

TALLINN UNIVERSITY OF TECHNOLOGY  
School of Business and Governance

Jussi Hirsimäki

**VALUATION OF LOCKHEED MARTIN CORPORATION  
USING DISCOUNTED CASH FLOW AND RELATIVE  
VALUATION METHODS**

Bachelor's thesis

International Business Administration, Finance and Accounting

Supervisor: Kalle Ahi

Tallinn 2024

I hereby declare that I have compiled the thesis independently and all works, important standpoints and data by other authors have been properly referenced and the same paper has not been previously presented for grading.

The document length is 9 614 words from the introduction to the end of the conclusion.

Jussi Hirsimäki .....

(date)

## TABLE OF CONTENTS

ABSTRACT .....	4
INTRODUCTION .....	5
1. Theoretical framework on company valuation .....	7
1.1. Purpose of company valuation .....	7
1.2. Income approach.....	9
1.2.1. Cash flows .....	11
1.2.2. Discount rate.....	13
1.2.3. Terminal value.....	16
1.3. Market approach.....	17
1.3.1. Multiples and peer group selection.....	18
2. Lockheed Martin Corporation .....	20
2.1. Company overview.....	20
2.2. Current financial standing .....	22
2.3. Assumptions and future estimates .....	24
3. Empirical valuation of the company.....	28
3.1. Discounted cash flow method.....	28
3.2. Relative valuation method.....	29
3.3. Sensitivity analysis .....	31
3.4. Discussion of the results.....	33
CONCLUSION .....	35
LIST OF REFERENCES .....	37
APPENDICES.....	42
Appendix 1. Electronic material.....	42
Appendix 2. Components of WACC calculation .....	42
Appendix 3. Non-exclusive licence.....	44

## **ABSTRACT**

Due to heightened tensions in the geopolitical environment, it was deemed appropriate to choose the fundamental valuation of one of the leading aerospace and defense companies, Lockheed Martin Corporation, as the subject of the paper. Geopolitical events increase public military spending, which plays a key role in the market value of operating in the industry.

The study aimed to find the fundamental value of Lockheed Martin Corporation and, therefore, evaluate whether the company is currently a good investment or not. The research objectives were to calculate the company's fundamental value using discounted cash flow and relative analysis methods and assess whether the company is currently overvalued or undervalued. The valuation was done based on multiple scenarios, and the results were analyzed through sensitivity analyses.

The results from the two methods showed that there is room for value appreciation and that the markets could have undervalued the company. It was also noted that using the risk-free rate as a proxy for the long-term growth rate inflated the results to a certain degree, which is why the importance of sensitivity analysis is further emphasized.

Keywords: DCF, relative valuation, aerospace and defense, fundamental value

## **INTRODUCTION**

The conflict between Russia and Ukraine, which started in February 2014 and escalated into a full-scale war in February 2022, has caused friction in the geopolitical environment. Additionally, recent events between Israel and Hamas, Red Sea ship attacks, as well as Iran's latest missile strikes at Israel have also increased global tensions.

A study by Capelle-Blancard and Couderc (2008) showed that one of the key factors driving the market value of companies operating in the defense industry is public military spending. And what causes the increase in military spending is geopolitical events. A good example of this is the report prepared by the European Defense Agency (2023), according to which in 2022 – when the full-scale war between Russia and Ukraine started – EU countries' defense spending was at a record high when 20 out of 27 countries increased their military spending. For this reason, it has been deemed appropriate to choose the fundamental valuation of one of the leading aerospace and defense companies, Lockheed Martin Corporation, as the subject of the paper.

The study thus aims to find the fundamental value for Lockheed Martin Corporation and, therefore, evaluate whether the company is currently a good investment or not. The research questions are as follows:

1. What is the fundamental value of the company using the selected valuation methods?
2. Is the company over-/undervalued?

The paper is divided into three parts. The author begins the paper with a theoretical framework on business valuation, which examines the purpose of business valuation and the two primary valuation approaches: income-based and market-based. The section on the income approach reviews the main components of the income approach, or, more precisely, DCF, which are cash flows, discount rate, and terminal value. Understanding these helps one understand how to convert future benefits into present value. In contrast, the market approach is reviewed by looking more

closely at the valuation multiples and the selection of an appropriate peer group. These, in turn, provide insights into how companies are valued relative to other companies.

After the theoretical part, the paper focuses on examining the target company, Lockheed Martin Corporation, in more detail. The chapter begins with a general overview of the company, which examines the company, its business areas, and its competitors. In addition, the chapter examines Lockheed Martin's current financial situation, the development of the share price, and the factors affecting the development. The assumptions and future estimates related to Lockheed Martin's valuation are also defined, which lays the foundation for the income approach applied in the next chapter.

In the third chapter, the discounted cash flow (DCF) method and the relative valuation method are applied to Lockheed Martin Corporation. Sensitivity analyses are also performed to assess the impact of main assumptions on the valuation result. The chapter ends with the interpretation and discussion of the results. Finally, the paper ends with a conclusion, which combines key findings and insights and thus serves as a clear and easily accessible summary of the paper.

# **1. Theoretical framework on company valuation**

## **1.1. Purpose of company valuation**

Damodaran (2012) highlights that every asset has value. The key to successful investing management and control of these assets is based on understanding the value and sources of value. Every asset can be valued, but some are easier to value than others, and the details of the valuation will vary from case to case. In parallel, Fazzini (2018) states that value is not a concept that can easily be confined to a universal definition, and there is no unique measure of it. Although businesses are not considered assets, they still act similarly as they provide economic value, just like assets do. Thus, businesses are often also the targets of valuation. Company valuation can be useful in a wide variety of tasks.

Damodaran (2012) has presented three areas of finance where company valuation is relevant: portfolio management, acquisition analysis, and corporate finance. In acquisitions, valuations are done before making and accepting/rejecting offers. However, biases in such cases have a considerable role in valuation as the counterparties want the estimated values to favor them. In corporate finance, valuation, in turn, helps management make better financial decisions, such as what projects to take, how to finance them, and so on. Nevertheless, the most relevant area concerning the paper is portfolio management. Valuation plays a significant role amongst fundamental investors who pick their stocks for the long term and where the decision to buy the stock is based on the company's fundamentals. Because investors buy stocks in the hope that their value will increase over time so that they are compensated for the risk they take, it is crucial that investors do not overpay for stocks.

Prior to initiating any valuation procedures, it is critical to establish a comprehensive understanding of the essential principles underlying company valuation. As Schmidlin (2014) writes in his book, company valuation is concerned with deriving the fair value of a company. Nevertheless, value has many different meanings in the field of valuation, and to understand the

meaning of fair value, the standards of value must be considered first (Trugman, 2012). Different standards of value have different valuation purposes, and applying the wrong kind would yield misleading results (Hitchner, 2017). Hitchner (2017) has presented five primary standards of value:

- 1) Fair market value;
- 2) Investment value;
- 3) Intrinsic value;
- 4) Fair value (state rights);
- 5) Fair value (financial reporting).

In the case of the paper, the value to consider is intrinsic value, also known as the investor's fair value. Damodaran (2012) describes intrinsic value as the value obtained from a fundamental analysis of the company done by an unbiased analyst who has not only estimated cash flows correctly but has applied the right discount rate in the analysis as well. Trugman (2012) defines fundamental analysis as an approach where the asset or security is assumed to have an intrinsic value. That value can be found through evaluation where relevant variables have been taken into account. So, the intrinsic value of the asset is the asset's value if the asset's investment characteristics are hypothetically fully understood. Thus, the estimate of an intrinsic value reflects the investor's true perception of the asset's value. (Pinto et al., 2010) Any deviations from the current market price would mean the asset is under or overvalued. Damodaran (2012), however, points out that an analyst will still find a way to bring their biases and preconceptions into the value. Therefore, the yielded value will indeed only be an estimate.

