

RESEARCH ARTICLE

Leveraging national security: private equity and bankruptcy in the United States defense industry

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Abstract

Defense contractors play an essential role in US security operations. Among other responsibilities, contractors manufacture arms, manage logistics, analyze intelligence, and carry out cybersecurity operations. Historically, defense contractors were either publicly traded corporations or privately owned companies. The past two decades, however, have seen a major shift in the ownership structure of the US defense industry. Private equity firms—once niche actors in the US national security marketplace—have carried out over 1,500 deals involving defense contractors since 2000. This study employs a mixed-methods research design to assess the effects of private equity investment on the financial stability of the US defense industry. Using data on over 8,000 defense contractors, the inquiry finds that contractors with private equity backing experience bankruptcy at higher rates than contractors with no prior private equity investment. In addition, the study evaluates private equity activity in the military satellite services market—a field of growing importance in the strategically important domain of outer space. The inquiry’s findings have notable international security implications. Given the US’ role as a lynchpin in numerous alliances around the world, higher rates of bankruptcy among defense contractors have the potential to affect the security of the United States and its allies.

Keywords: Political economy; technology; international relations; private equity; defense industry; United States

Introduction

Defense contractors are integral to American national security operations.¹ Among other duties, contractors manufacture arms, manage complex logistics operations, support military bases overseas, protect embassies, analyze intelligence, and carry out cyber operations. Indeed, contractors are so essential to US global military missions that a recent Congressional report concluded: “without contractor support, the United States would not be able to arm and field an effective fighting force.”² Historically, US defense contractors were either publicly traded corporations or privately owned companies. In recent decades, however, a third type of ownership entity—the private equity firm—has emerged as a major class of investor in the American defense industry. Before 2000, few defense contractors were owned by private equity firms. From 2000 to 2022, however, private equity firms acquired over 1,500 defense contractors and, in recent years, have been responsible for over 40 percent of annual mergers and acquisitions in the US defense industry.³

What effect has widespread private equity investment had on the financial stability of the US defense industry? This inquiry uses data on over 8,000 defense contractors to examine comparative rates of bankruptcy between contractors with and without private equity backing. Depending on the dataset used, the study finds that private equity investment raises the risk of bankruptcy for a defense

¹In 2020, the U.S. Department of Defense spent \$445 billion—more than half its total budget—on goods and services supplied by defense contractors. See Levinson (2021).

²Schwartz, Sargent, and Mann (2018).

³PitchBook (2022); KPMG (2021a, 2021b).

contractor between 4 percent and 9 percent.⁴ Bankruptcy is more likely among defense contractors with private equity backing for three reasons. First, leveraged buyouts—an acquisition strategy frequently used by private equity firms—significantly increase the debt load of acquired contractors. Second, private equity-owned companies operate with less regulatory and investor oversight when compared to publicly traded companies. Limited oversight permits private equity backed defense contractors to assume more business and financial risk than publicly traded contractors. Third, private equity firms' general partners have fee structures that incentivize risk-taking when acquiring and managing companies, thus increasing the likelihood of bankruptcy among private equity backed defense contractors.

The US defense industry is unique among the markets in which private equity operates: national defense is a public good, and the US military is the lynchpin of numerous security alliances around the world. Therefore, bankruptcies in the defense industry—unlike bankruptcies in most other sectors of the US economy—could affect the security of both the United States and its allies. Indeed, in a recent report, the US Department of Defense (DoD) noted that financial distress or bankruptcy of a defense contractor along an important supply chain has the potential to disrupt the operations of the US armed forces.⁵ Moreover, private equity firms invest not only in arms and hardware manufacturers, but also in contractors that perform cyber operations, manage military logistics, and protect sensitive US government facilities abroad. Financial distress among such strategically important service providers could seriously affect US national security interests.

This is among the first inquiries to analyze the effects of private equity investment on the financial stability of the US defense industry. To gain theoretical leverage over this topic, the study draws on scholarship from three distinct fields. First, it engages with the literature from international political economy analyzing defense outsourcing.⁶ Second, the study applies theory from the field of corporate finance to analyze the effects of private equity investment on the financial stability of defense contractors.⁷ Finally, the study relates to research linking technological advancement within the US defense industrial base to ongoing security competition between countries.⁸ By drawing from and contributing to this diverse set of scholarship, this inquiry bridges gaps across academic disciplines among which there has been little previous dialogue.

The remainder of this study proceeds as follows: first, an overview of the private equity business model is presented along with competing assessments of the effects of private equity investment on companies. Next, the inquiry describes the growth of private equity investment in the US defense industry and highlights several unique properties of US defense markets. Subsequently, a statistical analysis of over 8,000 defense contractors demonstrates that private equity backing increases bankruptcy rates among contractors. A case study of the military satellite services market then identifies the processes linking private equity investment to higher rates of bankruptcy among defense contractors. Finally, the study concludes with policy recommendations and presents suggestions for future research.

The private equity business model

Private equity firms are investment management companies that pool capital from institutional investors and wealthy individuals and then use that capital primarily to acquire companies and other assets. The money raised by private equity firms is organized into individual funds, which operate outside the jurisdiction of public securities laws. Thus, private equity firms are not required to publicly disclose financial information about the companies they acquire. The owners of a private equity firm

⁴Data on private equity activity and bankruptcies in the U.S. defense industry were obtained from S&P Capital IQ and PitchBook.

⁵U.S. Department of Defense (2018).

⁶Gholz and Sapolsky (1999–2000); Singer (2003); Avant (2005); Krahnmann (2010); Cappella Zielinski (2016); Akcinaroglu and Radziszewski (2020); Gholz and Sapolsky (2021).

⁷Phalippou and Gottschal (2009); Harris et al. (2014); Buchner and Wagner (2017).

⁸Greenwalt (2019); Schmidt (2021).

are referred to as “general partners.” General partners are responsible for investing the capital raised in funds and for overseeing the operations of the companies that funds purchase. The investors in private equity funds are referred to as “limited partners.” After committing capital to a private equity fund, limited partners have little influence on the investment decisions made by general partners.

Private equity firms typically acquire established companies—as opposed to start-ups—and structure these acquisitions as leveraged buyouts.⁹ In a leveraged buyout, a private equity firm typically uses 60 to 90 percent debt capital to finance the acquisition of a company.¹⁰ Notably, the debt used to execute a leveraged buyout is placed on the acquired company’s balance sheet, and the acquired company is responsible for servicing this debt. Companies owned in-full or in-part by private equity firms are referred to as “portfolio companies.”¹¹ Following an acquisition, general partners seek to add value to a portfolio company through corporate reorganizing measures, cutting costs, and improving operations. This process usually occurs over 3 to 5 years. After reforms and reorganization are complete, a private equity firm seeks to make a return on its investment by selling the portfolio company. Sales of portfolio companies—often referred to as “exits”—generally are made to another company or to another private equity firm.¹² Consequently, private equity firms have a “buy to sell” business model: they purchase companies with the intent of selling them within a limited period.¹³

General partners earn money through a combination of management fees and performance fees. Management fees typically range from 1 to 2 percent of a fund’s total assets annually. Performance fees—often referred to as carried interest—typically consist of a payout of between 15 to 40 percent of a fund’s profits if a specified return threshold is met. Because carried interest is calculated based on a fund’s returns, general partners can increase their fees substantially by maximizing the use of debt when acquiring and managing companies.¹⁴ In addition to this performance fee structure, general partners face pressure from their investors to outperform public markets. Limited partners expect general partners to produce returns that beat Wall Street index funds.¹⁵ Funds that do not outperform public markets will face difficulty raising capital in future fundraising rounds. Taken together, these fee incentives and performance expectations incentivize general partners to assume higher levels of business and financial risk than the management at publicly traded corporations or traditional privately owned companies.¹⁶

Analysts disagree about the effects of private equity investment on the financial performance of portfolio companies. Some researchers argue that private equity firms make portfolio companies more efficient and profitable by implementing corporate governance reforms that better align the interests of ownership and management.¹⁷ Additionally, companies acquired by private equity firms may be better positioned to secure debt financing, which can enable them to increase investment in operations and equipment.¹⁸ Greater use of debt as part of portfolio companies’ capital structure is central to the private equity business model. Proponents of private equity assert that higher corporate debt levels have the effect of inhibiting wasteful spending. This “disciplining” role of debt pressures portfolio companies to use available capital for ventures that increase near-term corporate valuation rather than on more speculative projects.¹⁹

Analysts more skeptical of private equity ownership contend that it is associated with several adverse business outcomes. Most notably, companies acquired by private equity firms are likely to experience a significant increase in debt.²⁰ While supporters of private equity argue that debt has a disciplining effect on portfolio companies, critics of private equity maintain that higher leverage ratios cause portfolio

⁹This is in contrast to venture capital, which typically invests in start-up companies.

