

Valuing U.S. Corporates by Applying Discounted Cash Flow Valuation

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<p>Description</p> <p>In the context of financial industry, there is always a possibility that companies' stocks are traded at non-equilibrium prices on the stock market in comparison with their intrinsic values and potential growth in the future. Therefore, studying valuation is very important because it enables us to determine if companies are correctly valued by the stock market.</p> <p>To address this problem, a valuation model named Discounted Cash Flow has been used to determine intrinsic values of 100 U.S. corporates in ten different sectors. These companies are all currently operating and trading on New York Stock Exchange. This problem inherently requires working with a lot of numbers and calculations, therefore, a quantitative research has been conducted. Concerning data usage, secondary data has been used. Various types of historical data were collected, including seven-year historical accounting data from 2010 to 2016, daily stock performances of each company, and daily stock performances of the general stock market. Apart from that, a Discounted Cash Flow model has been built on Microsoft Excel to perform the valuation tasks with the aim of generating three types of values, including enterprise value, equity value, and equity value per share.</p> <p>The findings showed that the majority of 100 firms were undervalued in all three categories of values. In other words, these companies were underrated by the stock market. For enterprise value, while 53 firms across ten sectors were found undervalued, 47 firms were found overvalued. For equity value, while 55 firms across ten sectors were found undervalued, 45 firms were found overvalued. Finally, for equity per share, while 54 firms across ten sectors were found undervalued, 46 firms were found overvalued.</p>		
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Miscellaneous Appendices attached (103 pages)		

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Abbreviations

DCF	Discounted Cash Flow
NYSE	New York Stock Exchange
U.S.	United State of America
CF _d	Debt cash flow
K _d	Required return to debt
FCF	Free cash flow
WACC	Weighted average cost of capital
ECF	Equity cash flow
K _e	Required return to equity
CCF	Capital cash flow
WACCBT	Weighted average cost of capital before tax
R _f	Risk-free rate
β	Beta
R _m – R _f	Market risk premium
CAPM	Capital Asset Pricing Model
M&A	Mergers and Acquisitions
IPO	Initial Public Offerings
GDP	Gross Domestic Product
EBIT	Earnings before interest and taxes
EBITDA	Earnings before interest, taxes, and depreciation amortization
EBIAT	Earnings before interest after taxes

1. Introduction

1.1. Background

We all know that every publicly listed company's stock is trading at a specific price on the stock market. But not everyone knows if that price truly reflects the company value. That is the reason why determining the real value of a company is a crucial topic in finance. In finance, this topic is called valuation. Valuation has a huge impact on the national, regional, and global level. Non-equilibrium valuations could negatively influence the entire domestic stock market and may lead a nation to an economic recession. For instance, an overheated stock market may suddenly blow itself up and cost a nation a fortune when all the stock prices dropped unexpectedly to get back to their real values. When the crisis happens and panics spread widely, it may result in financial disruptions at regional and global level. Given the influential role of the valuation, I believe that valuation is a vital part of not only the financial market but also the entire economy. At this point of writing, valuation is a contemporary topic in both academic and business fields. With endless curiosity in finance, I am motivated to find out why stock prices are trading at this price but not other prices and how I can pick an increasing stock instead of decreasing one to invest in the future. This personal motivation encourages me to conduct this research. In addition to that, many earlier studies have been found focused too heavily on theoretical concepts and formulas construction, instead of empirical and practical aspects. In addition to that, there is a shortage of empirical studies in this area, too. Conducting this research gives me fulfillments of satisfying my curiosity and excitements of contributing to the current shortage.

1.2. Relevance of the Topic

In the context of financial industry, companies' stocks could be traded at the non-equilibrium prices compared to their true performances and potential growth in the future. And therefore, this study determines to answer the question which stocks are currently trading at the non-equilibrium prices by using a Discounted Cash Flow (DCF) valuation model. Concerning its practicality, by determining the intrinsic values of 100 U.S. corporates, this study could be used as a crucial source of information assisting top managers in their decision-making process. It could be about

picking the right stocks or defining short- and long-term strategies. Some of these decisions could be seen as follows

- If the stock is found traded at higher than its true value, managers may need to come up with solutions to normalize its stock price before it becomes an uncontrollable bubble and busts accidentally.
- In contrast, if the price is traded at a lower level, managers may need to go for a new strategy to raise the stock performance, protect company's investors, communicate with the press, and calm the public to minimize the possible damages.

The thesis's topic is relevant because valuation is the fundamental knowledge that every person practices in finance field should know about. In this thesis, I will estimate the true values of 100 U.S. companies using the DCF model. These companies are currently traded on New York Stock Exchange (NYSE) and belong to ten different sectors. For each sector, ten companies are selected. The following are ten sectors, categorized by NYSE

1. Basic Industries
2. Capital Goods
3. Consumer Durables
4. Consumer Non-Durables
5. Consumer Services
6. Energy
7. Health Care
8. Public Utilities
9. Technology
10. Transportation

1.3. Research Approach, Objectives, and Questions

The research approach is quantitative since all data used in this research are numerical data which are primarily from the balance sheet, income statement, cash flows, and stock market return. Data were used as inputs for various mathematical formulas and variables to estimate the intrinsic values of companies. The data are then imported into

Microsoft Excel to process since the researcher has constructed the DCF model within this program.

The problem this dissertation aims to address is that there is always a possibility that companies' stocks are traded at non-equilibrium prices on the stock market. In other words, their performances and potential growth do not match with the prices currently trading. Through this topic, I want to find out whether they are traded at the equilibrium prices. With this objective, this research tries to answer these questions

The principal research question addressed in current dissertation is

- Which of 100 U.S. companies analyzed in the sample are overvalued or undervalued?

Similarly, the supplementary research question explored in the current thesis is

- What investment strategies should stock investors consider for each company?

Regarding the methodology and data analysis, the following points are worth noticing. First of all, the research is quantitative in nature. It uses precise and accurate measurements to evaluate the value of companies. As stated above, data used in this study are mainly accounting and stock market data, and therefore they are totally accurate, static, and unchanged. Microsoft Excel program is deployed to process these inputs. This research is an empirical study in nature, and therefore, its results require less elucidation. Some of the traits reflect the quantitative nature are as follows: working with numbers, containing researchers' viewpoints rather than participants' ones, the relationship between researchers and companies is distance rather than close, data and number used in this research are static, and the input is hard reliable data rather than rich deep data.

Concerning about data sources, this thesis uses the internet for gathering data. The data are collected mostly from the following websites Yahoo! Finance, World Bank, U.S. Department of the Treasury, Rocket, and Stockrow. This dissertation uses these sources interchangeably in order to ensure the quality of the information and the sufficiency of them. Each source has its weakness so using a combination of them will address these challenges. For example, while the research needs 7-year data from 2010 to 2016, Yahoo! Finance source only provides only 3-year data from 2014 to

2016 or 4-year data from 2013 and 2016. However, Rocket and Stockrow, on the other hand, provide 10-year data. Alternatively, Yahoo! Finance provides the most updated trading price on the stock market for all companies, that none of the other sources provide.

1.4. Structure of the Thesis

This thesis has divided into six chapters. Starting with Introduction chapter, it shortly summarizes all aspects of the thesis, including objectives, methodologies, research questions, the relevance of the topic, and motivations of the researcher. The second chapter is Theoretical Literature Review. This chapter introduces various concepts, definitions, practical utilities of valuation, different valuation models, and more importantly almost all aspects related to the DCF model, such as different types of cash flows and the DCF formulation. This essentially enables readers to understand the entire picture of valuation and the DCF model. The third chapter is Empirical Literature Review. This chapter focuses on reviewing earlier empirical research. Three major sub-topics have been mentioned here are the applications of valuation, factors affect valuation, and the accuracy of DCF methods. The goal of this chapter is to offer readers an insightful look at current trends and developments of the valuation topic within the research field, and display connections between empirical and theoretical knowledge. The fourth chapter is Methodology. It consists of research approach, research context, data collection, and data analysis. This chapter offers rationale and justifications for why the research was conducted using a particular approach, how well it suits the thesis, where and how data were collected, and how the valuation process goes step-by-step. The fifth chapter is Results, and it presents the final results of the thesis in a comprehensive and in-depth way to answer the given research questions. Analyses and interpretations are given out to interpret the results and implications. The final chapter is Discussions. It consists of three major parts which are the summary of key findings, practical implications, and limitations and recommendations.