To briefly cover the other values, the fair market value is the price at which the property would change hands between a buyer and a seller, considering both parties have sufficient knowledge of the situation and the facts. Investment value, in turn, could be defined as the value reflecting the personal attributes of an investor (e.g., auctions). Fair value (state rights) is the value of state actions. For example, the value of a share before a corporate action, without considering the effect caused in the value by investors anticipating the action. Lastly, the fair value (financial reporting) is considered the same as the fair market value. However, in some transactions, the fair value would include the synergies between the parties (e.g., mergers and acquisitions), meaning that the value would more closely reflect the investment value rather than the fair market value. (Hitchner, 2017)



Fama (1970) introduced the Efficient Market Hypothesis (EMH), which argues that share prices are always priced correctly at the market because they would reflect all available information to the market. Therefore, they would always be trading at their fair values. This would mean that share prices would never be over- or undervalued, making it impossible for investors to beat the market. EMH has, nevertheless, had its part of criticism. For instance, De Bondt and Thaler (1985) found that investors tend to overreact to surprising news, LeRoy and Porter (1981) showed that the markets display excess volatility, and Grossman and Stiglitz (1980) showed that it is impossible for the market to be efficient regarding information as information is costly. Therefore, there would be no compensation for those who do their research. Also, people argue against EMH with an example such as Warren Buffett, who has successfully beaten the markets. Thus, those who think the markets are inefficient should do their research, and those who, in turn, believe that the markets are efficient should interpret the current market price as the company's fair value. (Damodaran, 2012)

That being said, the fundamental justification for company valuation is that market errors exist and that those errors could be found using the information that every investor should have access to, at least in theory. Although there are several different valuation models, one can ultimately approach company valuation from two different directions: income-based and market-based (Damodaran, 2011).

## **1.2. Income approach**

The fundamental principle of intrinsic or income-based valuation is that the value of an asset is equal to the present value of future benefits (Trugman, 2012). Consequently, assets with high and predictable cash flows should be more valuable than those with low and volatile cash flows. This underscores the fact that the value of an asset is a function of expected future benefits rather than what someone perceives it to be worth. (Damodaran, 2011)

Among the various income-based valuation methods, the Discounted Cash Flow (DCF) method stands out as the most common. In DCF, the present value of expected future cash flows is calculated using a discount rate. The type of cash flow and discount rate one uses depends on whether one is valuing the equity stake or the entire business. Regardless of the approach, the

results should remain consistent, provided one's assumptions are consistent. (Damodaran, 2012)

The DCF formula is as follows:

$$DCF = \sum_{t=1}^n \frac{CF_t}{(1+r)^t} + \frac{TV}{(1+r)^n}$$

Where:

- *DCF* is the discounted cash flow, representing the present value of future cash flows,
- $CF_t$  is the cash flow in year  $t$ ,
- $r$  is the discount rate, representing the risk and the time value of money,
- $n$  is the number of periods in the explicit period,
- *TV* is the terminal value, reflecting the present value of all future cash flows after the explicit period.

When investors commit their funds to an investment, they expect their investment to increase in value. All investment decisions and business valuations are based on this basic idea. What makes DCF and other income-based valuation methods a valuable valuation approach is their forward-looking nature, which embraces this idea by taking into account the assumption that the value of an ownership interest is equal to the sum of the present values of the expected future benefits of owning that interest. No other valuation approach considers this basic premise, as well as DCF and other income-based valuation methods. Another reason it is essential to know how to perform DCF valuation is its flexibility. Although DCF valuation is quite complex due to the math involved in it compared, for example, to relative valuation, those complexities also enable it to be more flexible. It is practical for an appraiser to modify their calculations depending on what the valuation target is at any given moment. (Hitchner, 2017)

DCF, however, also has its downsides. DCF relies heavily on assumptions about the company's future and the economy. It is impossible to see into the future, and therefore, one cannot expect absolute certainty in valuation since cash flows and discount rates are only estimates. (Damodaran, 2012) It is also a rather time-consuming method to value assets, again, due to the math involved and for the reason that one has to gain a thorough understanding of the company as well as the industry, which may take time. Therefore, DCF is often utilized only by professionals and seldom by ordinary people.

The following subchapters will cover the three main elements needed to carry out DCF valuation:

- 1) Cash flows;
- 2) Discount rate;
- 3) Terminal value. (Fazzini, 2018)

### 1.2.1. Cash flows

The most critical part of the DCF valuation is estimating the future cash flows (Fazzini, 2018). However, before the future cash flows are estimated, a measure of earnings shall be considered first (Damodaran, 2012). Depending on whether one values only the equity part of the firm or the whole firm, either Free Cash Flow to Equity (FCFE) or Free Cash Flow to Firm (FCFF) is considered. FCFE is the cash flow available to those who hold the common equity after all operating expenses, interest, and principal payments have been settled, along with the required investments made in fixed and working capital. Meanwhile, FCFF is the cash flow that remains available to the company's all capital suppliers after all operating expenses (including taxes) have been paid and the required investments have been made in working and fixed capital. (Pinto et al., 2010) So, the main difference between the two is that FCFF is the cash flow available to all providers of capital (equity and debt), while FCFE only considers equity. FCFE and FCFF are calculated as follows:

$$FCFE = NI + D\&A - \Delta WC - CAPEX + Net\ Borrowing$$

Where:

- *NI* is net income,
- *D&A* is depreciation and amortization,
- $\Delta WC$  is the change in net working capital,
- *CAPEX* is capital expenditures,
- *Net Borrowing* is the difference between the amounts borrowed and the repayments.

$$FCFF = NOPAT + D\&A - \Delta WC - CAPEX$$

Where:

- *NOPAT* is net operating profit after taxes ( $EBIT \times (1 - tax\ rate)$ ), reflecting the company's earnings from operations after accounting for taxes if it had no debt,

- $D\&A$  is depreciation and amortization,
- $\Delta WC$  is the change in net working capital,
- $CAPEX$  is capital expenditures.

An essential input regarding future cash flow projections is the growth rate. There are a few ways to estimate the growth of a firm. Firstly, one can view the company's past performance. However, it is important to understand that what has happened in the past is not a guarantee of the future. This applies especially to high-growth firms. Another way to determine the growth rate is to trust an analyst who follows the firm and has come up with a growth rate for that firm. However, one should still be skeptical about analysts' growth rates, as their track record is relatively poor. Therefore, relying too much on analysts can lead to inconsistent estimates. The third way is to base the growth on a company's fundamentals. How much is invested into new assets, and what is the quality of those investments? These investments can comprehend acquisitions, building distribution channels, or, for instance, expanding marketing capabilities. Assessing these inputs can give one a sense of the company's fundamental growth rate. (Damodaran, 2012)

As said, the valuation of a company with high and predictable cash flows tends to be more precise and will yield a more accurate estimate of the value. These companies are usually more mature and are no longer in the growth state of the company life cycle. The industry where the company operates also plays a massive role in how well a person can make predictions about future cash flows. Trying to value companies operating, for instance, in the technology industry, will be more challenging as such companies can face drastic changes in their operations due to sudden technological advancements. In addition to the industry of the company and the uncertainty it may cause, forecasts might also be affected by the management's ability to predict how the business will evolve, as well as the comparability between the company's past and future results. This means that the time horizon of the forecasts also varies between the companies and industries. (Fazzini, 2018)

In the case of a stable industry or company, forecasts can be made further into the future in contrast to volatile industries and companies. Depending on the company and industry, cash flow forecasts are usually done for three to five years. The reason why cash flow projections are not made for longer than a five-year period is due to risk. In the case of a longer than five-year period, the risk adjustment would be so significant that it would significantly reduce the present value of the cash flow compared to its nominal value. (Fazzini, 2018)

### **1.2.2. Discount rate**

Because cash flows are forecasted for different time periods, they need to be discounted using a proper discount rate for them to be comparable (Fazzini, 2018). This is due to the time value of money, where the value of money is more now than in the future. Damodaran (2011) has given three reasons why money loses value over time. Firstly, it is due to inflation. While inflation increases, the purchasing power of a currency decreases. To compensate, the value assigned to future cash flows is reduced. Secondly, people instead consume their money now rather than later in the future. To give up the current consumption, people would have to be offered more to consume in the future. Lastly, future cash flows are always involved with risk, and it is possible that the future cash flows might not be delivered for whatever reason. The bigger the risk, the lower the value of cash flows. Each company has its own risk profile, so the risk is different for every company. The discount rate is therefore used to adjust expected future cash flows according to not only to the monetary value of time but also to the riskiness of the company, the industry, and the market. (Fazzini, 2018)

A discount rate is the rate of return required by the investors regarding the investment. A discount rate consists of the risk-free rate of return and the risk premium. The risk-free rate of return is what an investor would expect from an investment if it were entirely risk-free. The risk-free rate of return is usually obtained from government bonds as they are considered somewhat riskless. No investment is ever entirely risk-free, but the chance of a default is relatively small regarding government bonds. (Trugman, 2012)

On top of the risk-free rate of return, the additional rate of return, the risk premium, is added. It represents the riskiness of the investment and is there to compensate the investor for the risk they have taken. The risk premium can be broken down into different components: equity risk premium, specific company risk premium, and industry risk premium. Equity risk premium takes into account market perceptions and expectations on the broad scale of the market, thus representing the total riskiness of the equity market. On the contrary, specific company risk premium and industry risk premium reflect the additional risks related to the particular company and industry. (Trugman, 2012)

Now, depending on whether the equity stake or the whole firm is valued, the proper discount rate should be taken into consideration. In the case of an equity stake valuation, the cost of equity is

used as the discount rate. The cost of equity is the rate of return investors require from their equity investment in the firm. (Damodaran, 2012) There are many different models for calculating the cost of equity, but the most common is the Capital Asset Pricing Model (CAPM) (Fazzini, 2018). Sharpe (1964) brought CAPM into wider recognition in his paper, according to which an asset's expected return should be proportional to its beta. The model was taken well due to its simplicity, which made it easily applicable. By utilizing CAPM, the cost of equity is calculated as follows:

$$r_e = r_f + \beta_e(r_m - r_f)$$

Where:

- $r_e$  is the expected return on investment,
- $r_f$  is the risk-free rate,
- $\beta_e$  is the beta of the investment, reflecting the systematic risk,
- $r_m$  is the expected return on the market,
- $(r_m - r_f)$  is the equity risk premium (ERP).