¹⁰Kaplan and Strömberg (2009). The debt capital used in leveraged buyouts is supplied to private equity firms by banks and other financial institutions.

¹¹Private equity firms often purchase companies outright; however, they occasionally take minority stakes in companies.

¹²Less frequently, private equity firms float portfolio company shares on public exchanges in initial public offerings.

¹³Barber and Goold (2007).

¹⁴Gilligan and Wright (2014).

¹⁵Hooke (2021).

¹⁶Gilligan and Wright (2014).

¹⁷Jensen (1989); Bernstein and Sheen (2016).

¹⁸Tyková (2018).

¹⁹Tyková and Borell (2012, p. 138).

²⁰Rasmussen (2018).

companies to become more susceptible to credit default.²¹ Importantly, these higher default rates do not occur because private equity firms habitually purchase distressed companies—this is a common misconception about the private equity industry.²² In fact, private equity firms generally acquire companies that have a relatively low risk of financial distress when compared to companies not purchased by private equity.²³ In addition to raising credit default risk, elevated debt loads caused by leveraged buyouts and consolidation activity may decrease portfolio companies' free cash flow—reducing access to capital that could be reinvested in business development.²⁴

In addition to negative business outcomes, private equity investment can have deleterious costs for both employees and consumers. For instance, studies examining private equity's effect on the quality of services provided by healthcare providers and for-profit colleges raise serious concerns. In the healthcare sector, research finds that costs for patients rise while the quality of care deteriorates at facilities owned by private equity firms.²⁵ Likewise, private equity-owned colleges are associated with lower graduation rates, higher tuition costs, higher student debt, and lower post-graduation salaries.²⁶ The effects of private equity investment on companies in the healthcare and for-profit education industries are useful for considering private equity activity in the US defense industry. In all three markets, the federal government intervenes heavily via subsidies or procurement. Meanwhile, the quality of goods and services produced by companies in these markets is difficult to measure.²⁷ Under such conditions, even strong proponents of the private equity model acknowledge that portfolio companies can “operate in a profit-maximizing way that, although compliant with laws and regulation, is not always what most of us would view as socially optimal.”²⁸

Private equity and the US defense industry

Figure 1 depicts trends in private equity investment in the US defense industry from 1990 to 2022. Before 2000, private equity firms carried out only a handful of annual deals in US defense markets.²⁹ In the mid 2000s, however, private equity acquisitions of defense contractors rose markedly. From 2004 to 2009, annual acquisitions occurred at a rate of 67 contractors per year, reaching a peak of 107 deals totaling \$18.2 billion in 2007. In the early 2010s, the Great Recession and federal budget sequestration slowed the pace of private equity deals marginally. However, between 2015 and 2022, private equity investment in the defense industry climbed again—averaging a total of 120 acquisitions annually. In recent years, private equity firms have accounted for over 40 percent of all acquisitions in the US defense industry, outpacing takeovers by both publicly traded corporations and traditional private companies.³⁰ Moreover, the dollar value of individual private equity deals in the defense industry has grown. Before 2010, private equity firms generally acquired small or mid-market defense contractors. Today, firms are involved in deals for all but the largest prime contractors. Notably, the median deal size for a private equity acquisition of a defense contractor was \$50 million in 2000. By 2022, that figure had risen to \$350 million.³¹ The acquisition of larger contractors signifies that private equity firms increasingly own companies that are critical to US defense operations.

Several factors have fueled private equity investment in the US defense industry. First, following the collapse of the dot-com bubble in the early 2000s, institutional investors turned to private equity funds to diversify their portfolios.³² This inflow of capital caused private equity to expand into new fields,

²¹Ayash and Rastad (2021).

²²Hooke (2021).

²³Tyková and Borell (2012, p. 139).

²⁴Rasmussen (2018).

²⁵Applebaum and Batt (2020); Gupta et al. (2021).

²⁶Eaton et al. (2020).

²⁷Gupta et al. (2021).

²⁸Brown et al. (2020, 12).

²⁹PitchBook (2022).

³⁰KPMG (2021a, 2021b). The Carlyle Group, Arlington Capital Partners, Veritas Capital, AE Industrial Partners, and Audax Group are among the most active private equity firms in the U.S. defense industry, each with over 30 acquisitions since 2000.

³¹PitchBook (2022).

³²Bain & Company (2010).

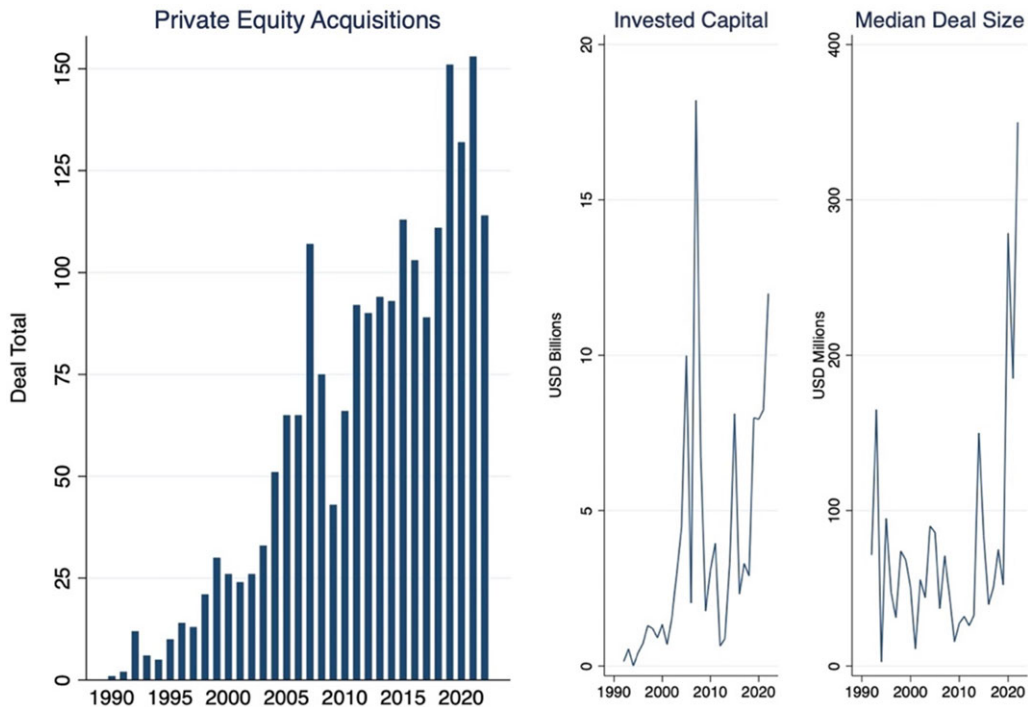


Figure 1. Private Equity Involvement in the US Defense Industry: 1990-2022.