2. Theoretical Literature Review

2.1. Value

There are two prominent schools of thought concerning the topic of valuing company lately. The first is of those who believe finance fundamentals have nothing to do with the intrinsic value of company. They argue that the market price of companies is determined by judgments of buyers and sellers, not by fundamentals such as dividends, income, earnings, and cash flows. The second is of those who affirm that the intrinsic value derives from finance fundamentals and thus sooner or later the market values will catch up with this value or at least fluctuate around this point. (Damodaran 2016.) One of the primary principles of investment is that we do not pay more than what it is worth. Although the principle is clear, many people let others' opinions influence too much on their decisions. Meaning that they decided to buy or sell certain stocks because their friends bought or sold them several days ago. It is true that perceptions may matter but they are not all. The reason is that when we invest in a stock, we expect to see its future return instead of throwing money randomly somewhere because of being told by someone. Thus, one should be aware that the perceptions of value should come from the reality, not from the bias. An investment should be made based on the company's potential of generating cash flows in the future, thus the price we pay for that stock should match our expectation of the company's performance. (ibid., 1.)

A company value is perceived differently among different people. For instance, in the context of mergers and acquisitions deals, the selling company will put the value of its companies on the table differently for different potential buyers. The term "value" should be well-perceived because it is not the same as price. Price is the specific point of prices at which both the seller and the buyer agreed to trigger the transaction. There is a wide variety of reasons why the value of a company changes continuously but not fixed. (Fernandez 2007.) For example, an international company which desperately needs to access to the local market will be willing to pay much more to buy a local firm compared to another domestic player trying to acquire the same firm.

2.2. Valuation in general

There are two predominant streams of perceptions about the valuation. The first stream is of those who view the valuation process as a hard science with rigid models and structures. Accordingly, there will only be one correct answer for a problem, no room for flexibilities, errors, and analysts' views. The other stream is of those who view the valuation process more of an art. Investors and analysts, therefore, have more room for their own well-thought analyses, enabling them to produce a diverse range of results. Having said all that, the credible approach should be the one balancing the two streams, lying somewhere in the middle. (Damodaran 2016.)

Valuation is one of the core competencies that every person involved in the finance field should be aware of. Apart from the utility in mergers and acquisitions area, it has tremendous other utilities as follows. (Fernandez 2007.)

- For selling and buying company activities, conducting the valuation helps the seller know the lowest price point that he would accept, and the highest price point the buyer would pay for.
- For trading stocks, the valuation helps investors determine the price point for their picking stocks and provides them the ability to compare self-calculated price with the market price of stocks. Therefore, investors are able to make the better decision on whether to sell, hold, or buy a particular share.
- It is also useful for Initial Public offerings (IPOs). Knowing the true value of the company before offering shares to the public helps the company's management justifies the market price.
- The valuation could be used to evaluate inheritances and wills. It enables the comparison between the value of shares and the value of other types of assets.
- It assists in building a fair compensation program. The valuation supports companies or its departments to determine value creation from their executive efforts, in which the compensation program is based on.
- The valuation can identify the primary value drivers within a company through valuing the company or its business units.
- It provides the strategic decisions for the company on whether it should continue, expand, grow, slow down, halt, stop or sell itself to the other firm.
- It is useful for the long-term planning. The valuation offers the feasible suggestions for keeping or losing focuses in particular markets, business lines,

products, services, and customer segments. Also, the valuation provides a tool for measuring the effectiveness of company's strategies and policies on value creation and destruction.

There are three significant issues an analyst should pay attention to when performing the valuation process. They are the human bias, the uncertainty, and the complexity and the development of valuation models. (Damodaran 2016, 2.)

2.2.1. Valuation issue 1: The Bias

The bias plays such a big role in influencing the result of valuation. Concerning the act of picking a company to evaluate, the choices often derive from personal biases. This is because we often choose a company for reasons rather than picking up randomly. (Damodaran 2016, 2.) Those biases could originate from friends, colleagues, other investors, analysts, personal interest for studying a particular company, or even from some breaking news circulating by online media outlets. Moreover, if the analyst is working in the financial industry, he can easily form a universal idea about a particular company through his friends' and colleagues' mindset. Aside from that, the market's estimate value of a company can substantially make the analysts questioned themselves about their valuations. If the valuation goes too far from the market's estimate, it may make the analyst think that his valuation is wrong rather than the market is wrong. The other source of bias is known as the institutional factor. As for equity research companies, they often issue the buy recommendations rather than sell signals. This is because analysts not only have difficulties to access to information of the companies which they have already issued the sell recommendation, but they intentionally restrict themselves from performing valuations on these companies due to the conflict of interest originating from their upper managers and company's partners. For instance, many managers could potentially hold a large chunk of share of *should-sell* companies and some investment banks, partners of the equity research firm, applied pressure to analysts not to give out the "sell" signal. The additional source of bias is the reward and punishment structure associated with analysts' compensation. It is natural that almost everyone wants better salary, larger compensation, and promotions. Considering the context of mergers and acquisitions, these goals may not be achieved if an analyst finalizes his valuation process with the conclusion that the selling company is overvalued and then presents this result to his customer - the acquiring company. Doing this gets the analyst nothing

but deep gratitude from the customer since the overpriced deal should not be done. Conversely, the analyst may enjoy a huge chunk of compensations and bonus if he arrives with the conclusion that the firm is undervalued since it surely compels the acquiring company much more to close the deal. (ibid., 2-3.)

The bias could be formed from the beginning of valuation process till its end. Analysts often start off by picking a company with intentional motives. Because of this bias, they collect the data for valuation in a way that best serve their interest since the inputs do not only contain raw numbers but also the management practices which can be deliberately interpreted in different ways - positive and negative. (ibid., 2.)

2.2.2. Mitigate the Bias

Bias is something that cannot be regulated. As a human, it is natural that almost all analyst is subject to some sources of bias at a certain degree when it comes to valuation. Obviously, the idea of eradicating the bias is almost impossible, and therefore, the only thing we could do is to minimize the impact of its in the valuation process. The general strategy is that we could either protect valuation process from outside influencers or report the bias after finishing the valuation. Hereunder are the five specific approaches. (Damodaran 2016, 2-3.)

- Reduce institutional pressures: Research analysts should be treated fairly and protected from the upper managers when they issue the sell recommendations.
- Separate valuations from reward and punishment structure: As long as the company continues to favor the undervalued valuation, the bias continues to exist. In short, isolating the valuation process from the deal making process will address this issue.
- Not revealing the intentions beforehand: The acquiring company should not publicly inform its position on the value of the target company before the valuation is concluded. Because that somehow pushes financial analysts to arrive with the valuation that justifies the company's position.
- Self-awareness: The bias could be mitigated significantly if analysts aware of their biases on their works. High level of self-awareness may allow them to choose objective inputs and conduct the transparent valuation process.
- Bias revealing: It will be helpful if there is a policy encouraging analysts to reveal their bias up front before conducting the valuation process. By doing

this, readers of the valuation report could understand the standpoints of analysts while reading the report.