In CAPM, the systematic risk, beta, represents the risk the investment adds to the market portfolio (Damodaran, 2012). Beta is a metric that predicts how a stock will move relative to stock market movements overall, thus measuring the stock's volatility. CAPM assumes that investors hold diversified portfolios and, therefore, does not consider unsystematic risk. This means that CAPM does not actually factor in the company or industry-specific risk regarding the company being valued. (Trugman, 2012)

Although the use of CAPM is common, the model could be better. As mentioned, the model assumes that investors hold diversified portfolios and, therefore, that investors are this one giant homogenous group, which, of course, is not true, as there are many types of investors. Dempsey (2013) challenged the validity of CAPM by arguing that the model oversimplifies the market. However, according to him, people still seek to validate such models because predicting market trends would become too time-consuming and challenging without them.

In search of a better model, Fama and French (1993) introduced their own asset pricing model that was based on CAPM but took additional risk factors, such as size risk and value risk factors, into account in its formula. According to them, these additional risk factors would help to better capture

the state of the market. However, there have been papers against this model as well. For instance, Frazzini and Pedersen (2014) argued against the Fama-French model as well as CAPM in their paper, in which it was found that assets with lower betas tend to outperform assets with higher betas, contradicting the traditional idea of risk-return relationship.

A study by Kisman and Restiyanita (2015) also showed that CAPM performed more poorly in predicting stock returns than Arbitrage Pricing Theory (APT). APT is a model developed by Ross (1976) that also predicts and measures stock returns. How these two models are different from each other is that APT relies more on macro factors such as GDP and inflation, whereas CAPM mainly on the market risk. As APT is more complex, it can, however, be more challenging to apply in real-world situations.

Nevertheless, when the whole firm is valued - whatever model is used to estimate the cost of equity - the discount rate includes the cost of debt in addition to the cost of equity. The cost of debt is the interest expense the company pays on its borrowings, such as loans and bonds. (Damodaran, 2012) The cost of debt can be calculated as follows:

$$r_d = i * (1 - tax\ rate)$$

Where:

- $r_d$  is the after-tax cost of debt,
- $i$  is the nominal interest rate on the debt.

These two together form the cost of capital of the company. However, each company is unique in the sense of how they are financed, and for this reason, the Weighted Average Cost of Capital (WACC) is used. WACC is calculated as follows:

$$WACC = r_d * \frac{Debt}{Debt + Equity} + r_e * \frac{Equity}{Debt + Equity}$$

Where:

- $Debt$  is the market value of debt,
- $Equity$  is the market value of equity,
- $r_d$  is the after-tax cost of debt,
- $r_e$  is the cost of equity.

It is essential to use WACC as it takes into account the proportions of equity and debt of the company (Fazzini, 2018).

### 1.2.3. Terminal value

As for the cash flows, it is impossible to forecast them forever. Thus, there is the terminal value, sometimes also known as the continuing value, that reflects the company's value after the explicit period. (Hitchner, 2017) The terminal value can be calculated in three ways: 1) the liquidation value, 2) the multiple approach, and 3) the stable growth model. The first approach assumes that the company will sell its assets at some point in the future and thus cease to exist. The price at which the assets are sold is called a liquidation value. It is a conservative approach in the sense that it does not take into account the assets' earning power as it is based on the accounting book value. (Damodaran, 2012, 2019)

The second approach, the multiple approach, is the easiest of the methods and, hence, also the most used. The terminal value is calculated by applying a multiple to the company's earnings or revenues for the last forecasted period. The problem with the approach is that if the multiple is determined by comparable company analysis, the valuation becomes a relative valuation rather than a DCF valuation. After all, the purpose of the DCF valuation is to find the intrinsic value and not the relative value of the company. (Damodaran, 2012, 2019)

The third approach, the stable growth model, is the technically soundest of the methods regarding the DCF valuation. Liquidation value and stable growth model are both cash flow-based approaches, but where liquidation value expects the company to have a finite life, the stable growth model assumes that the cash flows will increase at a constant rate forever as some of the cash flows are invested back into the company. (Damodaran, 2012, 2019) By utilizing the stable growth model, the terminal value can be calculated as follows:

$$TV = \frac{FCF_n * (1 + g)}{(r - g)}$$

Where:

- $FCF_n$  is the free cash flow for the last forecast period,
- $g$  is the long-term growth rate,
- $r$  is the discount rate.



It is important to notice that the long-term growth rate in the equation cannot be bigger than the nominal growth rate of the economy. This is because no firm can forever grow at a higher rate compared to the economy. One solution is to use the risk-free rate as a proxy for the constant growth rate. (Corelli, 2017; Damodaran, 2012, 2019)

### **1.3. Market approach**

In the market approach, the company's value is determined by comparing it to similar companies operating in the industry. What makes the market approach an advantageous method is its simplicity. Even for people unfamiliar with business valuation, it is easy to understand that companies operating in the same industry should have similar pricing characteristics. It is also much more practical than the income approach as it requires less mathematical modeling and, thus, takes less time. Moreover, it uses actual data, where the value estimate is not only based on assumptions. (Hitchner, 2017) The lack of assumptions made about the company and the industry decreases the possibility of biases affecting the end result. Lastly, it is much more likely to reflect the current atmosphere in the market (Damodaran, 2012).

Nevertheless, some things should be taken into account. Firstly, finding peer companies similar enough to the company being appraised might be challenging. This tends to be the biggest problem regarding the market approach. Secondly, it lacks flexibility and adaptability. As said in the earlier chapter regarding the income approach, the calculation in the DCF can be easily modified. The market approach does not allow such modifications or adaptations; hence, including unique operating characteristics affecting the company's value can be difficult. (Hitchner, 2017) With an emphasis on "can", as it is still possible to normalize inputs, meaning, for example, that anomalies and inconsistencies are removed to make the valuation more reliable (Damodaran, 2012). Also, the fact that the market approach reflects the current state of the market is also its weakness. Peer companies could be overvalued or undervalued by the market, leading to results too high or too low. (Damodaran, 2012) Thus, it is a good idea to apply both income and market-based valuation methods to get the most accurate value estimate for the company.

One can utilize two methods when approaching company valuation from the market perspective: 1) the comparable companies method and 2) the comparable transactions method, of which the

paper will only focus on the former (Fazzini, 2018). The comparable companies method, sometimes also known as the relative valuation method, has two main components. For the companies to be comparable, prices must be standardized first. This is done by using multiples. The second step is to find similar firms. As said, this can be challenging because firms tend to be different, even though they would operate in the same industry. Each company is unique regarding its risk, growth potential, and cash flows. (Damodaran, 2011)

### **1.3.1. Multiples and peer group selection**

It is impossible to compare companies only based on the share price as companies have different amounts of shares outstanding. This is why multiples are needed to standardize those prices. (Damodaran, 2012) A multiple is a metric where the value of a company is divided by an item, usually from the balance sheet or the income statement. This allows comparisons of companies regardless of how big they are. (Hitchner, 2017) However, it is essential to remember that the usage of multiples in company valuation is considered to be applicable only if the company being appraised and the guideline companies are similar enough to each other (Trugman, 2012).