including the American national security marketplace. Second, the US defense budget rose rapidly in the early 2000s following the 9/11 terror attacks and the onset of wars in Afghanistan and Iraq.³³ Growth in US defense outlays—after a decline in national security spending in the 1990s—suggested that the defense contractors’ financial prospects were likely to improve and thus prompted private equity investment.³⁴ Third, the US defense industry has experienced significant consolidation since the mid-2000s.³⁵ High industry consolidation rates transformed defense contractors into attractive takeover targets for private equity firms, which specialize in managing and extracting value from mergers and acquisitions.³⁶ Fourth, in recent years the DoD has solicited greater investment in the defense industry from US-based private capital.³⁷ Pentagon officials have pushed for greater US ownership of defense contractors due to industrial espionage concerns and strategic risks associated with dependencies on overseas suppliers.³⁸

The US defense industry is unique among the markets in which private equity firms operate. Unlike most other sectors of the economy, the federal government is the major source of demand in defense markets, and defense contractors are responsible for supporting government agencies as they provide the public good of national security.³⁹ Not only do contractors manufacture hardware and weapons, they also supply important elements of the national security work force. Among other duties, contractors carry out cyber operations, protect sensitive government facilities overseas, pilot drones, and analyze intelligence.⁴⁰ Indeed, 48 percent of US defense outsourcing funds were spent on services in

³³McCormick (2019); Carril and Duggan (2020).

³⁴Censer (2014).

³⁵Hensel (2010); Mahoney (2021).

³⁶DeSanto and Levey (2018).

³⁷U.S. Department of Defense (2022b).

³⁸Scissors (2019).

³⁹Gansler (2011).

⁴⁰Kinsey (2009); McFate (2014); Pattison (2020).

2020—roughly the same amount as on physical equipment.⁴¹ Projecting forward, the Pentagon increasingly views corporations as crucial to US national security operations. Innovations in the fields of artificial intelligence, autonomous systems, biotech, space technology, and quantum computing are concentrated in the private sector rather than in government laboratories. The DoD asserts that accessing and applying these technologies for defense-related missions is essential for the United States to maintain a strategic edge over its competitors.⁴²

Because defense contractors play a central role in US military operations, increased rates of financial distress in the defense industry could have serious national security repercussions.⁴³ For defense manufacturers, production of hardware is often part of a complex supply chain involving numerous companies responsible for producing critical components. Performance failure of any contractor in a strategically important production chain can disrupt the delivery of critical weapons and systems to the US armed forces.⁴⁴ Financial distress can also inhibit a company's ability to hire and retain the best personnel and to provide workers with necessary equipment and support.⁴⁵ The productivity loss from such personnel constraints may cause diminished contractor performance. Additionally, the national security vulnerabilities stemming from contractor financial distress could compel the US government to bail out contractors deemed essential to defense operations.⁴⁶ The US military's dependence on contractors coupled with the US government's significant financial resources thus create a significant degree of moral hazard within the defense industry.

Research design and empirical evaluation

We selected bankruptcy as the inquiry's dependent variable because it is an excellent proxy for corporate financial stability. It also acts as a summation of numerous other indicators of corporate financial health. Additionally, as the DoD has noted, bankruptcies among defense contractors have the potential to disrupt the operations of the US armed forces and the intelligence community.⁴⁷

We designed an empirical analysis to determine whether private equity backing of a defense contractor increases its likelihood of bankruptcy when compared to a contractor with no prior private equity investment. We theorize that private equity involvement increases the likelihood of bankruptcy among contractors because of debt loading, limited government and investor oversight of private equity firms, and incentives for general partners to adopt high-risk business strategies.⁴⁸ Our logistic regression models use cross-sectional data with an individual company as the unit of analysis. S&P Capital IQ provides the data for the analysis of 8,658 US defense sector companies founded between 1900 and 2020.⁴⁹ The dependent variable is bankruptcy, coded 1 when a company enters bankruptcy at any point in its history and 0 otherwise. Bankruptcy among defense contractors is a rare event. Since 1990, only 207 of 8,658 contractors have gone bankrupt as classified by Capital IQ. The approximately 2 percent of defense companies that filed for bankruptcy is consistent with other economic sectors including consumer staples (2.1 percent, 1,105/ 52,199) and energy (2.6 percent, 795/30,285). Many

⁴¹U.S. Government Accountability Office (2021).

⁴²U.S. Department of Defense (2022a).

⁴³Mahoney, Tkach, and Rethmeyer (2022)

⁴⁴U.S. Department of Defense (2018).

⁴⁵Baghai et al. (2021).

⁴⁶Erwin (2020b).

⁴⁷U.S. Department of Defense (2018).

⁴⁸As mentioned previously, private equity firms tend to acquire companies that are at a relatively low risk for financial distress. For this reason, we are confident that the private equity firms examined in this study did not aim to acquire an unusually high number of distressed defense contractors. See Tyková and Borell (2012).

⁴⁹We gathered data on companies classified by Capital IQ as operating in the "Aerospace & Defense" industry. Additionally, we confirmed that all companies included in the dataset had defense as a major component of their business, as classified by Capital IQ.

sectors experience lower levels of bankruptcy than defense, with some as low as 0.1 percent including banking, consumer discretionary, and information technology.⁵⁰

Bankruptcies in the defense industry are concentrated over time. All bankruptcies in the sample occurred after 1990, and only eight occurred prior to 2001. What accounts for this significant concentration? During the George W. Bush Administration from 2001 to 2009, a total of 117 bankruptcies occurred, accounting for 57 percent of all bankruptcies in our sample. Counterintuitively, the wars in Iraq and Afghanistan may have increased the likelihood of bankruptcy in the defense sector. While US defense spending accelerated to unprecedented levels during this period, companies may have experienced increased competition, shifting government priorities, and greater performance scrutiny. These factors—along with higher levels of private equity involvement—likely contributed to increased bankruptcy filings.

Our key explanatory variable is private equity backing, which captures current or past private equity investment in a company. *Private Equity* is coded 1 if at least one private equity firm invested in the company and 0 otherwise. We code private equity using Capital IQ's designations of prior investors for each company in the dataset. Companies may have 1 or dozens of prior investors including private equity firms, private companies, public companies, publicly traded companies' investment arms, or investment banks. If a company received an investment from an outside party that was not identified by Capital IQ as a private equity firm—for example a publicly traded company—we code the variable as 0. We generate a second variable, *PE Count*, which is the total number of private equity firms investing in an individual company. While the variable ranges from 0 to 52, two-thirds of the time either 1 or 2 private equity firms are engaged in the business.⁵¹ Capital IQ does not detail when an investment or ownership takeover by a private equity firm occurred, simply that it happened. Consequently, our sample measures whether a private equity firm invested in a company and how many private equity firms were active in each company.

We control if a company was ever publicly traded. *Publicly Traded* is coded 1 if a company was ever listed on a US stock exchange and not previously owned by a private equity firm and 0 otherwise. In some cases, a company may move between public ownership and traditional private corporate ownership structure. In these cases, we code the company as having been publicly traded. As mentioned previously, publicly traded companies have different financial disclosure laws than privately held companies. This may increase corporate accountability and impact company business strategy.⁵²

We also control for *Employees*, which we measure as the most recent logged total number of global employees listed in Capital IQ. The number of employees is a proxy for company size. While other business characteristics such as profits, profit margins, revenue, free cash flow, and debt are superior approximations of a company's size, these measures are not available for most privately held companies. The total number of employees approximates a company's size, which affects a company's ability to compete for contract awards, engage in mergers and acquisitions, raise capital, and conduct a host of other business practices. Capital IQ includes employee totals for publicly traded companies as well as thousands of privately held companies. We acknowledge that employee totals, however, are inconsistently coded. We reviewed all privately held companies in the data and could not verify a pattern for when employee totals are included or excluded by Capital IQ. Consequently, this variable may overrepresent publicly traded companies based on a percentage basis. The variable includes employee totals for 193 of 212 publicly traded companies (91 percent) while including 4,602 of 8,405 (55 percent) of privately held company employee totals. We argue the large number of employee totals from privately held companies is sufficient to warrant inclusion in the analysis.