2.2.3. Valuation issue 2: The Uncertainty

In science subjects, such as mathematics and physics, we often look at final results to evaluate the quality of the process in solving problems. However, this type of judgment cannot apply to the valuation process because there are many uncertainties accompanied with the process. Even the best valuations have a certain degree of error. With this nature, we could say that the uncertainty is part of the valuation process. We usually start off the process of valuation with some general ideas about the value of the company. But then when the process evolves and we obtain more and more information, our first impression about the firm may change. This information could derive from the firm-specific, sector, or general market level. As part of the valuation process, we need to make a series of predictions on various aspects of the business. With all information at hands, we have to make educated guesses about the future of the company. However, there are no guarantees that all of our forecasts will be correct due to various uncertainty factors. The first factor is estimation uncertainty. Although we could access the valuable sources of information, the valuation could still suffer the estimation error if we make mistakes in transforming that raw information into inputs or wrongly use these inputs in models. The second factor is firm-specific uncertainty. All of our educated predictions about the future of the company could be wrong. The company may perform significantly better than or worse than what we expected in terms of cash flows and earnings. Finally, it is macroeconomic uncertainty. Assuming we predicted correctly at the firm level, the changes of economic policies at the government level could easily divert the company to the different track. These changes may include the fluctuation of the interest rate or government spending. (Damodaran 2016, 4-5.)

2.2.4. Dealing with the Uncertainty

Classifying the uncertainties into three categories as estimation uncertainty, firm-specific uncertainty, and macroeconomic uncertainty helps us figure out which one we should put the maximum effort to contain and which one we should not. As for estimation uncertainty, the strategy is to build a well-constructed model so it will minimize the effects of wrong estimations. However, this strategy will not have much impact on firm-level and macroeconomic uncertainties. As for firm-specific level,

analysts should give their best shots on estimating the future of company based on the readily available information. Analysts should address questions like – Will the company grow or shrink? What will the cash inflow and outflow be? – Another important note is that analysts should not add the macroeconomic flavor into their valuation. Because it may give analysts a hard time to justify their valuation. For instance, an analyst predicted the interest rate will increase one percent over the next year and applied this prediction into the process of valuation. When the valuation is done, the analyst will have a hard time to answer how much of his valuation reflected the macroeconomic uncertainty and how much reflected his personal views. In brief, analysts should focus on addressing the estimation and firm-level uncertainties rather than macroeconomic uncertainties due to its high unpredictability nature. Building the better models and gathering reliable information to estimate are the primary steps to alleviate the uncertainties. When there are changes in the macroeconomic environment, we can simply update the model accordingly to reflect new information. In general, valuation process may not be static but change over time because new information keeps coming. (Damodaran 2016, 5-7.)

2.2.5. Valuation issue 3: The Complexity of Valuation

The revolutions of computer, mobile phone, and information technology at the present time have changed valuation in a big way. Computers have enhanced the ability of calculating and multi-tasking to the whole new level. For example, any formulas in valuation models could be addressed within a second. In addition to that, information becomes richer, more diverse, and accessible than ever. Which means we can easily access and obtain the historical data of hundreds of companies for the valuation purpose. On the flip side, these developments bring a huge challenge of complexity which can significantly affect the valuation works. The major part of that complexity is about the information. There is a debate amongst experts over the issue that whether analysts should use as much information as possible or just use enough. Those who use more information than needed in the valuation models believe they will make their predictions and valuations more exact and closer to the reality. In contrast, the opponents of this view argue that doing so just make the valuation models expose to more errors because the overuse of information will create more and more inputs. For instance, if an analyst breaks down working capital into smaller components such as accounts payable, receivable, inventory, and others, he will need to make predictions for each item. However, this process is only helpful if he thoroughly understands the

differences between those components. (Damodaran 2016.) Damodaran is the believer of the latter view. Concerning the approach of using information more than needed, analysts may suffer several issues. The first issue is the overload of information. Analysts may be put in the dilemma that forces them to choose one view between two opposite views regarding their target companies. As a result, analysts may end up not knowing which source of information should be used or choosing randomly between the two as the inputs for their valuation models. The second issue is *black box syndrome*. The models become more and more complex and reach to the point that analysts cannot explain how models work. Consequently, with the result of valuation at hands, the analysts may only be able to answer, “It’s the value produced by the model” rather than “It’s the value we examined.” Finally, it is the problem of separating big and small assumptions. The sophisticated models often generate massive outputs. Thus, it makes the distinction between assumptions become much harder. For example, if a big assumption is that the company will remain its pretax operating margins at 20 percent for the next couple of years, this prediction has to contend with the small assumption of the decrease of 4 percent in the revenue causing by accounts receivable predicted 10 years into the future. (ibid., 8-9.)

2.2.6. Dealing with the Complexity of Valuation

Complex models are not always the good approaches to go for. Solving a mathematics problem is a good example for this view. If we only need five steps to find the final answer, there are no reasons to do it in ten steps. Damodaran (2016) believes valuation should share this same value. If three inputs are enough to produce the value of a company, we should not add extra inputs into the model. If we can find the value of a company by forecasting cash flows three years into the future, we do not need to go with ten years. (ibid., 9.)

2.3. Valuation Models

While there are a number of methods could be used to value a company, most of them could be classified into six groups. (see Table 1.)

Table 1. Main Valuation Methods (adapted from Fernandez 2007)

Main Valuation Methods					
Balance Sheet	Income Statement	Mixed (Goodwill)	Cash Flow Discounting	Value Creation	Options
<ul style="list-style-type: none"> •Book value •Adjusted book value •Liquidation value •Substantial value 	<ul style="list-style-type: none"> •Multiples •PER •Sales •P/EBITDA •Other multiples 	<ul style="list-style-type: none"> •Classic •Union of European Accounting Experts •Abbreviated income •Others 	<ul style="list-style-type: none"> •Equity cash flow •Free cash flow •Capital cash flow •Debt tax shield 	<ul style="list-style-type: none"> •EVA •Economic profit •Cash value added •CFROI 	<ul style="list-style-type: none"> •Black and Scholes •Investment option •Expand the project •Delay the investment •Alternative uses

The first four groups starting from the left are the most frequently used valuation methods, including balance sheet-based methods, income statement-based methods, mixed methods and cash flow discounting-based methods. Among the four, the cash flow discounting-based methods are the only conceptually “correct” methods. Moreover, they become increasingly prevalent at the present time. Although the other methods are conceptually “incorrect”, many keep using them. (Fernandez 2007, 2.) Damodaran (2016, 10) also supported this viewpoint by pointing out that this approach is widely taught in academic institutions since it has the best theoretical credentials.

Alternatively, Damodaran (2016, 9) classified valuation models into three groups. Firstly, it is discounted cash flow valuation which is the same as cash flow discounting-based methods mentioned above. The second category is the relative valuation which values the company by examining the pricing of assets relative to its revenue, profit, earnings, sales and other similar variables. The final one is the contingent claim valuation which utilizes option pricing models to estimate the value of assets that have option characteristics. It is worth noticing that these three approaches produce different results from each other when estimating value of the same company. (ibid.)

2.4. Discounted Cash Flow Valuation (DCF)

As mentioned above, the cash flow discounting-based valuation is also known as the discounted cash flow valuation. Interestingly, the latter term is much more well-known to academics and practitioners at this point in time than the first one.

Damodaran (2016) also favors the term DCF in his valuation book. DCF methods view a company as a cash generator in which it expects the company to continuously generate new flows of cash in the future. Concerning about the process of using DCF methods, Fernandez (2007) said that the methods will forecast the future cash flows for a company and then discounted these flows back to the present time by using appropriate discount rates, which represents the flows' risks. Although many researchers may use different symbols to illustrate the DCF formula, the general formula is as follows, written by Fernandez in his research in 2007.

This formula applies for all different DCF methods.

$$V = \frac{CF_1}{1+k} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \dots + \frac{CF_n + VR_n}{(1+k)^n}$$

in which

CF_i : Cash flow generated in the period i ;

k : appropriate discount rate for the cash flows' risk;

V_n : Residual value of the company in the year n . Residual value stands for the discounted value of all cash flows after a certain point of time, calculating based on the assumed constant growth rate. For example, we forecast the cash flows of a company five years into the future, so the residual value is the value beyond the fifth year.