Utilizing the relative valuation requires the selection of the appropriate multiples. Multiples can ultimately be divided into equity multiples and enterprise value multiples. Equity multiples consist of multiples such as price to earnings (P/E), price to book value (P/B), and price to sales (P/S). Equity multiples are ratios that compare a stock's market value to a particular financial metric. Enterprise value multiples, on the other hand, take into account the market value of all invested capital, which is then related to some measure of the fundamental value of the entire business. An example of such a multiple is enterprise value to EBITDA (EV/EBITDA). (Pinto et al., 2010) The type of multiple one should use, equity or enterprise value, depends mainly on the peer group and how the companies in the peer group are financed. If there are significant differences in financial leverage between the companies, using enterprise value multiples rather than price multiples could be wiser. (Trugman, 2012)

Although using multiples is relatively simple, they are still easy to misuse. Therefore, one should consider the four basic steps presented by Damodaran (2012) when using them. Firstly, one should ensure that the multiples are defined similarly between companies. For instance, the P/E ratio is usually defined as the current market price divided by the earnings per share. However, sometimes, it might be that, instead of the current market price, analysts use the average price of the prior six months. Secondly, one should take into consideration when a multiple is considered high or low

or when the value of a multiple is typical for the industry. A multiple ratio may be considered high in other industries, while other industries may consider the same ratio low in theirs. The third step is to gain an understanding of the fundamentals of the multiples and how changes in those fundamentals could affect the value of a multiple. Lastly, one should find the proper peer group and ensure that the companies are truly comparable with the appraised company.

The selection of the peer group is an important part of the relative valuation. The more homogeneous the peer group is, the more reliable the value estimate will be (Fazzini, 2018). Nevertheless, finding the peer group for the relative valuation can be a challenging task. It requires time and effort from the appraiser, but it is, nevertheless, the most crucial part of the relative valuation. (Hitchner, 2017) Each firm is different from the other; therefore, one needs to find the comparable firms that are most alike. There are several ways to comprise the peer group, but it is good to note that none of the methods is the only correct way to proceed (Hitchner, 2017). Different scenarios require different methods.

A common technique for finding the peer group is to use Standard Industrial Classification (SIC) codes or the more recent Global Industry Classification Standard (GICS) system developed by Standard & Poor's and Morgan Stanley. However, these classification codes tend to be too broad regarding the companies they include, which means that, in the case of only relying on the classification codes, the companies end up not being too similar to each other, thus making the valuation unreliable. (Koller et al., 2010) Still, they can be a good starting point for narrowing down the group.

The most important thing would be to find companies that are similar enough to each other in regard to risk, growth, and cash flows, regardless of the industry they operate in. It might be, however, that there are no companies with exact characteristics, which means that one needs to broaden their criteria. It all depends on how narrow or broad the appraiser's definition of a comparable firm is. (Damodaran, 2012)

Once the peer group has been established and the multiples have been selected, one shall determine the benchmark multiple, which is applied to the target company to calculate the implied share price. If the peer group's range of values is not too large, either the mean or the median of the peer group can be used as the benchmark multiple. In the case of a larger range of values, the median would be preferred. (Fazzini, 2018)

## 2. Lockheed Martin Corporation

### 2.1. Company overview

Created in 1995 by the merger of Lockheed Corporation and Martin Marietta, Lockheed Martin Corporation is one of the leading aerospace and defense companies (Lockheed Martin, 2024a). The company is a major operator in the industry, employing approximately 122,000 people worldwide and having hundreds of facilities globally. It has more than a century of innovation experience, reflected in a wide selection of high-quality products and services. (Lockheed Martin, 2024b) In 2023, the company's most significant customer was the U.S. government and its agencies, which covered 73% of the net sales. The other two are international customers, with 26 percent, and finally, U.S. commercial and other customers, with 1 percent. (Lockheed Martin, 2024c) The company's current chairman, president, and CEO is Jim Taiclet. Taiclet started as chairman in March 2021, after first serving as the company's CEO and president since June 2020. Taiclet has been part of Lockheed Martin's board of directors since January 2018. (Lockheed Martin, 2024d)

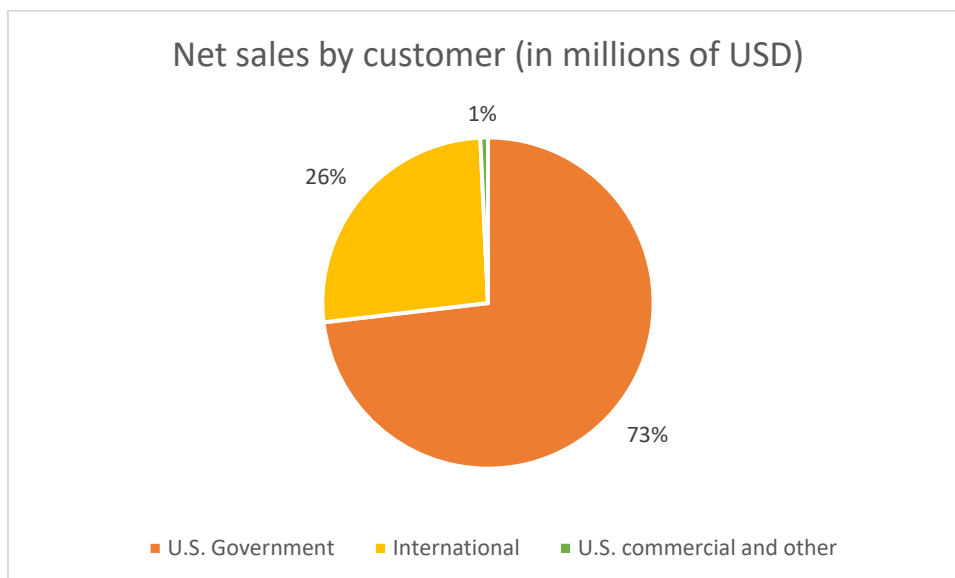


Figure 1. Net sales by customer (in millions of USD)

Source: Lockheed Martin annual report 2023 (2024c)

The company operates in four different business areas:

1. Aeronautics;
2. Missiles and Fire Control (MFC);
3. Rotary and Mission Systems (RMS);
4. Space. (Lockheed Martin, 2024c)

Aeronautics employs more than 30,000 people and is engaged in advanced military aircraft research, design, development, and manufacture, among other things. The segment covers major programs such as the F-35 Lightning II, C-130 Hercules, F-16 Fighting Falcon, and F-22 Raptor. The F-35 is by far the largest, as it alone accounted for 26% of the company's total revenue and 64% of aeronautics revenue in 2023. (Lockheed Martin, 2024c, 2024e)

Missiles and Fire Control (MFC), in turn, specializes, for example, in providing advanced combat systems, missiles, rockets, and manned as well as unmanned systems. The segment covers programs such as The Patriot Advanced Capability-3 (PAC-3), The Javelin program, and The Multiple Launch Rocket System (MLRS). MFC conducts business in over 50 countries and offers a versatile selection of more than 50 products and services. (Lockheed Martin, 2024c, 2024f)

Whereas, Rotary and Mission Systems (RMS) employs approximately 35,000 people in sixteen countries and has a portfolio of more than 1,000 programs, such as Sikorsky helicopter programs and Integrated Warfare Systems and Sensors (IWSS) programs. Business area support is primarily enjoyed by various US military branches, including the Air Force, Army, Coast Guard, Marine Corps, Navy, and Missile Defense Agency. Additionally, it serves intelligence, civilian, commercial, and international military customers. (Lockheed Martin, 2024c, 2024g)

Lockheed Martin has also actively participated in space research and has been in a leading position in the space industry since the 1950s. The Space business area oversees the research, design, development, engineering, and production of satellites, space transportation systems, and strategic, advanced strike and defense systems. Its most important programs are, e.g., Global Positioning System (GPS) III, designed to modernize the GPS satellite system for the U.S. Space Force, and the Orion Multi-Purpose Crew Vehicle (Orion), a NASA spacecraft. The space segment employs more than 23,000 people worldwide. (Lockheed Martin, 2024c, 2024h)