We also control for *Business Duration*, which is the logged total number of years since a company's founding. Capital IQ lists the founding year of 6,679 companies. In cases of mergers or acquisitions, we utilized Capital IQ's coding for year founded. When a parent company merges or acquires another company, the original founding date is included in the dataset. For example, Lockheed Martin is listed as founded in 1912 despite completing many merges and acquisitions over the years, notably with

⁵⁰A company that enters bankruptcy and reemerges into the market after bankruptcy is considered bankrupt for the purposes of our study.

⁵¹The maximum number of private equity firms involved with a company was 52.

⁵²Akcinaroglu and Radziszewski (2020); Tkach (2019).

Table 1. Cross-tabulation of private equity involvement and bankruptcy

<i>Bankrupt</i>	<i>Private Equity</i>		Total
	0	1	
0	6,447 (98.0%)	1,963 (96.3%)	8410
1	132 (2.0%)	75 (3.7%)	207
Total	6,579	2,038	8,617 (100%)
$\chi^2 = 18.6$			

Martin Marietta in 1995. Young and old companies alike go bankrupt, but frequently for different reasons. Prior research suggests that young companies often fail due to internal shortcomings in management and leadership, while older companies are less likely to adapt to market changes and are less discerning when making mergers and acquisitions.⁵³

Finally, we control for when a defense contractor is *Restructuring*. Restructuring is a reorganization of a company's finances or operations outside of bankruptcy protection but typically under financial distress. Conceptually, restructuring is a pre-bankruptcy step that companies utilize to improve solvency by addressing financial, leadership, product, or other company characteristics that inhibit profitability. Consequently, we expect restructuring to have a substantively large effect on the likelihood of bankruptcy. Restructuring, however, is not a guarantee a company goes bankrupt or is acquired, as companies sometimes do successfully restructure and continue to generate profits. The dependent variable *Bankrupt* and explanatory variable *Restructuring* are weakly correlated (0.23). We rely on Capital IQ's coding of the company category—restructuring—to code if a company entered restructuring in the past. Restructuring, like bankruptcy, is a rare event only occurring 46 times in our sample. Because our dataset is cross-sectional, we cannot verify when a company entered restructuring or the duration of restructuring.

Table 1 is the cross-tabulation of the effects of private equity involvement and company bankruptcy in the defense sector. The dependent variable *Bankrupt* is the row variable, and the explanatory variable *Private Equity* is the column variable. The column percentages are provided. Direct tests of association are beneficial for initial examination of the relationship between the categorical variables. The Pearson Chi-square value ($\chi^2 = 18.59, p < 0.001$) demonstrates that a relationship does exist. The gamma value of 0.30, where 1 is perfect positive correlation and -1 is perfect negative correlation with asymptotic standard error of 0.07, demonstrates a positive correlation and requires further investigation.

Table 2 contains the logistic regression results of private equity companies' effect on bankruptcy of defense firms.⁵⁴ Model 1 is the bivariate regression and is included because it encompasses all 8,617 companies in the sample. The results support our hypothesis as *Private Equity* is positive and statistically significant ($p < .001$). Model 2 includes controls for public companies, employees, business duration, and company restructuring. The results for *Private Equity* are consistent with model 1. Substantively, moving from no private equity investment to at least one investor increases the likelihood

⁵³Kucher et al. (2020); Thornhill and Amit (2003); Loderer et al. (2011).

⁵⁴Logistic regression may suffer bias in small samples or when one of the two dichotomous categories has few events. In the Capital IQ sample, bankruptcy only occurred 2.4 percent of the time which may generate bias estimates. We utilize rare events logit (King and Zeng 2001) and Firth's penalized maximum likelihood estimator (Rainey and McCaskey 2021) to account for this potentiality. The results are available in the online appendix and are substantively consistent. Prior private equity involvement increases the likelihood of bankruptcy across model specifications.

Table 2. The effects of prior PE involvement on bankruptcy

	Capital IQ Dataset (Models 1-4)				PitchBook Dataset (Models 5-6)	
	1	2	3	4	5	6
<i>Private Equity</i>	0.624** (0.147)	1.300** (0.212)	1.272** (0.213)		1.287** (0.149)	1.822** (0.229)
<i>Public</i>		0.014 (0.400)	0.098 (0.400)	0.319 (0.426)		-0.258 (0.516)
<i>Employee</i>		-0.055 (0.057)	-0.062 (0.057)	-0.031 (0.057)		-0.341** (0.065)
<i>Business Duration</i>		0.192 (0.166)	0.166 (0.165)	0.218 (0.167)		-0.201 (0.102)
<i>Restructuring</i>			2.724** (0.568)	2.858** (0.548)		
<i>PE Count</i>				0.064** (0.019)		
<i>Constant</i>	-3.889** (0.088)	-4.656** (0.608)	-4.563** (0.603)	-4.493** (0.609)	-3.758** (0.063)	-2.159** (0.285)
Observations	8,617	4,280	4,280	4,277	12,041	5,298
Standard errors in parentheses						
* $p < 0.05$, ** $p < 0.01$						

of bankruptcy by about 4 percent for a contractor. In the defense industry, a 4 percent increase in the likelihood of bankruptcy represents a substantial rise in risk. Bankruptcy is a low probability but high impact event with potential disruptive consequences for the US armed forces. Therefore, an increase in the probability of bankruptcy among defense contractors with private equity backing is cause for concern.

Model 3 uses *PE Count* to operationalize our key concept. The results support our hypothesis as *PE Count* is positive and statistically significant. Notably, the substantive effects suggest that increases in the number of private equity firms investing in a contractor are not as significant as distinguishing between the presence or absence of private equity firm involvement. For example, when other variables are at their appropriate mean or mode, shifting the *PE Count* from 0 to 1 private equity firm increases the likelihood of bankruptcy by 2 percent. Shifting the variable from 0 to 52 private equity firms involved with a company increases the likelihood of bankruptcy by approximately 4 percent. Thus, we find consistent empirical support that private equity firm investment in a defense contractor increases its likelihood of bankruptcy.

Turning to the control variables from Model 2, predicting an individual bankruptcy filing appears difficult. The lack of empirical findings for *Public*, *Employee*, and *Business Duration* suggest that bankruptcy is more about a business's management than what is captured by these variables. The literature has explored dozens of variables predicting bankruptcies across multiple estimation strategies and found that a company's financials and market position are better predictors of bankruptcy than

company age, though age does have some predictive capability in the models.⁵⁵ Total employees—the approximation for company size—is limited in its utility as size is not the predominate determinate of bankruptcy for large or small firms. Finally, publicly traded companies and privately held companies do not affect bankruptcy rates, which is similar to other sectors of the economy. The lack of finding here suggests that the defense sector is consistent with these previous findings.⁵⁶

As expected, the control variable *Restructuring* is positive and statistically significant. This result captures the effects of a company reorganizing its finances or operations to improve financial solvency when the company is under duress. Formal restructuring is infrequent—Capital IQ only identifies 46 companies that entered restructuring.⁵⁷ Substantively, a company that enters restructuring is about 22 percent more likely to go bankrupt than a company that does not undergo restructuring. We posit that restructuring that adds debt to corporate balance sheets or shifts capital away from productive investment increases the likelihood of bankruptcy for a contractor.