As can be seen, the formula is formed in the indefinite duration despite looking a lot like temporary period based on the value given to "n". To obtain the company's value, the residual value needs to be calculated, based on the assumption of a constant growth rate (g) of flows after the year n (Fernandez 2007). Following is the simplified formula for estimating the residual value. (ibid., 9).

$$VR_n = CF_n(1+g)/(k-g)$$

Although the value of a company could be calculated in the perpetual period, it is not reasonable to do so since the present value will be dropped significantly in far future. Additionally, many companies usually lose its competitive advantages after a certain number of years. (ibid.)

According to Fernandez (2004c), we can use up to ten different methods to value a company on the basis of the DCF valuation. Those ten are based on free cash flows; equity cash flows; capital cash flows; economic value added; risk-free rate-adjusted equity cash flows and free cash flows; adjusted present value; economic profit; business's risk-adjusted free cash flows and equity cash flows. (ibid., 1.) Fernandez (2004c, 1) went further and suggested that all these ten methods yield the same value in a logical way. The condition is that all these techniques are used to evaluate the same reality with the same hypotheses. On the other hand, Damodaran (2016) categorized the DCF models into three groups. The first is the valuation of a business as a going concern rather than a collection of assets. The second group includes two methods which are valuing the whole company and valuing company's value. Finally, there are two more ways of doing DCF valuation – a value based on excess returns and the adjusted present value. (10.)

In order to understand these valuation methods, there are three different types of cash flows needed to be clarified, including the debt cash flows, the free cash flows, and the equity cash flows and each of them has a distinct discount rate. (Fernandez 2007, 9.)

2.5. Discounted Cash Flow Valuation: Advantages and Limitations

The DCF valuation is significantly beneficial if using appropriately, it is substantially valuable for analysts (Damodaran 2016, 15). The DCF approach is designed in a way that prompts analysts to understand deeply about the business, industry, and sector. Therefore, if the DCF valuation is carried out appropriately, analysts will learn a lot from these aspects after conducting multifaceted analyses of target companies, especially their cash flows, risks, and earnings. Those who pursue the DCF valuation method are on the same page with Warren Buffet, one of the most successful investors in the world, in a sense that investments are made because of the underlying business, not the stock itself. Despite having that plus point, the DCF valuation is inherently

contrarian in a way that it emphasizes on the finance fundamentals rather than market perceptions. As a result, if the estimated value of the target company is lower than the market price, DCF valuation concludes that the company is overvalued. Similarly, when the estimated value is higher than the market, the conclusion is the company is undervalued. (ibid., 15.)

Aside from these advantages, there are several limitations of the DCF valuation. When the DCF valuation is deployed by frivolous analysts, the result may stray too far from – lower or higher – the true value. The second drawback is the DCF valuation requires a lot of information for inputs because we need to estimate cash flows, company's growth rate, and discount rates. Finally, by using the DCF models, analysts will often find their estimated companies, industries, sectors, or even the stock market overvalued if the fundamentals are undermined by market perceptions. This issue creates a dilemma for equity research analysts because their workplace usually tends to favor undervalued company rather than overvalued ones. Because of that, they have to choose whether to stick with the DCF valuation and reflect everything is overvalued or choose alternative valuation techniques that are closer to market perceptions. Since the first option may lead them to go out of the business, they often prefer the later choice. (ibid., 15.)

2.6. Three Type of Cash Flows and Their Appropriate Discount Rates, and the Economic Balance Sheet

Table 2 lists the three types of cash flows and their correspondent discount rates. Meaning that a company can be valued using either the debt cash flows or the equity cash flows or the free cash flows with its correspondent discount rate as the required return to equity or the required return to debt or the weighted average cost of capital, respectively. The full details of each cash flows will be mentioned in the next section.

Table 2. Three type of cash flows and their appropriate discount rates (adapted from Fernandez 2007)

Cash Flows	Appropriate Discount Rate
CFd : Debt cash flow	Kd :Required return to debt
FCF : Free cash flow	WACC :Weighted average cost of capital
ECF : Equity cash flow	Ke :Required return to equity

The economic balance sheet is an important concept when valuing a company, therefore figure 1 is presented to give more details about it. The figure mentioned the distinctions between the full balance sheet and the economic balance sheet. For the valuation, we use the economic balance sheet, not the full balance sheet. From this point forward, when the thesis mentions company's liabilities or financial liabilities, it refers to the sum of shareholders' equity (Ebv or E) and company's debt (D), not the entire liabilities from the balance sheet. And more importantly, this sum is equal to the company's value. Given the importance of the term, whenever the company's value appears beyond this point, it is understood as the total of debt and shareholders' equity. Similarly, when the thesis mentions company's assets or financial assets, it refers to the sum of total working capital requirements (WCR) and net fixed assets (NFA), not entire assets from the balance sheet. That means the newly defined assets equals the entire assets minus spontaneous financing amount such as the value of accounts payable from suppliers, creditors, etc. (Fernandez 2007.)

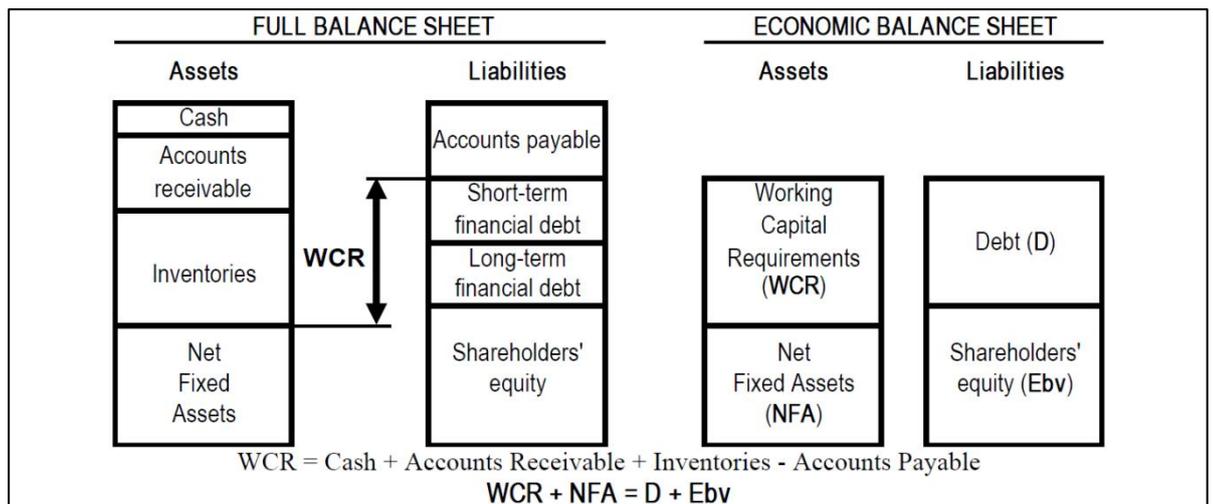


Figure 1. Full and economic balance sheet of a company (Adapted from Fernandez 2007)

2.6.1. The Debt Cash Flows (CF_d) and the Required Return to Debt (K_d)

The debt cash flows are the flow of interest expenses on the debt and the principal which a company must pay back to the lenders, bondholders, or banks after a certain period of using. That is to say, a loan taken today for financing the company's activities has a larger value tomorrow because the company has to pay interest expenses for using it. Therefore, in order to determine the current value of the existing

debt, it needs to be discounted back to present time using the required return to debt (K_d). However, the discounted debt cash flows are frequently found to be equal to its book value. As a result, using the debt on the book value is enough, there is no need to calculate the discounted debt cash flows or so-called the market value of debt. Nevertheless, it is only true when the required return to debt is equal to the debt's cost. (Fernandez 2007.)