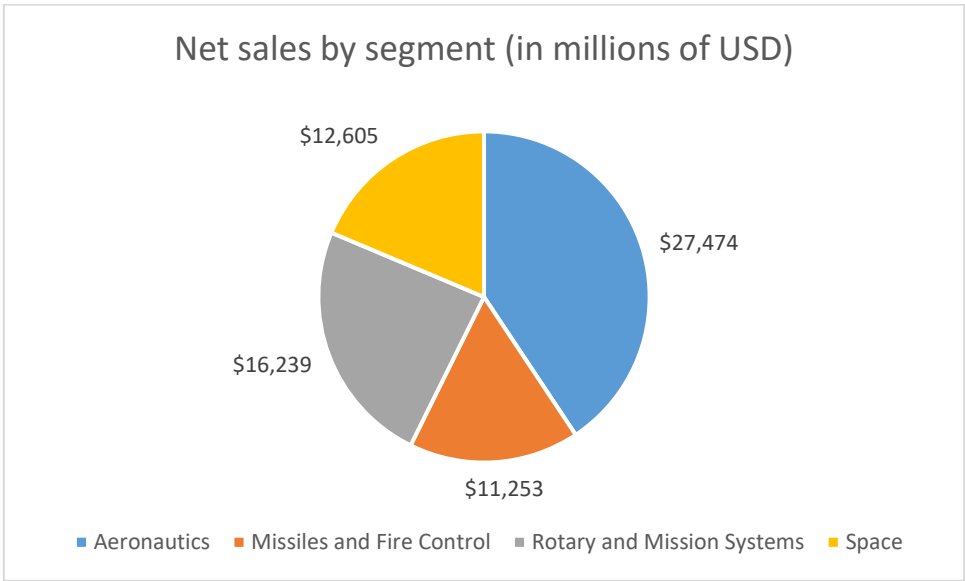


Figure 2. Net sales by segment (in millions of USD)

Source: Lockheed Martin annual report 2023 (2024c)

The company competes with many other companies operating in the aerospace and defense industry. The main competitors are the Boeing Company, General Dynamics, L3Harris Technologies, Northrop Grumman, and RTX Corporation. The key features of the industry are long operating cycles and fierce competition, which can be seen in the number of competitors bidding on program opportunities and the existence of things like bid protests. Although the competition for government contracts is fierce, competing for a contract with a peer company while acting as a supplier or customer of the same competitor on other projects is very common. (Lockheed Martin, 2024c)

**2.2. Current financial standing**

According to Lockheed Martin's 2023 annual report, revenue was around \$67.6 billion, up from roughly \$66 billion in 2022. Although the increase was not massive, it was expected, as the company was significantly affected by COVID-19 in 2022, when its revenue decreased from the previous year. Net income instead took a brisk jump from 2022's \$5.7 billion to about \$6.9 billion in 2023. This, in turn, can be seen as a testament to the strong demand for the company's products and services, reflected in a record backlog of \$160.6 billion. (Lockheed Martin, 2024c)

Lockheed Martin’s capital structure experienced a shift, with total debt increasing from around \$15.5 billion to \$17.5 billion and total equity decreasing from approximately \$9.3 billion to \$6.8 billion. However, the company maintains a robust free cash flow margin of more than 9%, a figure considered stable and reasonable within the industry, reflecting the company's financial health and its ability to generate cash. (Lockheed Martin, 2024c)

Additionally, the company has increased its cash dividends per common share from \$11.40 in 2022 to \$12.15 in 2023 while also decreasing the amount of average diluted common shares outstanding from 265 million to 251 million through share repurchases, thus distributing cash back to its shareholders. (Lockheed Martin, 2024c)

In millions, except per share data	2023	2022	2021
Net Sales	\$ 67,571	\$ 65,984	\$ 67,044
Consolidated Operating Profit	8,507	8,348	9,123
Segment Operating Profit	7,389	7,467	7,664
Net Earnings	6,920	5,732	6,315
Diluted Earnings Per Common Share			
Net Earnings	27.55	21.66	22.76
Cash Dividends Per Common Share	12.15	11.40	10.60
Average Diluted Common Shares Outstanding	251	265	277
Cash and Cash Equivalents	\$ 1,442	\$ 2,547	\$ 3,604
Total Assets	52,456	52,880	50,873
Total Debt, net	17,459	15,547	11,676
Total Equity	6,835	9,266	10,959
Common Shares Outstanding at Year-End	240	254	271
Net Cash Provided by Operating Activities	\$ 7,920	\$ 7,802	\$ 9,221
Capital Expenditures	(1,691)	(1,670)	(1,522)
Free Cash Flow	\$ 6,229	\$ 6,132	\$ 7,699

Figure 3. Lockheed Martin financial highlights

Source: Lockheed Martin annual report 2023 (2024c)

When, in turn, looking at the stock performance of the company, one can see that Lockheed Martin's stock performed well relative to the S&P500 index prior to COVID-19. However, after the initial COVID-19 crash, the stock was not able to keep up with the S&P500 index and did not see any significant price increase until the escalation of war between Russia and Ukraine, after which it has continued to more or less struggle or at least has since not seen any prominent growth.



Figure 4. Lockheed Martin (Blue) stock price performance versus S&P500 index (Yellow)

Source: Google Finance (2024)

The COVID-19 pandemic was exceptionally bad for Lockheed Martin, especially in terms of labor and supply chain disruptions. The disruptions have particularly affected the F-35 fighter, the company's largest program. Fighters have not been able to be delivered on schedule, as production has slowed down. Because of this, the year 2022 was particularly miserable, as the company faced negative growth. (Lockheed Martin, 2023)

However, to meet the continuous growth in demand for its programs, the company has said that it is committed to increasing its production line capacity. An essential factor here is 1LMX, the company's mission-oriented business and digital transformation program that seeks to adopt advanced manufacturing practices, digital tools, and other cutting-edge technologies to streamline its internal operations and make production more efficient. Therefore, the company anticipates that the growth in 2023 will continue in 2024 and beyond. (Lockheed Martin, 2024i)

### 2.3. Assumptions and future estimates

Regarding DCF, various assumptions need to be made to estimate the company's future free cash flows. The key line items for DCF valuation have been reviewed below. For a comprehensive view, the full-scale 3-statement model can be found in Appendix 1. The main assumptions regarding the explicit period can be seen in the table below.



Table 1. Main assumptions

Revenue (average estimate)	Year 1 – 3.1% Year 2 – 3.6% Year 3, 4, 5 – 4.6%
Revenue (high estimate)	Year 1 – 4.7% Year 2 – 4.4% Year 3, 4, 5 – 5.4%
Revenue (low estimate)	Year 1 – 1.7% Year 2 – 2.7% Year 3, 4, 5 – 3.7%
COGS	~ 13% gross profit margin
Operating expenses	~ 0.08% of revenue
Interest expenses	5.19% interest rate
Other income expenses	Assumed to straight-line
Tax expenses	~ 15% effective tax rate
Capital expenses	With revenue
D&A	With revenue
Accounts receivable	With revenue
Contract assets	With revenue
Inventory	With COGS
Other current assets	With revenue
Accounts payable	With COGS
Contract liabilities	With revenue
Salaries, benefits and payroll taxes	With revenue
Other current liabilities	With revenue

Source: appendix 1, Hirsimäki (2024)

The first and most critical of line items is sales growth, as it is the basis for cash flow projections and directly or indirectly affects many other line items. As Damodaran (2012) said in his book, there are a few ways to forecast revenue growth, one of which is to rely on analysts. Although he says that their track record is relatively poor when it comes to forecasting future performance, the same thing would apply to anyone. After all, they are just forecasts, and nobody has a crystal ball. But to think that a John Doe could do a better job than analysts at forecasting, especially without the same tools analysts have, is delusional. Thus, according to Yahoo Finance (2024a) analyst information, revenue growth rates of 3.1% and 3.6% are assumed for the base case for 2024 and 2025, respectively. The revenue growth will be reviewed not only based on the average analyst estimate but also on the high and low estimates. Therefore, the same numbers for the low estimate will be 1.7% and 2.7%, and for the high estimate, 4.7% and 4.4%. The next three years, however, lack the analyst information for all the cases.

Lockheed Martin's sales are mainly tied to the United States defense budget, which means that the company's growth trajectory is somewhat linked to the nominal growth rate of the United States economy. While Lockheed Martin has international customers, their impact on sales growth is not too significant. (Lockheed Martin, 2024c) Therefore, for the base case, the annual sales growth for the next three years is assumed to be the same as the terminal growth rate of the company, which is considered the same as the risk-free rate or U.S. 10-year treasury yield, which at the time of the writing is at 4.6% according to CNBC (2024). The same number is set for the low estimate at 3.7% and the high estimate at 5.4%, based on the author's view of the company.

To estimate the growth rate of the cost of goods sold, the author has assumed a gross profit margin of around 13% for the entire period. The percentage is the average of gross profit margins for the years 2021, 2022, and 2023. The same principle applies to operating expenses, as the author has taken the average of the ratios of operating expenses to revenue for 2021, 2022, and 2023. Operating expenses will, therefore, be approximately 0.08% of the revenue for the explicit period. To estimate the interest expenses, the author has assumed an interest rate of 5.19% for the five-year period. This figure is the sum of the risk-free rate of 4.6% and the default spread of 0.59% (CNBC, 2024; Damodaran, 2024c). The capital expenditures, as well as the depreciation and amortization, are assumed to grow at the same rate as the revenue, whereas other income expenses will be assumed to straight-line for the whole explicit period as they are not tied to the revenue.