We conducted additional robustness tests using a second defense industry sample from PitchBook, a data analytics company that collects information on public and private capital markets. PitchBook identified over 12,000 companies operating in the US defense sector founded between 1900 and 2020.⁵⁸ PitchBook's database includes companies that entered bankruptcy, allowing us to construct our dichotomous dependent variable. We also coded our key theoretical variable—*Private Equity* using the same criteria and coding scheme as in the prior analysis. Similarly, we constructed our control variables *Public*, *Employee*, and *Business Duration* using the same operationalizations as our primary analysis. Models 5 and 6 contain the empirical results. We find results consistent with our prior models, as former private equity involvement is associated with a statistically significant increase in the likelihood of bankruptcy. Substantively, using Model 6, we find that private equity involvement with a defense company increases the likelihood of bankruptcy by approximately 9 percent, nearly double the effect found when using data from Capital IQ. While the consistent empirical result adds additional confidence to our main analysis, there are two reasons to be cautious about the effect size. First, Pitchbook's conceptualization of the defense sector is broad, which adds thousands of additional companies to the analysis. Second, Pitchbook does not include whether a company enters restructuring or other forms of pre-bankruptcy financial distress. Nonetheless, the additional results are consistent with our expectations and provide supporting evidence that private equity investment in defense contractors increases their likelihood of bankruptcy.

Case studies: Private equity and the US military satellite services market

This section examines the business histories of Intelsat and SES—two satellite services providers integral to US military operations—to identify the process linking private equity investment to increased rates of bankruptcy in the US defense industry.⁵⁹ Intelsat and SES were selected for comparison for several reasons. First, the companies are competitors, roughly the same size in terms of corporate valuation, and occupy leading positions within the global satellite marketplace. Therefore, numerous market-level factors affecting their respective business performances can be held constant during the period under examination. Second, the companies display variation on the inquiry's explanatory variable of ownership type. SES has been a publicly traded company since 1998, while Intelsat was acquired by a consortium of

⁵⁵Jones (2017).

⁵⁶We utilized a second coding scheme for the *Public* variable that includes all subsidiaries of a publicly traded company. Capital IQ's classification system only lists the parent company as publicly traded. Our results are substantively similar using the expanded variable operationalization.

⁵⁷Distressed corporate restructurings are often private agreements between lenders and borrowers and thus are not covered by the media. For this reason, Capital IQ likely underreports the total number of distressed restructurings.

⁵⁸The difference in the total number of defense contractors identified by PitchBook and Capital IQ occurs because each dataset uses a distinct company categorization scheme. In PitchBook, we used companies classified as operating in the "Aerospace & Defense" industry or in the "Military" industry. The additional category "Military" was available in PitchBook but not in Capital IQ.

⁵⁹For more on the use of case studies to identify mechanisms linking explanatory and dependent variables see Bennett and Checkel (2015).

private equity firms in 2004 and was then sold to another private equity firm in 2007. Third, the companies vary on the study's dependent variable of bankruptcy: Intelsat filed for bankruptcy in 2020 while SES has never gone bankrupt and was at relatively low risk of credit default between 2000 and 2022. Finally, both companies operate in a market of significant strategic importance to the US military. For decades, the DoD has depended on commercial satellite companies for communications services, navigation assistance, reconnaissance, mapping, precision munition guidance, and monitoring foreign missile launches.⁶⁰ Therefore, the military satellite services market is vital to US national security interests, and bankruptcy at a major satellite services provider represents a serious security concern.

To measure the comparative financial stability of Intelsat and SES over time, the case studies track two metrics that serve as indicators of bankruptcy risk: corporate credit ratings and company debt-to-EBITDA ratios. Credit ratings are assessments made by financial institutions about a company's ability to meet its debt obligations. This inquiry primarily uses credit ratings issued by Moody's—a leading credit ratings agency—which has developed a 21-tier credit scale ranging from Aaa to C. Moody's ratings between Aaa and Baa3 are considered "investment grade" and are characterized by low to moderate credit default risk. Credit ratings between Ba1 and C are categorized as "non-investment grade" and carry a higher probability of default.⁶¹ In addition to credit ratings, the case studies also rely on changing debt-to-EBITDA ratios to gauge bankruptcy risk. Earnings before interest, taxes, depreciation and amortization (EBITDA) is a metric used by many financial analysts as a measure of a company's cash flow.⁶² According to Moody's, in the defense industry a corporate debt-to-EBITDA ratio between 0x and 2.0x is considered low risk for credit default while a ratio of 2.0x to 3.0x is considered moderately risky. Contractors with debt-to-EBITDA ratios above 3.0x are judged to be at substantial risk, while a ratio above 6.0x is an indicator of very high risk for credit default.⁶³

The case studies provide evidence that defense contractors with private equity backing are more likely to experience bankruptcy because private equity firms are willing to accept greater levels of risk—primarily in the form of financial leverage—than management at publicly traded companies. Indeed, in several annual reports, SES affirmed that it was committed to administering its debt position carefully so that it could maintain an investment grade credit rating.⁶⁴ SES' executives publicly expressed this position to assure investors that the company was managing its capital structure sustainably while still pursuing growth opportunities. Conversely, even when Intelsat's credit was at a non-investment grade level, the company's private equity owners pursued policies that added significant debt to Intelsat's balance sheet. Intelsat's owners adopted this debt-driven approach to expansion in an effort to realize a very high return on investment within a relatively short time period. Ultimately, this risky business strategy backfired, and Intelsat became so overleveraged that it was eventually forced to file for bankruptcy.

Intelsat: Stratospheric leverage

Intelsat is a satellite services company with a long history of providing communications, surveillance, and video services to the US armed forces, intelligence community, and defense industrial base. During the Gulf War, for example, roughly 25 percent of the DoD's satellite communications traffic was handled by Intelsat.⁶⁵ In the 2000s, US soldiers operating in Iraq and Afghanistan relied heavily on Intelsat satellites for strategic telephony and video communications.⁶⁶ During these conflicts, Intelsat was the major commercial satellite communications provider to US Central Command (CENTCOM), providing CENTCOM with intelligence, surveillance, and reconnaissance services. More recently, Intelsat has

⁶⁰U.S. Government Accountability Office (2018). Contractors supply approximately 40 percent of the DoD's annual satellite communications services.

⁶¹Non-investment grade corporate debt is commonly referred to as "junk bonds" or "high yield debt."

⁶²Moody's (2018a).

⁶³Ibid.

⁶⁴SES (2009); SES (2010).

⁶⁵Walker and Hooper (1999).

⁶⁶U.S. Government Accountability Office (2011).

expanded its capabilities to include broadband network access to unmanned aerial vehicles (UAVs), which send surveillance footage from remote locations to US military and intelligence agencies.⁶⁷

Intelsat was originally formed in 1964 by international treaty and functioned for decades as an international organization responsible for providing satellite communications services to over 125 member countries.⁶⁸ For two decades after its formation, Intelsat was the primary provider to the US government of international video transmission signals.⁶⁹ By the mid-1980s, however, commercial satellite companies began to lobby for Intelsat's privatization, arguing that Intelsat benefitted competitively from its status as an international organization.⁷⁰ In the 1990s, the Clinton administration advocated for Intelsat's privatization, arguing in a White House paper that satellite services should be provided by competitive private entities wherever possible.⁷¹ Ultimately, in 2001, Intelsat was privatized by the US Congress through the Open-Market Reorganization for the Betterment of Telecommunications (ORBIT) Act, a law intended to promote a more competitive global satellite marketplace.⁷²

Intelsat was in a strong financial position upon its privatization, with annual earnings of \$505 million on revenue of \$1.1 billion.⁷³ The company's reputation as a superior provider of satellite communication services was also excellent, with one financial analyst noting that "they [Intelsat] are the gold standard for operating a fleet."⁷⁴ Moreover, US government demand for satellite services rose rapidly in the early 2000s as the DoD increasingly turned to commercial providers to supplement limited government satellite capacity.⁷⁵ The wars in Iraq and Afghanistan represented a windfall for satellite companies, which provided US soldiers in these countries with network connectivity and other communications services. As a former intergovernmental organization with existing ties to the DoD, Intelsat was ideally poised to take advantage of what Intelsat's president characterized as the Pentagon's "insatiable demand" for bandwidth in the Middle East.⁷⁶

In the mid-2000s, as the need for satellite services grew, Intelsat's shareholders considered several options for the company's future. According to a provision of the 2001 Orbit Act, Intelsat eventually was expected to have an initial public offering (IPO) and become a publicly traded company.⁷⁷ However, rather than go public, in 2004 Intelsat's shareholders chose to sell the company to four private equity firms: Apax Partners, Apollo Global Management, Madison Dearborn Partners, and Permira Advisors. The firms agreed to acquire Intelsat in a leveraged buyout for \$3 billion and to govern Intelsat collectively via a consortium known as Zeus Holdings Limited.