2.6.2. The Free Cash Flows (FCF) and the Weighted Average Cost of Capital (WACC)

2.6.2.1. The free cash flows

The free cash flows are the flow of cash generated from the business operation. In addition, this flow has to be after tax. The free cash flows can be distributed to shareholders after covering the working capital requirements (WCR) and spending for investments in fixed asset if the company has no financial expenses and debt to be paid. More importantly, the company's value (D+E) can be calculated based on this flow. (Fernandez 2007, 10.)

The free cash flows are also known under the other name as *free cash flows to the firm* or *FCFF*. Damodaran (2016, 11) used this term to illustrate the flows of cash that are before debt payments and after reinvestment spending. The discount rate used for FCFF is named *cost of capital* which reflects the riskiness of the assets. (ibid.) Despite having a few differences in names, those terms have same nature in valuation. The following is the formula of how to calculate FCFF proposed by Damodaran (2016, 167). The equation starts with the operating income.

$$\begin{aligned} \text{Free cash flow to firm} &= \text{Operating income} (1 - \text{tax}) \\ &\quad - (\text{Capital expenditures} - \text{Depreciation}) \\ &\quad - \text{Change in noncash working capital} \end{aligned}$$

To estimate a company's value, we must forecast company's future free cash flows by predicting the amount of cash we will receive and spend in each period. This task seems to be relatively the same as the cash budgeting technique. However, the difference lies at the timeline of prediction. The future cash flows require to be forecasted further ahead in time than normally done with cash budgeting. (Fernandez 2007, 10.)

The free cash flows are all about cash, which is the amount the company actually received and spent, not as accounts receivable or payable. Because of that, the accounting is unable to show us the direct number for the free cash flows, since it follows accrual accounting principles and allocates costs, expenses, and revenue using arbitrary mechanisms. Therefore, once this problem is identified, any types of cash flows can be calculated by adjusting the traditional accounting balance sheet. (ibid.)

2.6.2.2. *The weighted average cost of capital (WACC)*

The weighted average cost of capital (WACC) will be used to discount the future cash flows back to the present time. The WACC is also known as the weighted average cost of debt and equity. The following formulation expresses that a company's value is equal to its shareholders' equity (E) plus its debt (D). (Fernandez 2007.)

$$\mathbf{E + D = Present Value [FCF; WACC]} \quad \text{where} \quad \mathbf{WACC = \frac{E K_e + D K_d (1 - T)}{E + D}}$$

In which

E : Market value of the equity

Ke : The required return to equity = cost of the equity, which reflects the equity's risk

D : Market value of the debt

Kd : The required return to debt = cost of the debt before tax

T : Tax rate

The WACC is measured by taking the equity's risks and debt's risks into account. Knowing how risky an investment helps investors determine how much investment return they should expect for the risk that they take. That explains the existence of the cost of the equity (Ke) and the cost of the debt (Kd) in the WACC formula.

2.6.3. The Equity Cash Flows (ECF) and the Required Return to Equity (Ke)

2.6.3.1. The equity cash flows (ECF)

The equity cash flows are calculated by deducting the interest payments and principal repayments (after tax), which are made in each period to the debt holders, from the value of free cash flows and adding the new debt if there is one. After all, these cash flows are totally available for shareholders. Additionally, the value of the equity cash flows is obtained only after the company pay financial expenses and principal to debt owners, and cover fixed asset investments and working capital requirements. The equity cash flows not only allow us to find the company's equity value (E), but also the company's total value (D + E) if we combine it with the value of the existing debt (D). (Fernandez 2007, 11.)

According to Damodaran (2016, 12), the cash flows used to value the equity of the company are called *free cash flows to equity* or *FCFE*. The discount rate corresponds with FCFE is known as *cost of equity*. Apart from calculating directly, we could find indirectly find the value of equity by taking the enterprise value which is calculating by using FCFF minus the non-equity value. It is important to know that doing either way yields the same value. (ibid.)

The formula of ECF is expressed below (Fernandez 2007, 11):

$$\text{ECF} = \text{FCF} - [\text{interest payments} \times (1 - T)] - \text{principal repayments} + \text{new debt}]$$

Besides this formula, Damodaran (2016, 177) gave out another formula to calculate FCFE directly from accounting entries, not from the free cash flows. The formula starts with the net income.

$$\begin{aligned} \text{Free cash flow to equity} = & \text{Net income} - (\text{Capital expenditures} - \text{Depreciation}) \\ & - \text{Change in noncash working capital} \\ & + (\text{New debt raised} - \text{Debt repayment}) \end{aligned}$$

Before estimating the company's equity value, we first need to forecast the equity cash flows into the future. It could be 5 years, 10 years or longer depending on the purpose of valuation. Once, we have the future equity cash flows ready, we will

discount them back to the present time using the required return to equity (K_e), which is explained in the following section.

2.6.3.2. *The required return to equity (K_e)*

This required return to equity (K_e) is used to discount the future equity cash flows back to the present time, reflecting the level of business risk investors enduring.

The required return to equity (K_e) is calculated by using either following model (Fernandez 2007).

- Gordon and Shapiro's constant growth valuation model

$$K_e = [\text{Div}_1 / P_0] + g$$

In which:

Div_1 : Dividends to be received in the next period; $\text{Div}_1 = \text{Div}_0 \times (1 + g)$

P_0 : Share's current price

g : constant, sustainable dividend growth rate

For instance, a dividend of 10 dollars is expected to be received in the next period, share's current price is at 100 dollars, the constant rate of growth rate is 10%. So, the required return rate to equity (K_e) would be 20%

$$K_e = (10/100) + 0.1 = 0.2 = 20\%$$

- The capital asset pricing model (CAPM)

$$K_e = R_f + \beta (R_m - R_f)$$

In which

R_f : Rate of return for risk-free investments (Treasury bonds)

β : A measure of volatility, reflecting the risk of a business

R_m : Expected rate of return on the general stock market

$R_m - R_f$: Market risk premium or equity premium

2.6.4. The Capital Cash Flows (CCF) and the Weighted Average Cost of Capital Before Tax (WACCBT)

2.6.4.1. The capital cash flows (CCF)

The capital cash flows (CCF) is another type of cash flows which could be used to value companies. It is the total value of the equity cash flows (ECF) and the debt cash flows (DCF). The debt cash flows are equal to the sum of interest payments and principal repayments. (Fernandez 2007.)

$$\text{CCF} = \text{ECF} + \text{DCF}$$

In which

$$\text{DCF} = I - \Delta D$$

$$I = D \times K_d$$

It should be aware that the capital cash flows are not the free cash flows

2.6.4.2. The weighted cost of capital before tax (WACCBT)

This method showed that a company's value can be calculated using the capital cash flows and then discount the flows back to present time using the weighted cost of capital before tax (WACC_{BT}). Meaning that the value of a company is equal the market value of its equity plus the market value of its debt. (Fernandez 2007.)

$$\text{E} + \text{D} = \text{Present value [CCF; WACC}_{\text{BT}}]$$

In which

$$\text{WACC}_{\text{BT}} = \frac{\text{E } K_e + \text{D } K_d (1 - T)}{\text{E} + \text{D}}$$

2.7. Forecasting Cash Flows

Forecasting cash flows is one of the most important steps when estimating a company's value. To do this, we first need to examine the past growths of the business to forecast its future flows, then we predict the length of growth period generated by both company's management and analysts studying the company (Damodaran 2016,

238.) There are three things needed to keep in mind when performing this step. They are the length of the growth period, the forecast of cash flows in that period, and the calculation of terminal value.

