	Size
	-.015	.134	-.077	.491**	.399**	-.049	.069	-.050	.533**	-.072	.366**	.632**	
	-.229*	.196*	-.256**	.431**	.359**	-.133	.162	-.135	.327**	-.206*	.582**		
	.079	.025	.022	.259**	.186*	.022	-.027	-.007	.068	.012			
	.080	-.178*	.044	-.141	-.172	.817**	-.923**	.394**	.099				
	.139	-.049	-.093	.126	.099	.084	-.102	.060					
	.032	-.041	-.066	-.035	-.068	.611**	-.462**						
	-.076	.173	-.033	.114	.133	-.819**							
	.045	-.171	-.003	-.112	-.119								
	-.175*	.399**	-.313**	.849**									
	-.188*	.531**	-.374**										
	.287**	-.424**											
	-.181												

*Statistically Significant at 10% Level

**Statistically Significant at 5% Level

***Statistically Significant at 1% Level

Figure 5: Logit Regression Results with Unemployment as Economic Indicator

	R 5	R 6	R 7	R 8
Constant	36.843 (.309)	28.769 (.413)	47.900 (.191)	37.969 (.289)
MilSpend	-2.061 (.270)	-1.585 (.380)	-2.769 (.145)	-2.191 (.236)
PubScrut	.008** (.011)	.009*** (.008)	.008** (.014)	.009*** (.010)
Unplmnt	-.196 (.562)	-.129 (.696)	-.300 (.374)	-.232 (.490)
Size	.411 (.356)	.248 (.570)	.811* (.068)	.649 (.125)
CF	-.637*** (.000)	-.603*** (.000)	-.719*** (.000)	-.676*** (.000)
InvTurn	.339*** (.002)	.334*** (.002)	.378*** (.001)	.388*** (.001)
NPM	-12.023 (.121)		-21.672** (.039)	
ROA		-8.908 (.239)		-22.411* (.085)
Debt	.033 (.161)	.036 (.133)		
IntCov			.028 (.387)	.034 (.360)

Size is the size of the firm, measured by log of total assets; CF is cash flow per share measured as net income plus depreciation, depletion and amortization, divided by shares; InvTurn is inventory turnover measured by how many times a company's inventory is sold and replaced each year; MilSpend is military spending as a percentage of total government spending; PubScrut is public scrutiny measured by number of WSJ articles published on each company per year; IntCov is interest coverage after tax calculated by earnings after tax to interest expense; Unplmnt is the national unemployment rate; NPM is net profit margin measured as after tax profits as a percentage of total sales; ROA is return on assets calculated as net income to total assets.

*Statistically Significant at 10% Level

**Statistically Significant at 5% Level

***Statistically Significant at 1% Level

Table 6: Logit Regression Results with Inflation as Economic Indicator

	R 9	R 10	R 11	R 12
Constant	23.808 (.282)	20.279 (.351)	28.618 (.224)	21.393 (.330)
MilSpend	-1.429 (.245)	-1.173 (.324)	-1.839 (.164)	-1.377 (.259)
PubScrut	.009*** (.009)	.009*** (.007)	.009*** (.010)	.009*** (.008)
Inflation	.121 (.710)	.080 (.804)	.195 (.564)	.118 (.714)
Size	.378 (.392)	.226 (.602)	.761* (.079)	.611 (.143)
CF	-.629*** (.000)	-.599*** (.000)	-.707*** (.000)	-.666*** (.000)
InvTurn	.336*** (.002)	.333*** (.002)	.377*** (.001)	.384*** (.001)
NPM	-11.257 (.133)		-20.465** (.045)	
ROA		-8.485 (.250)		-21.137* (.095)
Debt	.034 (.152)	.037 (.127)		
IntCov			.027 (.398)	.032 (.384)

Size is the size of the firm, measured by log of total assets; CF is cash flow per share measured as net income plus depreciation, depletion and amortization, divided by shares; InvTurn is inventory turnover measured by how many times a company's inventory is sold and replaced each year; MilSpend is military spending as a percentage of total government spending; PubScrut is public scrutiny measured by number of WSJ articles published on each company per year; IntCov is interest coverage after tax calculated by earnings after tax to interest expense; Inflation is inflation measured by changes in the consumer price index; NPM is net profit margin measured as after tax profits as a percentage of total sales; ROA is return on assets calculated as net income to total assets.

*Statistically Significant at 10% Level

**Statistically Significant at 5% Level

***Statistically Significant at 1% Level