Another step is to estimate the tax rate for the explicit period. Using the U.S. corporate tax rate of 21% is not applicable because the company has been paying less in taxes. Therefore, the effective tax rate of around 15% is assumed for all five years based on the average taxes paid by the company in the three years prior to the explicit period.

After the relevant assumptions have been made regarding the line items of the income statement, the same shall be done to the balance sheet to come up with the estimates for net working capital. Net working capital is calculated by subtracting the operating current liabilities from the operating current assets, meaning the line items relevant to those two should be estimated. It is good to note that cash and cash equivalents, as well as short-term debt, have been excluded from calculations as they are not directly connected to the company's core operations.

The operating current assets thus consist of accounts receivable, contract assets, inventory, and other current assets. All other line items are assumed to grow at the same rate as the revenue,

except the inventory, which is assumed to grow at the same rate as the cost of goods sold. On the contrary, the operating current liabilities consist of accounts payable, salaries, benefits and payroll taxes, contract liabilities, and other current liabilities. Accounts payable is assumed to grow with the cost of goods sold, whereas other line items with the revenue.

### 3. Empirical valuation of the company

#### 3.1. Discounted cash flow method

Regarding the methodology of the paper, the author has chosen to use discounted cash flow and relative valuation methods to determine Lockheed Martin's fundamental value estimate. Using the two valuation methods together ensures that the results are as accurate and reliable as they possibly can be. Of course, the results will still only be estimates, but relying, for instance, only on DCF would mean that the final result could not be considered too solid due to the uncertainty related to predicting the company's future. Thus, incorporating the relative valuation to the fundamental valuation of Lockheed Martin will provide us with a better understanding of the value of the company. As Fernández (2001) writes, using relative valuation after first carrying out the valuation using another method will improve the accuracy of the results.

The paper will approach DCF valuation from the firm perspective (FCFF), meaning that both the company's equity and debt are taken into account in the valuation. The goal of FCFF valuation is to calculate the company's projected unlevered free cash flows for the explicit period - 5 years in the case of the paper - and then discount them to their present values using the WACC as a discount rate. The formulas for the calculations have been presented in sub-chapters 1.2, 1.2.1, 1.2.2, and 1.2.3. The calculations are based on the average, low, and high analyst estimates.

The first step is to estimate the company's WACC. Despite everything mentioned prior in the paper, and because no model is perfect, the cost of equity is calculated using CAPM.

Table 2. Weighted average cost of capital (WACC)

Cost of equity	8.74%
After tax cost of debt	4.41%
WACC	8.18%

Source: appendix 1

After establishing the WACC, the company's unlevered free cash flows are calculated based on the assumptions and estimates made in the previous sub-chapter. The WACC is then applied to the free cash flows to calculate their present values. Once the present values of the future free cash flows have been calculated, the terminal value is calculated using the stable growth model. The

WACC discounts the terminal value to its present value, after which the terminal value's present value is added to the sum of the present values of free cash flows to come up with the enterprise value. Finally, the enterprise value is adjusted for debt and cash, meaning that the company's net debt is subtracted from the enterprise value to arrive at the equity value. Equity value is then divided by the outstanding dilutive shares, resulting in the company's intrinsic value per share or the implied share price as seen in the table below.

Table 3. Implied share prices

Implied share price USD (average)	804.12
Implied share price USD (high)	842.98
Implied share price USD (low)	765.18
Actual share price USD	465.31

Source: appendix 1

Notes:

1. The calculations resulting in the implied share prices can be found in appendix 1.

### 3.2. Relative valuation method

As said, the relative valuation method is incorporated into the fundamental valuation to improve the accuracy of the value estimate. To perform the relative valuation, appropriate multiples and the peer group must be determined. The author has chosen to use the following peer group and multiples.

Table 4. Peer group and multiples

Peer group	Multiples
The Boeing Company	P/E (Price-to-Earnings)
Northrop Grumman Corporation	P/B (Price-to-Book)
BAE Systems plc	P/S (Price-to-Sales)
General Dynamics Corporation	EV/EBITDA (Enterprise Value-to-EBITDA)
L3Harris Technologies, Inc.	
RTX Corporation	

Source: Lockheed Martin annual report 2023 (2024c), Hirsimäki (2024)

The particular multiples were chosen because each of them provides a unique view of the company. The P/E ratio is an earnings multiple, which is the most known of the multiples to an ordinary investor. It provides an excellent overall picture of the market and tells us how much investors are

willing to pay for the stock relative to its earnings. While the market offers one valuation estimate of the company, accountants frequently present a very different appraisal of the same company (Damodaran, 2012). Hence, the P/B ratio is also incorporated into the valuation. While the former two equity multiples represent accounting measures and are determined by accounting rules and principles, an alternative measure, revenue, is considered (Damodaran, 2012). The P/S ratio is, therefore, included in the valuation as well. In addition to just equity multiples, the relative valuation will utilize an enterprise value multiple EV/EBITDA. Using an enterprise value multiple in the valuation will provide a broader view of the valuation as it takes both equity and debt into account.

On the other hand, the peer group consists of the companies Lockheed Martin (2024c) has mentioned as its competitors, except for BAE Systems plc., which is not based in the U.S. but is one of the major operators in the industry and thus, included in the valuation. The aerospace and defense industry is relatively exclusive, which means that the companies are influenced more or less by the same factors, making them comparable in terms of risk, growth, and cash flows.

After gathering the peer group and choosing the appropriate multiples, one can calculate the multiples for the companies, as seen in the table below.

Table 5. Lockheed Martin and peer group valuation multiples for 2023

Company	P/E	P/B	P/S	EV/EBITDA
Lockheed Martin Corporation	16.83	17.04	1.72	12.69
The Boeing Company	-46.04	-5.94	1.31	61.19
Northrop Grumman Corporation	35.83	4.98	1.87	19.94
BAE Systems plc	21.79	3.77	1.75	12.04
General Dynamics Corporation	23.65	3.68	1.85	16.34
L3Harris Technologies, Inc.	33.05	2.15	2.09	18.13
RTX Corporation	45.36	2.36	2.10	18.78

Source: appendix 1

To get the benchmark multiples, the author has taken the average values of the peer group multiples. The Boeing Company's P/E ratio, P/B ratio, and EV/EBITDA ratio have been excluded from the calculations to enhance the accuracy of the results. The ratios differ from the rest to the extent that using them would result in distorted averages.

Table 6. Benchmark multiples, outliers excluded

Company	P/E	P/B	P/S	EV/EBITDA
The Boeing Company			1.31	
Northrop Grumman Corporation	35.83	4.98	1.87	19.94
BAE Systems plc	21.79	3.77	1.75	12.04
General Dynamics Corporation	23.65	3.68	1.85	16.34
L3Harris Technologies, Inc.	33.05	2.15	2.09	18.13
RTX Corporation	45.36	2.36	2.10	18.78
Peer group average	31.93	3.39	1.83	17.05

Source: appendix 1

Table 7. The implied share prices based on the benchmark multiples

	P/E	P/B	P/S	EV/EBITDA
Implied share price USD	882.86	92.54	494.40	647.32
Actual share price USD	465.31	465.31	465.31	465.31

Source: appendix 1

Notes:

1. The calculations resulting in the implied share prices can be found in appendix 1.

Lastly, the author has taken the benchmark multiples and applied them to their corresponding financial metrics of the target company to calculate the implied share prices. The results can be seen above in table 7.

### 3.3. Sensitivity analysis

Performing a sensitivity analysis, especially regarding the DCF valuation, is necessary because DCF relies on the assumptions the appraiser has made about the company, and it might be that the appraiser might have been too optimistic or too conservative regarding the inputs. The figure below shows how changes in the discount rate (WACC) and the long-term growth rate affect the valuation, as these are the two figures that have the most significant impact on the implied share price.