2.7.1. The Length of Growth Period

Determining the length of future cash flows to forecast is one of the most difficult exercises. There are two scenarios for the future of a company, either it will reach stable growth rate after a certain period of booming or it will stop surviving. Because when the firm grows bigger and bigger in size, it will have significantly less room to develop and eventually reach the stable stage. It is also worth noting that the high growth in valuation derives from the excess of company's earning over its investment. In other words, the return on capital is larger than the cost of capital or the return on equity is larger than the cost of equity. Accordingly, if we measure a firm five or ten years into the future, we implicitly mean that the return is over the cost. When identifying the length of time horizon of the firm having high growth rate, there are three important factors we should not pay attentions to. The first is the size of company. Smaller companies are more likely to grow faster than well-established firms. However, concerning the market size of the company, the big-size company could still grow more quickly when the market size is expandable. The second is the current growth rate and excess returns. If a firm is on the trend of growing quickly and gaining excess returns, it may remain the same status few years into the future. The final factor is the sustainability of competitive advantages. If a company has huge competitive advantages over others and operates in an environment that is hard to enter, it may maintain a long period of high growth. Conversely, we should not consider a long period of growth for a company that loses its competitiveness over time. However, the management could substantially change the situation because its strategies have a considerable impact on the growth of the company. (Damodaran 2016, 238-241.)

2.7.2. Forecasting Cash Flows in the Chosen Period

When the length of growth period is figured out, we start forecasting the cash flows for this period. It is undeniable that future is uncertain and we cannot know exactly what will happen. Thus, this stage of valuation will require a lot of assumptions and judgments of how the business will be doing in the future. There are two ways to estimate cash flows. The first approach is based on the historical performances of the

business. But, it is important to understand that the past does not always reflect the future. The second approach is to consider using the predictions coming from the company's management and other analysts who are tracking the firm closely.

(Damodaran 2016.)

2.7.3. Terminal Value

After forecasting cash flows for a specified period, we will need to estimate a terminal value which illustrates the company's value beyond these years since we cannot forecast cash flows indefinitely. The terminal value could be estimated in three ways. The first way is to assess how much would others pay for the company's assets accumulated up to the final point of forecasting if the business is terminated. The second and third ways to calculate the terminal value are based on an assumption that the company will continue to operate after the final point of the forecast period. While the second approach uses the multiple method to estimate the terminal value, the third approach uses perpetual growth model with the assumption that cash flows will grow at a constant growth rate after the forecasting period. (Damodaran 2016.)

2.8. Capital Asset Pricing Model (CAPM)

The foundation of capital asset pricing model (CAPM) could be traced back to 1964, originally developed by William F. Sharpe. Back then, with the mission of searching for a better model that reflects the prices of capital asset, many researchers proposed models that are based on various conditions such as the risk and the expected utility maxim. (Sharpe 1964.) Knowing the fact that no one had tried to expand the construction of the capital asset prices under risk conditions, Sharpe took the job and published the paper named "Capital asset prices: a theory of market equilibrium under conditions of risk" which later won him a Nobel Prize in Economic Sciences in 1990.

The CAPM is the model used for measuring the expected return based on the level of risk investors enduring (Fama & French 2004). However, the foundation of model relied significantly on the assumptions and the predictions that disconnect with the real life (Fernandez 2015a). Additionally, there was a considerably limited number of empirical studies on CAPM, even low enough to invalidate its application (Fama & French 2004).

2.9. Risk Free Rate (R_f)

The risk-free rate is the rate at which an investor certainly expects to get the return on investment back after a certain period. Although people pick the government security rates such as treasury bill rate and treasury bond rate to represent the risk-free rate, each choice differs from each other. (Damodaran 2008c, 3.) In supporting this sentiment, Mukherji (2011) noted that the risk-free rate was often chosen spontaneously by researchers and practitioners without clear explanations. Mukherji (2011, 82) thought that the most appropriate risk-free rate is the one has lowest market and inflation risks. Mukherji's research (2011) suggested that treasury bills of 1-year and 5-year periods are the most prominent rates to choose, because they have significantly low inflation risk and zero market risk over the period of 10 years. Furthermore, Mukherji (2011) recommended using the treasury bills as the risk-free rates regardless of the duration of investment. The suggestion is only applied for the U.S. market due to the scope of the research. (82.) Interestingly, Damodaran (2008c) expressed a different view when choosing the risk-free rate. The risk-free rate must satisfy two criteria, the first is it does not have any default risks and the second is it does not have any reinvestment risks. With these criteria, the government zero coupon rate (default-free) is the most suitable to be used, and its duration should be coincidence with the cash flows being analyzed. As for the valuation field, the long-term government bond rates rather than treasury bills should be used as the risk-free rate. (31.) The risk-free rate can also be calculated by using financial market instruments in case there is no available rates to pick (Vaihekoski 2009, 1). It is especially true when someone tries to look for short-term risk-free rate such as one day or one week. (ibid., 15.)

2.10. Beta (β)

The beta is one of the main ingredients of CAPM model. It reflects the risk of investing a particular stock within a stock market (Campbell & Vuolteenaho 2004). And, therefore an investment has no risk if $\beta = 0$, or equal risk with the stock market if $\beta = 1$ (Fernandez, Ortiz Pizarro, & Fernández Acín 2015, 7). On the downside, there are two common mistakes that people don't usually realize about Beta. The first is the assumption that the market set individual beta for each company, the second is the beta may be computed by running a regression of historical data. These are wrong because we cannot produce a meaningful beta by calculating the daily-changing

historical data. In addition, betas are not subject to comparison between one company with another. (ibid., 7.) Because of that, many attempts have been made to revise the model. One of that is the recently-developed two-beta model which was proposed by Campbell and Vuolteenaho (2004), Harvard economists. The new model tries to relate the risk with the market's cash flows and the market's discount rates. (ibid., 35.)

2.11. Market Risk Premium ($R_m - R_f$)

The market risk premium is a main component of the CAPM model (Fernandez 2004b). It is the rate at which investors of the stock market expect to receive on top of the risk-free rate, assuming that their portfolios are diversified and include the majority of different stocks in the market (Fernandez, Ortiz Pizarro & Fernández Acín 2015, 7). For example, the investors could expect a return of 10% on their investments if the risk-free rate is at 2% and the market risk premium is at 8%. The market risk premium in this case is not guaranteed to happen, it just represents the riskiness investors are willing to take and the reward they expect from that. In addition to the name of “market risk premium”, academics and practitioners often refer it to the other terms as equity premium, risk premium, and market premium. It is important to differentiate the required market risk premium to the historical market risk premium, which is the same for all investors. The required market risk premium is various between investors thus there is no universal benchmark for the whole market. There are various ways to calculate the market risk premium listed as follows. (Fernandez 2004b, 1.)

- Historical market risk premium
- Gordon and Shapiro formulation
- Through survey of investors and analysts
- From the converse of the PER
- From the difference between stock and long-term bond volatilities
- Other recently-developed formula by academics

There is one huge concern that not everyone realizes about the market risk premium. It is the assumption that the market assigns the market risk premium and it could be calculated. In fact, market risk premium is perceived differently between investors and it could not be the same for all. (Fernandez, Ortiz Pizarro, & Fernández Acín 2015, 7.)