Intelsat's acquisition by Zeus Holdings had a rapid and significant effect on the company's financial stability. In January 2005, Moody's downgraded Intelsat's credit rating to B1—indicating that the company was at high risk of a negative credit event—and noted that the buyout resulted in "significant leveraging of Intelsat's capital structure."⁷⁸ As a result of the acquisition, Intelsat would be responsible for servicing an additional \$2.5 billion in debt.⁷⁹ Moreover, shortly after the deal closed, Zeus Holdings directed Intelsat to issue a \$350 million special dividend back to Zeus Holdings itself—adding additional debt to Intelsat's balance sheet.⁸⁰ As a result of this dividend—paid for with money borrowed by Intelsat—Moody's downgraded the company's credit rating from B1 to B2 and noted that Intelsat's new private equity owners appeared "inclined to aggressively use leverage for financial rather than business purposes."⁸¹

⁶⁷Erwin (2020a).

⁶⁸Stiglitz et al. (1995).

⁶⁹U.S. Government Accountability Office (2004a).

⁷⁰U.S. Government Accountability Office (2004b).

⁷¹Stiglitz et al. (1995).

⁷²U.S. Government Accountability Office (2004a).

⁷³Kurtin (2021).

⁷⁴Feder (2001).

⁷⁵Merle (2002).

⁷⁶Hubler (2009).

⁷⁷U.S. Government Accountability Office (2004a).

⁷⁸Moody's (2005a).

⁷⁹Ibid.

⁸⁰Berman et al. (2007). This type of special dividend is referred to as a "dividend recapitalization."

⁸¹Moody's (2005b).

Despite Intelsat's highly levered position, in 2006 Zeus Holdings directed Intelsat to acquire PanAmSat—another major satellite services provider—in a \$3.2 billion acquisition funded almost entirely with debt.⁸² Intelsat agreed to buy PanAmSat for a twenty-five percent premium to its listed share price on the New York Stock Exchange and assumed PanAmSat's existing debt, which stood at \$3.2 billion.⁸³ On the positive side for Intelsat, the consolidation nearly doubled the size of its satellite fleet, making it the largest satellite services provider in the world. The acquisition also allowed Intelsat to expand beyond its core government clients and into the commercial satellite television industry. Despite these synergies, the PanAmSat acquisition put even more pressure on Intelsat's already strained capital structure—causing Intelsat's debt to rise from \$4.8 billion to over \$11 billion.⁸⁴

In 2007, after closure of the PanAmSat deal, Zeus Holdings arranged to sell Intelsat to BC Partners, a British private equity firm. BC Partners agreed to purchase Intelsat in a \$4.6 billion leveraged buyout while also assuming Intelsat's existing \$11.4 billion in debt.⁸⁵ According to Moody's, the acquisition by BC Partners increased Intelsat's debt burden by 33 percent while offering Intelsat “no change to expectations of cash generation.”⁸⁶ In other words, significant leverage was added to Intelsat's balance sheet solely as a result of the ownership change while simultaneously contributing no strategic benefit to Intelsat's business. The sizeable increase in Intelsat's debt caused by this transaction prompted Moody's to lower Intelsat's credit rating by two steps to Caa1—a classification indicating very high credit risk—and prompted Moody's to openly question whether Intelsat would be able to meet its “substantial” interest burden, capital expenditures, and tax obligations.⁸⁷

In addition to incurring debt through BC Partners' leveraged buyout, Intelsat's capital structure was further burdened with debt as the result of fees charged by BC Partners. In particular, one of BC Partners' fees, the 2008 Monitoring Fee Agreement, stipulated that BC Partners would receive 1.25% of Intelsat's adjusted EBITDA.⁸⁸ Based on this fee structure, BC Partners' general partners would be compensated regardless of whether Intelsat improved its net income or cash flow. Indeed, BC Partners and other minority share owners received total transaction and monitoring fees of approximately \$200 million prior to 2013, including a \$60 million acquisition fee charged for purchasing Intelsat in 2008.⁸⁹ BC Partners was therefore sizably compensated for its management of Intelsat even though Intelsat would eventually file for bankruptcy.

After going through two leveraged buyouts in four years and also acquiring PanAmSat, Intelsat faced challenges not only to servicing its debt, but also to making capital expenditures essential to maintaining a competitive position in the satellite services market. By 2009, Intelsat was cash flow negative, with 50 percent of the company's revenue stream used to pay off the interest on its debt.⁹⁰ At the same time, Intelsat needed to replenish a fifth of its aging satellite fleet due to depreciation.⁹¹ To rebuild its fleet, Intelsat estimated it would need capital outlays of approximately \$500 million a year through 2013—a considerable sum given the company's debt load and negative cash flow.⁹² By 2011, Intelsat's projected capital expenditures coupled with its annual interest expenses of \$1.4 billion led Moody's to conclude that the “company's capital structure may not be sustainable over a prolonged period.”⁹³

In 2013, BC Partners opted to float 20 percent of Intelsat's equity in an IPO.⁹⁴ IPOs are typically signs of corporate strength intended to raise capital for future business expenditures. In this instance,

⁸²PitchBook (2022).

⁸³Sorkin and Belson (2005).

⁸⁴Berman et al. (2007).

⁸⁵Goldfarb and Davies (2007).

⁸⁶Moody's (2007a).

⁸⁷Moody's (2008a).

⁸⁸Intelsat (2012).

⁸⁹Ibid.

⁹⁰Moody's (2009).

⁹¹The lifespan of a typical geosynchronous orbit satellite is 15 years.

⁹²Moody's (2010a).

⁹³Moody's (2011).

⁹⁴Following the IPO, BC Partners remained Intelsat's controlling owner.

however, Intelsat chose to sell a portion of its shares on public markets to raise capital to pay down debt. Intelsat initially hoped to raise \$1.75 billion through the IPO. Ultimately, the IPO raised just \$347.8 million—a total well below expectations that would do little to help service the company’s \$15.9 billion in outstanding debt obligations. Following the offering, several financial analysts noted that Intelsat’s substantial debt—caused by leveraged buyouts and acquisitions—served as a serious impediment to the company’s future business prospects. One analyst observed that “the level of [Intelsat’s] debt is bordering on insanity.”⁹⁵

In 2013, Intelsat’s government business division began experiencing revenue declines due to budget sequestration and the drawdown of US troops in the Middle East. This business slowdown caused Intelsat’s total revenue to fall by 5 percent in 2014 and by an additional 4 percent in 2015. These modest revenue declines placed extreme financial pressure on Intelsat, which needed to spend over \$500 million annually on new satellites while also servicing its heavy debt load. In 2016, citing high leverage and deteriorating market conditions, Moody’s lowered Intelsat’s credit rating to Caa2, indicating that Intelsat’s debt obligations were highly speculative and very near default.⁹⁶ As a result of its unstable financial position, Intelsat hired the investment bank Guggenheim Securities to explore options for Intelsat to refinance or restructure its debt.