		Long-term growth rate						
		1.50%	2.00%	2.50%	3.00%	3.50%	4.00%	<b>4.60%</b>
Discount rate (WACC)	9.68%	\$356.16	\$376.60	\$399.89	\$426.66	\$457.78	\$494.37	\$547.81
	9.18%	\$383.95	\$407.67	\$434.94	\$466.63	\$503.90	\$548.38	\$614.57
	8.68%	\$415.63	\$443.41	\$475.68	\$513.64	\$558.94	\$613.93	\$697.72
	<b>8.18%</b>	\$452.06	\$484.94	\$523.61	\$569.75	\$625.76	\$695.18	\$804.12
	7.68%	\$494.40	\$533.80	\$580.80	\$637.86	\$708.58	\$798.54	\$945.11
	7.18%	\$544.22	\$592.11	\$650.23	\$722.29	\$813.94	\$934.45	\$1,140.84
	6.68%	\$603.67	\$662.90	\$736.31	\$829.69	\$952.48	\$1,121.17	\$1,430.88

Figure 5. Sensitivity analysis (average estimate), the effect of long-term growth rate and WACC on share price

Source: appendix 1

		Long-term growth rate						
		1.50%	2.00%	2.50%	3.00%	3.50%	4.00%	<b>4.60%</b>
Discount rate (WACC)	9.68%	\$373.95	\$395.36	\$419.75	\$447.79	\$480.37	\$518.69	\$574.64
	9.18%	\$403.04	\$427.88	\$456.44	\$489.62	\$528.65	\$575.22	\$644.54
	8.68%	\$436.19	\$465.28	\$499.08	\$538.83	\$586.26	\$643.84	\$731.58
	<b>8.18%</b>	\$474.33	\$508.75	\$549.24	\$597.56	\$656.21	\$728.91	\$842.98
	7.68%	\$518.65	\$559.89	\$609.11	\$668.86	\$742.92	\$837.12	\$990.60
	7.18%	\$570.79	\$620.93	\$681.80	\$757.25	\$853.23	\$979.42	\$1,195.54
	6.68%	\$633.03	\$695.05	\$771.92	\$869.70	\$998.28	\$1,174.92	\$1,499.23

Figure 6. Sensitivity analysis (high estimate), the effect of long-term growth rate and WACC on share price

Source: appendix 1

As seen, the author has put the long-term growth rate of 4.6% on the higher end of the spectrum as it is considered a relatively high growth rate as opposed to the standard practices of using a long-term growth rate of around 2%. Nevertheless, the author wanted to remain consistent in using the risk-free rate as a proxy for the long-term growth rate, even though the end result would be inflated to a certain degree compared to the actual share price of \$465.31. Yet, even if the long-term growth rate would be reduced to 2% in the cases where the cash flows have been calculated based on the average and high estimates, the company would still be considered undervalued by the market at the implied share prices of \$484.94 and \$508.75, respectively.



		Long-term growth rate						
		1.50%	2.00%	2.50%	3.00%	3.50%	4.00%	<b>4.60%</b>
Discount rate (WACC)	9.68%	\$338.39	\$357.86	\$380.05	\$405.56	\$435.20	\$470.06	\$520.96
	9.18%	\$364.89	\$387.48	\$413.46	\$443.65	\$479.15	\$521.52	\$584.58
	8.68%	\$395.08	\$421.54	\$452.29	\$488.45	\$531.60	\$583.98	\$663.81
	<b>8.18%</b>	\$429.81	\$461.13	\$497.96	\$541.92	\$595.27	\$661.41	\$765.18
	7.68%	\$470.16	\$507.69	\$552.47	\$606.82	\$674.19	\$759.89	\$899.51
	7.18%	\$517.64	\$563.26	\$618.63	\$687.27	\$774.58	\$889.38	\$1,085.99
	6.68%	\$574.30	\$630.72	\$700.65	\$789.61	\$906.58	\$1,067.27	\$1,362.30

Figure 7. Sensitivity analysis (low estimate), the effect of long-term growth rate and WACC on share price

Source: appendix 1

However, if the cash flows were calculated based on the low estimates and the long-term growth rate was reduced to 2%, the implied share price would be \$461.13, indicating that the company is slightly overvalued by the market.

### 3.4. Discussion of the results

When looking at the DCF valuation result of \$804.12, which was based on the average analyst estimate, and comparing it to the actual share price of \$465.31, one can be fairly confident that the result of DCF is not necessarily too realistic, as it cannot be possible that the market would have misvalued the stock by that much. The result was not a massive surprise when the risk-free rate was used as a proxy for the long-term growth rate. Nevertheless, when assessing the end result together with the other estimates and their sensitivity analyses, one can see that slight changes in the long-term growth rate bring the implied share price value in a more realistic direction, closer to a value that resembles the actual share price.

On the contrary, the relative valuation gave mixed results. Again, not a huge surprise. As illustrated in Table 5, Lockheed Martin differs from the rest in P/E and P/B ratios and is, in this case, an outlier itself. The company's P/E ratio is approximately half the peer group average, while the P/B ratio is around five times the benchmark multiple. The situation can be explained by the company's current state, as it has suffered from supply chain disruptions since the outbreak of COVID-19. This has caused the company to be unable to deliver the kind of results that investors would have

expected. The company's growth outlook is also by no means the most impressive. However, the P/B ratio shows that investors fundamentally believe in the company's assets.

While the P/E and P/B ratios are not comparable, the P/S and EV/EBITDA ratios offer a more consistent perspective. These ratios, as demonstrated in Table 5, were relatively similar across all companies, providing validation to the DCF valuation. The latter two ratios support the narrative that the market might be undervaluing the company.

The research questions were as follows:

1. What is the fundamental value of the company using the selected valuation methods?
2. Is the company over-/undervalued?

Looking at the results of the DCF valuation and basing the answer on the average analyst estimate as well as the 2% long-term growth rate, the company's fundamental value would be \$484.94, meaning that the market would have undervalued the company. Regarding the relative valuation, the average of the implied share prices derived from P/S and EV/EBITDA ratios results in the implied share price of \$570.86, thus implying that the company would be undervalued by the market.

## CONCLUSION

Global tensions have been on the rise, which is why it was deemed appropriate that the fundamental valuation of Lockheed Martin Corporation would be a suitable topic for the paper. Firstly, using the risk-free rate as a proxy for the long-term growth rate gave very inflated results, which is why the valuation is instead analyzed from the perspective of a 2% long-term growth rate. DCF valuation was done based on the analysts' average, high, and low estimates, of which the average and the high implied that there would be room for value appreciation. In contrast, the valuation based on the low estimate implied that the company would be slightly overvalued by the market. Relative valuation, in turn, showed support for value appreciation in the ratios that were applicable. When looking at the situation as a whole, one can see that the company will probably not see a massive price increase in the near future. However, there still might be room to grow from the current share price.

Sure, the company does not necessarily offer massive growth for investors, but it certainly offers stability, possibly at a slight discount. After all, Lockheed Martin is a mature company operating in a world that will always be filled with bad people, and to get rid of bad people, there need to be companies like Lockheed Martin. Also, provided that the company is able to fix the issues in its production, growth prospects could improve. However, for now, the company is overshadowed by production issues, which can be seen in the uncertainty among the investors.

The study aimed to find the fundamental value for Lockheed Martin Corporation and, therefore, evaluate whether the company is currently a good investment or not. Based on this valuation, the author thinks that current events have presented a possible investment opportunity in Lockheed Martin Corporation despite the production problems. Additionally, the valuation raises the question of the risk-free rate's applicability as a proxy for the long-term growth rate, given the unrealistic results. The importance of sensitivity analysis is further emphasized.



## LIST OF REFERENCES

- Capelle-Blancard, G., & Couderc, N. (2008). What drives the market value of firms in the defense industry? *Review of Financial Economics*, 17(1), 14–32.  
<https://doi.org/10.1016/j.rfe.2007.02.001>
- CNBC. (2024). Check out US TREASURY-CURRENT 10 YEAR's Stock Price (US10Y) in Real Time. Retrieved April 15, 2024, from <https://www.cnbc.com/quotes/US10Y>
- Corelli, A. (2017). *Inside Company Valuation*. Springer International Publishing.  
<https://doi.org/10.1007/978-3-319-53783-2>
- Damodaran, A. (2011). *The Little Book of Valuation: How to value a company, pick a stock and profit* (Vol. 34). John Wiley & Sons Inc.
- Damodaran, A. (2012). *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* (3rd ed.). John Wiley & Sons Inc.
- Damodaran, A. (Director). (2019, March 4). *Session 10: Growth Rates, Terminal Value & Model Choice*. [https://www.youtube.com/watch?v=ZTw3V\\_m-I9g&t=1379s&ab\\_channel=AswathDamodaran](https://www.youtube.com/watch?v=ZTw3V_m-I9g&t=1379s&ab_channel=AswathDamodaran)
- Damodaran, A. (2024a). *Betas*. Betas by Sector (US). Retrieved April 15, 2024, from [https://pages.stern.nyu.edu/~adamodar/New\\_Home\\_Page/datafile/Betas.html](https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/Betas.html)
- Damodaran, A. (2024b). *Country Default Spreads and Risk Premiums*. Retrieved April 15, 2024, from [https://pages.stern.nyu.edu/~adamodar/New\\_Home\\_Page/datafile/ctryprem.html](https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html)
- Damodaran, A. (2024c). *Ratings and Coverage Ratios*. Retrieved April 15, 2024, from [https://pages.stern.nyu.edu/~adamodar/New\\_Home\\_Page/datafile/ratings.html](https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ratings.html)