3. Empirical Literature Review

3.1. The Applications of Valuation

Valuation techniques, especially the DCF approach, have a wide range of applications in the business environment. One of those applications is shown in the mergers and acquisitions (M&A) activity. After studying stock performances and operation effectiveness of M&A deals, Bouwman, Fuller, and Nain (2009) showed that deals that are conducted when the market is in high-valuation period gain significant more announcement returns than those initiated during low-valuation period. However, the relationship is reversed in the long run. During two years after closing M&A deals, deals conducted that are in high-valuation period experience decreases in stock performances and operation effectiveness, while those in low-valuation perform better. This signifies that deals made in booming period actually underperform those in depressed period. (ibid.) The other application of valuation is that it can be used to benchmark the value of different kinds of enterprises. Using two valuation approaches at the same time – the DCF method and market-determined approach, Rao (2016, 56) has valued all firms belong to a market index named SENSEX. As a result, Rao (2016, 58) suggested that there was no divergence between DCF and market-determined approaches when examining the mean value of all enterprises and that investors should diversify their portfolio to obtain an optimum return. Continuing on the application of valuing different types of firms, Fernandez (2003b) noted that DCF valuation method could even be applied to value seasonal companies whose buying and selling activities of some products may be done within a month. Given the complex nature of these firms, the valuation should be based on monthly data rather than annual data. If the annual data is deployed, some adjustments such as the value of tax shields and the value of the unlevered equity must be made to guarantee the quality of the valuation. Otherwise, the value of firm may be overvalued or undervalued significantly. (ibid.) In another major study, Fernandez (2015b, 1) conducted the valuation for internet-based companies. Studying abrupt movements of tech stock prices during 1990s to early 2000, he suggested that tech companies should go through the same valuation process as other kinds of business, not underrate or overrate risks. (ibid., 16.) Similarly, we can see the application of valuation in valuing bankrupt companies. Gilson, Hotchkiss, and Ruback (2000, 31) have applied various valuation techniques, including DCF, comparable, and multiple methods to value 63

reorganized bankrupt firms. With the margin of error ranging from 20% to 250%, the study affirmed that valuing these firms are more complex than normally thought. Yet, the study certified that those valuation methods produce unbiased results. (ibid.) On the flip side, some research indicated that DCF methods are not well-suited for some fields. Villiger and Bogdan (2005) suggested that DCF approach was not reflected its power in valuing pharmaceutical companies because it failed to capture the risk of products being abandoned by the market. Schreiner (2009) also pointed that DCF and residual income valuation (RIV) models are too complicated and therefore they are more likely to be taught in the classroom but not frequently used by investment bankers. The researcher believed that multiples methods are more favorable in workplace due to its simplicity. (ibid.)

3.2. Factors Affect Valuation

In an extensive research of examining 539 companies in 27 countries, a group of researchers, including Porta, Lopez-de-Silanes, Shleifer, and Vishny (2002, 1147), found that the investor protection influences the valuation of a company. To be more specific, it is the effort of trying to protect minority shareholders and retain higher ownership of cash flows by controlling shareowners boost the valuation of companies. (ibid.) Reversely, the poor management of cash flows and the shortage of measures to protect minority shareholders cause lower valuations. (ibid., 1168.) Another research indicated that there is a negative relationship between the size of board of directors and company's valuations. Yermack (1996) has studied 452 U.S. companies and concluded that firms with smaller size of board of directors show more favorable values for financial ratios and more compensation for outstanding performance of CEOs than those with larger boards. Mak and Kusnadi (2005) also supported Yermack (1996) by confirming that there was a reverse relationship between board size and firm valuation. The research was conducted on 460 publicly-traded firms with the origin of Singapore and Malaysia and used Tobin's Q approach to measure company values. (ibid.) Concerning the corporate governance, there are a number of research attempting to address the relationship between corporate governance and company valuation. In an effort of answering this question, Beiner, Drobetz, Schmid, and Zimmermann (2006) have proved that the relationship is positive. Meaning that, if companies have a high quality of corporate governance, their companies will see greater values. (ibid.) Similarly, Cheung, Stouraitis, and Tan (2011) have analyzed ten Asian stock markets, and concluded that the better corporate governance practices are,

the higher the firm valuation will be. In contrast, Brown and Caylor (2006, 430) suggested that there was a negative relationship between firm valuation and corporate governance practices. After testing the impact of five components of corporate governance on firm valuation, the research showed a negative relationship. Moreover, an additional five corporate governance activities related to accounting were also proved to have a negative relationship with firm valuation. (ibid.) Another factor that may affect firm valuation is research and development (R&D) activities. In an investigation of the impact of R&D spending on firm valuation, Chan, Lakonishok, and Sougiannis (2000, 23) found that there was no tie between R&D activities and the prospect of higher stock returns. There was just a small or even no difference in the average return between companies which engage in R&D activities and those do not. (ibid.) Apart from those factors above, agency risk also plays a significant role in influencing firm valuation. By studying venture capital firms, Hartmann-Wendels, Keienburg, and Sievers (2008) revealed that agency risk may result in a huge cost. Whenever an investment plan includes an additional agency risk factor, the value of the investment targeted firm drops by about 20%. (ibid.) Last but not least, the strategic alliance that a company establishes may also affect company valuation. In a recent research, Moghaddam, Bosse, and Provance (2016, 165) showed that the relationship between the two is curvilinear. That is to say, firms with moderate number of strategic partners enjoy the highest valuation. (ibid.)

3.3. The Accuracy of DCF Methods

This section will be devoted to review the practical aspects of valuation. Kaplan and Ruback (1995) have studied 51 highly leveraged buyout transactions occurred between 1983 and 1989, and suggested that the DCF valuation approach is a reliable method to use. The estimated values of these transactions did not exceed over 10 percent of the market values. Additionally, the performance of DCF methods is relatively the same as or even better than multiple valuation methods when the two were being compared. Surprisingly, Kaplan and Ruback noted that multiple methods could also be a supplement for DCF approach. (1059-1060.)

In another research, Berkman, Bradbury, and Ferguson (2000) claimed that the accuracy of the best DCF method and the best price-earnings (P/E) methods is the same when they examined 45 newly listed companies (IPOs) in New Zealand Stock Exchange. Furthermore, the research seemingly supported the valuable role of DCF

approach in valuation by pointing out that there were only about 20 percent of absolute pricing error. These researchers also believed that valuing company by using firm's cash flows is more accurate than equity cash flows because firm's cash flows are more stable. (ibid.) Although the research of Kaplan and Ruback (1995) and that of Berkman et al. (2000) perform DCF valuation on different types of company – one on highly leveraged companies, the other on newly listed company – both research satisfied with the valuation results produced by the DCF approach.

Continued on the topic of Initial Public Offerings, Deloof, De Maeseneire, and Inghelbrecht (2009) studied 49 IPOs traded on the Euronext Brussels stock exchange. They found out various valuation methods have been used by investment bankers before the firm officially offer its stocks publicly such as Dividend Discounted Model (DDM) valuation and DCF approach. Moreover, they affirmed that while DDM generates a closer price to offering value, DCF is the most popular model using for IPOs. However, the estimated value originating from DDM tends to be lower than the market value of the firm after the first month of the initial offering. This study concluded that the DCF model proved to be the most reliable model with unbiased results. (ibid., 130-132.) On the other hand, Deloof et al. (2009) disagreed with Kaplan and Ruback (1995) and Berkman et al. (2000) at some points. Deloof et al. (2009, 132) suggested that P/E and price/ cash flow (P/CF) valuation methods are less accurate than multiple methods which forecast future cash flows to estimate firms' values one year after the IPOs. Besides that, this study weakened the role of multiples approach in valuation and confirmed that DCF approach is the most important one. DCF approach is primarily used by investment bankers to value companies regardless of their natures before going public. (ibid.)

4. Methodology

4.1. Research Approach

According to Cooper and Schindler (2013), there is no universal definition for the term research design, it is defined distinctively and perceived differently by people. However, research design usually has these common traits as follows.

- It includes a plan of collecting, measuring, and analyzing data.
- It assists researchers to identify a suitable methodology with limited resources.
- It is the general plan that supports researchers to outline their studies, such as writing hypotheses and interpreting the final result.
- It shows the structure of the research problem and approaches to find necessary empirical evidence. (124-125.)

There is a wide range of research designs for a researcher to choose. All of them are categorized into specific groups according to their characteristics. Cooper and Schindler (2013) listed eight groups, some of them are the purpose of the study, the time horizon, and the research environment. Amongst all groups, the purpose of the study categories is one of the most important groups. They include three types of research design: reporting, descriptive, and causal. (126.) Zikmund et al. (2013, 54) also classified research designs based on the purpose of the study but broke the category down into three different designs as exploratory, descriptive, and causal.