At the advising of Guggenheim Securities, in February 2017, Intelsat announced its intention to merge with OneWeb—a start-up satellite company with significant venture capital backing. The consolidation would have allowed Intelsat to pay down a sizeable amount of its outstanding debt. Execution of the merger, however, was contingent on Intelsat’s creditors accepting less than the principal value of their bonds.⁹⁷ Ultimately, the deal was abandoned because Intelsat’s creditors would not accept OneWeb’s merger offer. The deal’s collapse represented a devastating blow to Intelsat, which now had little prospect of easing its debt load.

In 2020, Intelsat filed for Chapter 11 bankruptcy protection after defaulting on its debt payments. In a statement, Intelsat’s CEO cited the burden of “legacy debt” as the primary source of Intelsat’s insolvency.⁹⁸ While the bankruptcy did not immediately affect Intelsat’s military support operations, there were concerns that Intelsat’s financial distress could lead to national security challenges. Following the bankruptcy, Will Roper—the US Air Force Assistant Secretary for Acquisition, Technology, and Logistics—acknowledged that US adversaries could seek to take advantage of Intelsat’s unstable position: “with companies coming under duress, it is an opportunity for predatorial tactics.”⁹⁹ While Roper indicated that the United States would not bail out Intelsat, he confirmed that the U.S could be forced to rescue distressed contractors in the future to avoid adversaries’ efforts to acquire contractors’ intellectual property.¹⁰⁰

To summarize, between 2004 and 2008, Intelsat went from being a stable company with \$2 billion in revenues and \$1 billion in earnings annually to a distressed corporation with nearly \$15 billion in debt.¹⁰¹ Intelsat’s financial distress did not arise from a major downturn in the satellite services market. On the contrary, in the 2000s the demand for satellite bandwidth was strong—especially from the DoD and other U.S national security agencies. Even after budget sequestration in 2011, the satellite services market grew at a modest compounded annual rate of 1.17 percent. Rather than a broad market downturn, Intelsat’s private equity owners caused the company’s insolvency via two leveraged buyouts, a debt-funded acquisition, management fees, and a debt-funded dividend.¹⁰² Intelsat’s financial distress also reduced the company’s ability to use capital for business investment, as evidenced by Intelsat’s struggle to expand and modernize its fleet.¹⁰³

⁹⁵Oran (2013).

⁹⁶Moody’s (2016a, 2016b).

⁹⁷Kharif et al. (2017).

⁹⁸Wiggins and Fontanella-Khan (2020).

⁹⁹Strout and Insinna (2020).

¹⁰⁰Erwin (2020b).

¹⁰¹Kurtin (2021).

¹⁰²After emerging from bankruptcy in 2022, Intelsat retained \$7 billion of debt on its balance sheet and presently has a non-investment grade credit rating.

¹⁰³While under private equity ownership, Intelsat’s satellite fleet diminished in size from 54 satellites to 45 satellites.

SES: Leverage with limits

SES is a publicly traded, satellite services company based in Luxembourg. Although headquartered outside the United States, SES does extensive business with American defense agencies and earned \$500 million in US government contracts in 2022.¹⁰⁴ The US Navy depends on SES satellites for ship-to-ship and ship-to-shore communications. Similarly, the US Air Force relies on SES to ensure that its weapons systems and command centers can share data across expansive distances. The US Army is a long-time SES customer and uses SES satellites to provide network access to soldiers operating on the battlefield and in remote areas. SES is also active in the drone market, an area of increasing importance for military surveillance operations.¹⁰⁵

SES was founded in 1985 and went public via an IPO on the London Stock Exchange in 1998. In its formative years, the company primarily focused on expanding within the commercial European satellite market. In the early 2000s, however, the global deregulation of the satellite industry and increasing demand for satellite services from both commercial and government customers prompted SES to embark on a strategic growth plan. Like Intelsat's management, SES' leadership recognized the business potential of consolidating the congested satellite communications marketplace. SES' growth strategy, however, was more measured than Intelsat's approach to consolidation. As a publicly traded company, SES was constrained from taking on excessive debt by public market mechanisms, such as shareholder and analysts' sentiment. Indeed, in its annual reports SES acknowledged that the company's policy was to grow via strategic acquisitions while retaining an investment grade credit rating in order to preserve investor confidence in the company.¹⁰⁶

In 2001, SES made its first major acquisition in the US satellite market by purchasing GE Americom for \$5 billion. The acquisition added sixteen new satellites to SES' fleet and provided SES with a foothold in the US government satellite market. Notably, SES funded almost a quarter of the GE Americom deal with its own equity in the form of stock.¹⁰⁷ Following the acquisition, Moody's issued a Baa2 credit rating for SES, signifying that the company's debt obligations were investment grade—although still characterized by moderate default risk. Although Moody's noted that the acquisition of GE Americom would add to SES' debt load—causing the company to reach a 3.3x debt/EBITDA ratio—Moody's also remarked that the company was committed to managing its future debt position carefully.¹⁰⁸ In comparison to SES, Intelsat's debt-to-EBITDA ratio increased to 7.6x following its comparable \$3.2 billion acquisition of PanAmSat.¹⁰⁹

In 2005, SES made another strategic acquisition with the \$1.1 billion purchase of New Skies Satellites. At the time of this acquisition, New Skies was the fifth largest satellite provider in the world with significant coverage in the Middle East and Africa. Notably, New Skies also was an experienced government services provider with a history of handling military communications. SES used bond issuances and debt available from revolving lines of credit to make the acquisition. Following the purchase, Moody's maintained SES' credit rating at Baa2 and noted that while the deal was strategically sound, it would also increase SES' credit risk—signifying that the company would need to cautiously manage its capital structure going forward. Specifically, Moody's counseled that SES should maintain a debt-to-EBITDA ratio of under 3.5x to avoid a possible credit downgrade. In the years following the New Skies acquisition, SES adhered to Moody's guidance and judiciously managed its debt position, sustaining a debt-to-EBITDA ratio under 3.0x through 2008.¹¹⁰ In its annual reports, SES pledged that it would keep its debt at manageable levels.¹¹¹ By making these public commitments, SES signaled to investors that the company would not adopt riskier approaches to growth.

¹⁰⁴Wilkens (2022).

¹⁰⁵SES (2023).

¹⁰⁶SES (2009); SES (2010).

¹⁰⁷General Electric, the previous owner of GE American, received a 25 percent ownership stake in SES as part of the deal.

¹⁰⁸Moody's (2001).

¹⁰⁹Moody's (2007a, 2007b).

¹¹⁰SES (2006); SES (2007); SES (2008).

¹¹¹*Ibid.*

By 2009, SES and Intelsat had emerged as the two largest companies in the global satellite industry. While both companies had engaged in strategic acquisitions to consolidate market share in the 2000s, they possessed very different capital structures. By 2009, Intelsat's debt-to-EBITDA ratio was 10.3x, while SES' stood at just 3.0x. Thus, while the companies were peers in terms of scale, SES was at low risk of bankruptcy and possessed steady cash flow that could be reinvested into upgrading its satellite fleet. Conversely, Intelsat's risky approach to growth left the company at high risk of credit default and with little available cash for capital expenditures. Intelsat's cash-strapped position did not go unnoticed by SES executives, who viewed their rival's leverage ratios as a liability that could be exploited competitively.¹¹² Indeed, in 2009 SES' CEO noted that "Intelsat is today capital constrained because of its LBOs," a situation that SES' management believed would enable it to outcompete Intelsat in several regions around the world.¹¹³

In 2010, SES embarked on a round of capital expenditures to upgrade its satellite fleet. The company's careful debt management over the previous decade allowed it to invest in this new hardware without significantly raising its risk of credit default.¹¹⁴ By 2013, SES was able to launch four new satellites into orbit, bringing the size of its fleet to 55. SES' growing satellite fleet allowed it to meet increasing global demand, and in 2014 SES surpassed Intelsat as the largest fixed satellite services provider in the world by total revenue. From 2013 to 2016, SES continued deploying much of its available capital to upgrading its fleet, launching four more satellites during this period and solidifying its position as the world's leading satellite services company.