- De Bondt, W. F. M., & Thaler, R. (1985). Does the Stock Market Overreact? *The Journal of Finance*, 40(3), 793–805.
- Dempsey, M. (2013). The Capital Asset Pricing Model (CAPM): The History of a Failed Revolutionary Idea in Finance? *Abacus*, 49(S1), 7–23. <https://doi.org/10.1111/j.1467-6281.2012.00379.x>
- European Defence Agency. (2023, November 30). Record High European Defence Spending Boosted by Procurement of New Equipment. Retrieved February 26, 2024, from <https://eda.europa.eu/news-and-events/news/2023/11/30/record-high-european-defence-spending-boosted-by-procurement-of-new-equipment>
- Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *The Journal of Finance*, 25(2).
- Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 33(1), 3–56. [https://doi.org/10.1016/0304-405X\(93\)90023-5](https://doi.org/10.1016/0304-405X(93)90023-5)
- Fazzini, M. (2018). *Business valuation: Theory and practice*. Palgrave Macmillan.
- Fernández, P. (2001). *Valuation using multiples. How do analysts reach their conclusions?*
- Frazzini, A., & Pedersen, L. H. (2014). Betting against beta. *Journal of Financial Economics*, 111(1), 1–25. <https://doi.org/10.1016/j.jfineco.2013.10.005>
- Google Finance. (2024). Lockheed Martin (LMT) Osakekurssit ja uutiset. Retrieved April 18, 2024, from <https://www.google.com/finance/quote/LMT:NYSE>
- Grossman, S., & Stiglitz, J. (1980). On the impossibility of informationally efficient markets. *The American Economic Review*, 70(3).
- Hitchner, J. (2017). *Financial Valuation: Applications and Models* (4th ed.). John Wiley & Sons Inc.

- Kisman, Z., & Restiyanita M., S. (2015). The Validity of Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT) in Predicting the Return of Stocks in Indonesia Stock Exchange. *American Journal of Economics*, 1(3).
- Koller, T., Goedhart, M. H., & Wessels, D. (Eds.). (2010). *Valuation: Measuring and managing the value of companies*. John Wiley & Sons Ltd.
- LeRoy, S. F., & Porter, R. D. (1981). The Present-Value Relation: Tests Based on Implied Variance Bounds. *Econometrica*, 49(3).
- Lockheed Martin*. (2023). [Annual report 2022]. Lockheed Martin Corporation. <https://www.lockheedmartin.com/content/dam/lockheed-martin/eo/documents/annual-reports/lockheed-martin-annual-report-2022.pdf>
- Lockheed Martin*. (2024a). A Merger of Equals. Retrieved April 19, 2024, from <https://www.lockheedmartin.com/en-us/news/features/history/merger.html>
- Lockheed Martin*. (2024b). About Us. Retrieved April 19, 2024, from <https://www.lockheedmartin.com/en-us/who-we-are.html>
- Lockheed Martin*. (2024c). [Annual report 2023]. Lockheed Martin Corporation. <https://www.lockheedmartin.com/content/dam/lockheed-martin/eo/documents/annual-reports/lockheed-martin-annual-report-2023.pdf>
- Lockheed Martin*. (2024d). Jim Taiclet. Retrieved April 19, 2024, from <https://www.lockheedmartin.com/en-us/who-we-are/leadership-governance/james-taiclet.html>
- Lockheed Martin*. (2024e). Aeronautics. Retrieved April 19, 2024, from <https://www.lockheedmartin.com/en-us/who-we-are/business-areas/aeronautics.html>
- Lockheed Martin*. (2024f). Missiles and Fire Control. Retrieved April 19, 2024, from <https://www.lockheedmartin.com/en-us/who-we-are/business-areas/missiles-and-fire-control.html>

- Lockheed Martin*. (2024g). Rotary and Mission Systems. Retrieved April 19, 2024, from <https://www.lockheedmartin.com/en-us/who-we-are/business-areas/rotary-and-mission-systems.html>
- Lockheed Martin*. (2024h). Space. Retrieved April 19, 2024, from <https://www.lockheedmartin.com/en-us/who-we-are/business-areas/space.html>
- Lockheed Martin*. (2024i). Lockheed Martin Reports Fourth Quarter and Full Year 2023 Financial Results. Retrieved April 19, 2024, from <https://news.lockheedmartin.com/2024-01-23-Lockheed-Martin-Reports-Fourth-Quarter-and-Full-Year-2023-Financial-Results>
- Pinto, J. E., Henry, E., Robinson, T. R., & Stowe, J. D. (2010). *Equity asset valuation* (2nd ed.). John Wiley & Sons Inc.
- Ross, S. A. (1976). The arbitrage theory of capital asset pricing. *Journal of Economic Theory*, 13(3), 341–360. [https://doi.org/10.1016/0022-0531\(76\)90046-6](https://doi.org/10.1016/0022-0531(76)90046-6)
- Schmidlin, N. (2014). *The Art of Company Valuation and Financial Statement Analysis: A Value Investor's Guide with Real-life Case Studies*. John Wiley & Sons Ltd.
- Sharpe, W. F. (1964). Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk\*. *The Journal of Finance*, 19(3), 425–442. <https://doi.org/10.1111/j.1540-6261.1964.tb02865.x>
- Trugman, G. R. (2012). *Understanding business valuation: A practical guide to valuing small to medium-sized businesses* (Fourth edition). American Institute of Certified Public Accountants.
- Yahoo Finance*. (2024a). Lockheed Martin Corporation (LMT) Analyst Ratings, Estimates & Forecasts - Yahoo Finance. Retrieved April 29, 2024, from <https://finance.yahoo.com/quote/LMT/analysis/>
- Yahoo Finance*. (2024b). Stock Market Live, Quotes, Business & Finance News. Retrieved May 01, 2024, from <https://finance.yahoo.com/>





## APPENDICES

### Appendix 1. Electronic material

Lockheed Martin Corporation 3-statement model, DCF, sensitivity analysis and relative valuation:

<https://www.dropbox.com/scl/fi/oh421rlmnuja7wrq1p31g/Electronic-material.xlsx?rlkey=hw3lsbdt1xszs7r2bj23mml5&st=dwk1j630&dl=0>

Source: appendix 2, author's calculations based on data obtained from Yahoo Finance (2024b)

### Appendix 2. Components of WACC calculation

Risk-free rate	4.6%
Unlevered beta	0.9
Equity risk premium	4.6%
Default spread	0.59%

Source: CNBC (2024), Damodaran (2024a, 2024b, 2024c)



## Appendix 3. Non-exclusive licence

### A non-exclusive licence for reproduction and publication of a graduation thesis<sup>1</sup>

I Jussi Hirsimäki

1. Grant Tallinn University of Technology free licence (non-exclusive licence) for my thesis Valuation of Lockheed Martin Corporation using discounted cash flow and relative valuation methods,

supervised by Kalle Ahi,

1.1 to be reproduced for the purposes of preservation and electronic publication of the graduation thesis, incl. to be entered in the digital collection of the library of Tallinn University of Technology until expiry of the term of copyright;

1.2 to be published via the web of Tallinn University of Technology, incl. to be entered in the digital collection of the library of Tallinn University of Technology until expiry of the term of copyright.

2. I am aware that the author also retains the rights specified in clause 1 of the non-exclusive licence.

3. I confirm that granting the non-exclusive licence does not infringe other persons' intellectual property rights, the rights arising from the Personal Data Protection Act or rights arising from other legislation.

---

08 May 2024

---

<sup>1</sup> The non-exclusive licence is not valid during the validity of access restriction indicated in the student's application for restriction on access to the graduation thesis that has been signed by the school's dean, except in case of the university's right to reproduce the thesis for preservation purposes only. If a graduation thesis is based on the joint creative activity of two or more persons and the co-author(s) has/have not granted, by the set deadline, the student defending his/her graduation thesis consent to reproduce and publish the graduation thesis in compliance with clauses 1.1 and 1.2 of the non-exclusive licence, the non-exclusive license shall not be valid for the period