In 2016, having completed several years of major spending on hardware upgrades, SES returned its strategic focus to acquisitions. SES' new takeover target was O3b, a medium earth orbit satellite company specializing in providing US defense agencies with broadband connectivity in remote areas. The low latency levels and high transmission speeds on O3b's 12 satellites made the company a competitive provider to the US military. Between 2009 and 2015, SES gradually had acquired a stake in O3b. In 2016, however, SES moved to take a controlling interest in the company by purchasing the remainder of O3b's shares for \$710 million. Assessing the takeover, Moody's commended the "cautious and gradual" strategy SES used to purchase O3b shares over several years. Moody's noted that SES' deliberate approach to the acquisition would enable the company to maintain a "strong liquidity profile" going forward.¹¹⁵ In 2018, O3b was awarded a \$500 million contract from the DoD, providing substantial returns for SES following the acquisition.

After upgrading its satellite fleet and acquiring O3b, SES' business with the US military grew rapidly. Between 2017 and 2022, SES' revenue from defense contracts rose by 30 percent and the company identified future work with the US defense sector as a key strategic growth area. Major contracts during this period included awards from US Africa Command, United States Army Intelligence and Security Command, and the US Air Force. To make further inroads with the Pentagon, in 2022, SES announced that it would acquire the satellite communications division of defense contractor Leonardo DRS for \$450 million. The deal was projected to double the value of SES' US government business, bringing the company's annual revenue from US contract awards to more than \$500 million.

In summary, in 2000, SES initiated a business expansion plan that involved making both strategic acquisitions and significant capital expenditures on hardware. Throughout the duration of this twenty-year expansion—which saw SES surpass Intelsat as the largest commercial satellite services provider in the world—the company maintained an investment grade credit rating. Therefore, despite pursuing an ambitious growth strategy, SES was able to carefully manage its capital structure to ensure that it faced a low risk of credit default or bankruptcy. The primary explanation for SES' pragmatic approach to growth was its ownership type. As a publicly traded company, SES was subject to significant oversight and financial transparency regulations that functioned to restrain its management from taking on excessive debt. Had SES pursued a high-risk approach to growth—like its rival Intelsat—the company

¹¹²de Selding (2009).

¹¹³*Ibid.*

¹¹⁴Moody's (2010b).

¹¹⁵Moody's (2016b).

likely would have faced swift and significant repercussions including a drop in share price, negative coverage from financial analysts, and criticism from shareholders. Despite being restricted in the levels of financial risk it could adopt, SES thrived. The company was able to make several major strategic acquisitions that helped it consolidate and expand market share while also modernizing its satellite fleet through capital investments. By managing its debt load carefully—and thus avoiding financial distress—SES became a leading global provider of satellite communications services as well as a leading supplier of these services to the US military.

Conclusion

Over the previous two decades, private equity firms have emerged as major investors in the US defense industry. This inquiry presents strong evidence that defense contractors with private equity backing are more likely to enter bankruptcy than defense contractors with no prior private equity investment. Bankruptcy rates are higher among contractors with private equity backing because private equity firms are incentivized to adopt high-risk business and financial strategies—especially when it comes to the use of debt capital—while facing comparatively little investor oversight and government regulation of their activities. An increased risk of financial distress within the US defense industrial base represents a serious security concern. The American military relies on defense contractors to produce sophisticated weapons and to supply the armed forces a wide range of critical services. This makes contractors vital not only to US military and intelligence operations, but also to the security of American allies and partners. Therefore, bankruptcy at a strategically important defense manufacturer or service provider can damage US national security interests.

Several questions related to private equity investment in the US defense industry remain open for future investigation. First, while this inquiry provides evidence of a relationship between private equity backing and higher rates of bankruptcy among defense contractors, it does not investigate the consequences across the defense industry of the financial distress caused by private equity firms. That is, what operational and strategic setbacks, if any, has the US military suffered due to leveraging strategies and bankruptcies caused by private equity investment? The Intelsat case study explored this question for a single company and demonstrated that Intelsat's financial distress reduced the company's ability to deploy capital towards expanding and modernizing its satellite fleet. More research is necessary, however, to determine if the financial distress caused by private equity firms has impacted the American armed forces' capabilities more broadly.

Second, this study examines bankruptcies exclusively. In addition to bankruptcies, however, financial distress among defense contractors can assume alternate forms. Specifically, this inquiry does not evaluate cases of credit default or instances when corporations face severely constrained cash flows due to private equity investment. When considered alongside bankruptcies, these more prevalent forms of financial distress suggest that greater numbers of defense contractors could be diverting capital away from business reinvestment in order to service debt incurred by leveraged buyouts and other debt-funded business strategies. Additional research should be conducted to assess the industry-wide consequences of all types of financial distress among defense contractors.

Third, private equity firms often engage in consolidation activity in order to create economies of scope and scale for their portfolio companies. While the DoD has historically encouraged consolidation in the defense industry, in a recent report the Pentagon warned that high rates of consolidation across the defense industrial base have reduced competition—raising the costs of procurement and making DoD increasingly reliant on a small number of suppliers.¹¹⁶ This inquiry examined consolidation in the defense satellite services market specifically. Deregulation of the satellite market in the early 2000s was intended to make the market more competitive—presumably decreasing prices and increasing the quality of services for the DoD. By 2022, however, consolidation in the industry left the US government with fewer major providers than in 2001. During this period, the US Government Accountability Office

¹¹⁶U.S. Department of Defense (2022c).

also found that the DoD's satellite service procurement costs rose by 30 percent.¹¹⁷ Additional research should be carried out to determine if consolidation carried out by private equity firms has reduced competition across the defense industry and, if so, how this has affected the Pentagon's ability to procure goods and services affordably.

In conclusion, this inquiry's findings have important policy relevance. Although defense contractors with private equity backing experience higher rates of bankruptcy, private equity firms may still perform an important role within the US defense industry. Private equity firms possess significant capital, and the US military needs major investment in order to develop its capacities in a number of emerging fields including artificial intelligence, cyber, outer space, and autonomous weapons. Additionally, private equity firms specialize in corporate acquisitions and industry consolidations—complex business activities that occur frequently in the US defense industry. For these reasons, improved government oversight and regulation of private equity-owned defense contractors represents a more promising and realistic alternative than restricting private equity investment in the US defense industry.

Two policy reforms could lower the future risks posed by private equity activity in the US defense industry. First, DOD's Office of Industrial Policy (OIP) should utilize existing available financial information on defense suppliers—such as corporate credit ratings—to evaluate major mergers and acquisitions in the defense sector. Government agencies should subject to additional scrutiny proposed mergers involving strategically important contractors, particularly when these transactions could lead to substantial increases in corporate debt or other types of financial risk. The authority to evaluate financial aspects of mergers and acquisitions already exists as part of the assessment process DOD undertakes with the Department of Justice (DOJ) and Federal Trade Commission (FTC). Going forward, DoD officials should identify a set of baseline characteristics for the nature and scale of deals that might warrant financial review.

Second, DoD should place additional emphasis on corporate financial stability in its contract award processes. Particularly for high-value contracts of significant national security importance, the Pentagon should favor defense contractors that face relatively low risk of financial distress. For instance, the Pentagon could mandate that only contractors with investment grade credit ratings be eligible for certain strategically important awards. Introducing financial stability as an evaluation criterion in the contracting process will increase scrutiny of corporate financial health for high-value contracts and will ensure that individual contractors prioritize their own financial stability alongside growth. Over time, the prioritization of financial stability among contractors should improve the overall financial resilience of the US defense industry.

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¹¹⁷U.S. Government Accountability Office (2011).

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