While Cooper and Schindler (2013) did not classify the exploratory research design into the purpose of the study, they put it into the different group that categorized designs based on how clear the research question is. Although there are some differences in classification between experts, this research is conducted using the exploratory research design. Described by Zikmund et al. (2013), exploratory research focuses on clarifying vague situations. This type of research aims to be the pioneer in certain aspects of topic and establishes the first ground for following research. It is not the type that provides concrete explanations and evidences for a course of action. (54.)

Exploratory design is totally a good fit for this research. Through reviewing empirical research, I have learned that there were some papers attempting to estimate the value of companies, however they mostly focus on some special types of companies such as

IPOs and revised bankrupted firms. There were almost no research trying to determine the value of publicly-traded companies, therefore, this dissertation will be one of the first papers addressing this issue. In line with the nature of exploratory research, this dissertation does not attempt to provide any conclusive evidence for the problem but rather establishing a firm background serving for further research. Similar to empirical research done in this area, this dissertation will present the intrinsic value of companies using DCF valuation but not go deeper to give analyses on each and every individual accounting entry. The reason is that this dissertation may become a massive research if conducting this way and it may take years to finish this bachelor's thesis.

Association with research design, there are two main research methodologies which are quantitative and qualitative research. Cooper and Schindler (2013) believed that qualitative research seeks for the in-depth answer for the problem by using various interpretive techniques, such as describing, coding, and translating. Qualitative methodologies are applied in wide range of fields, including linguistics, sociology, communication, and anthropology. On the other hand, quantitative research aims to present the precise and accurate measurements of a subject to find out consumer behaviors, knowledge, perceptions, and feelings. Researchers adopt quantitative technique usually work with some statistical software that helps them code, decode, and run their data through various analysis processes to obtain the final result. (144-146.) Zikmund et al. (2013) believed that quantitative research could also be perceived as a research that uses the empirical study to address the research problem.

Conducting the research may involve various stages of statistical measurements and analysis methods. This suggests that quantitative research tends to be clear and obvious, and it requires less elucidation. (134.) Agreed with Cooper and Schindler (2013), Zikmund et al. (2013) considered that quantitative research focuses significantly on assessing theories and concepts with scales that subsequently either explicitly or implicitly offer numeric values. These numeric values then go through computation processes to generate the results or prove hypotheses. (135.)

There are a number of differences between the two methodologies. Zikmund et al. (2013) noted that qualitative research are more subjective than quantitative ones because they usually consist of deep involvements from researchers such as close observing, interpreting, and analyzing. With this personal influence, one piece of interview can be concluded differently amongst researchers. This characteristic of qualitative research is called the shortage of intersubjective certifiability, one of the

biggest weaknesses of a research. With regards to the sample size, qualitative research is usually not conducted on a huge massive sample, but rather on just a handful of data. (135.) To clarify the distinctions between the two, Bryman and Bell (2003) mentioned the majority of differences in the table below.

Table 3. Differences between quantitative and qualitative research (adapted from Bryman & Bell 2003)

Quantitative	Qualitative
Numbers	Words
Point of view of researcher	Point of view of participants
Researcher distant	Researcher close
Theory testing	Theory emergent
Static	Process
Structured	Unstructured
Generalization	Contextual understanding
Hard reliable data	Rich deep data
Macro	Micro
Behavior	Meaning
Artificial settings	Natural settings

After examining this table, Greener (2008) said that some of the above distinctions are still in debate, such as structured vs unstructured, and macro vs micro. Additionally, we also need aware of the mixed method – the mixture of quantitative and qualitative methods – which can conveniently use random features of both research types. (80.)

Studying the natures and differences between the two methods, I believe this study is the quantitative research. The first evidence is that the research uses precise and accurate measurements to estimate the value of companies. Data used in this study is the accounting information, and therefore it is totally correct, static, and unchanged. The second sign is that this research uses Excel as a statistical tool to process data. Additionally, this study is the empirical research and its result requires less elucidation, these all are the features of a typical quantitative research have been mentioned by Zikmund et al. (2013). Concerning the differences between a quantitative and qualitative study proposed by Bryman and Bell (2003), this research possesses these following traits: working with numbers, it contains the majority of researchers' viewpoints rather than participants' ones, the relationship between researchers and participants (companies) is distant rather than close, data and number

used in the research are static, and the input is hard reliable data rather than rich deep data.

4.2. Research Context

Although Greener (2008) has not considered research context as a compulsory part for all types of research, she believed that it is a necessary component in many research fields. Research context is defined as the situation or status of an industry, a nation, or a sector that the research is based in. For instance, if a research is about healthcare, researchers may want to mention the context of national or international healthcare. (75.)

This research is in the field of finance and attempts to identify the true value of the US corporates, therefore the context of financial sector within the US economy should be the right context for the research. According to International Trade Administration, the US has the world's largest and most liquid financial markets. Considering the contribution of this sector in 2015, finance and insurance industry accounted for 7.2 percent of the US GDP, which is equal to 1.293 trillion dollars. With its large share of the economy, the sector not only played an important role in facilitating the growth of the economy but also created a large number of jobs. The US saw \$119.6 billion of exports in financial services and insurance sector in 2015, which is about \$88.4 billion surplus when excluding re-insurance. The sector created 6.08 million jobs in the labor market in 2015. Its subsector securities and investment also contributed significantly to the workforce. U.S. Department of Labor noted that more than 920,000 people have been employed in this area in 2015 and the growth of the workforce will increase by 12 percent by 2018. Apart from positively influencing the economy in a direct way, the financial sector also indirectly influences other sectors. It supported and financed the export activities of agriculture business and manufactured products tremendously. With the advantage of having a developed finance industry, the US was chosen as a destination for locating headquarters of around 128 big corporates from the Fortune's Global 500 list in 2015 chose the US as their headquarters. Having their offices in the US enables them to fully exploit a robust, energetic, and productive financial sector. As a result, this move creates a mutual relationship for both the US economy and these companies. From the US economy side, it enjoys significant benefits because those firms often make huge investments to build, maintain, and run headquarters in the US. On the other side, those companies can easily access financial resources

whenever they are in need. Financial sector provides a wide range of financial products and tools to assist them in identifying and controlling risks, managing and producing wealth, raising capital, and offering investment opportunities in money markets such as stocks, bonds, and derivatives. (Financial Service Industry Spotlight.)

There are 5 subsectors within this industry, including banking, asset management, insurance, venture capital, and private equity. For the US banking system, it held a total of \$15.967 trillion in assets at the end of 2015. The system is diverse in terms of the number of banking institutions and their types of firms. Its net income increased by 7.3 percent at the end of 2015, reaching \$161.6 billion. For asset management area, it also enjoyed the breadth and depth of the sector. As of the end of 2015, the total value of U.S. pension assets was \$24.5 trillion. However, the total value would be \$51.1 trillion if we added insurance assets and mutual funds. This number represents for 47.2 percent of global value from these funds and is equals to 294 percent of U.S. GDP. As for insurance subsector, while the majority of premiums generated by life, health, property, and casualty insurers, U.S. firms bought one-third of all reinsurance globally. Insurance companies from all over the world actively establish partnership and cooperation with U.S. counterparts. The US is one of the founding countries of the venture capital subsector. The industry has spent \$59.1 billion in investment in 2015. Venture capital-backed firms have played an important role in creating new jobs, fulfilling 38 percent of workforce position within public companies and 82 percent of the private sector in research and development field. These companies contribute 21 percent to the total GDP of the US. Finally, private equity industry has spent about \$625.89 billion to back U.S. companies. There are about 3,847 investing companies operated in this industry. Private equity-backed companies have created 11.3 million job positions in the U.S. and 19.6 million people globally. In 2015, business services and consumer-related businesses are the most attractive investment areas for private equity industry. (Financial Service Industry Spotlight.)

Apart from the industry context, it is crucial to mention the empirical context of the research. Valuation is a long-established topic within the academic and practical world. One of the most comprehensive empirical research dated back in 1995 by Kaplan and Ruback, evaluating 51 buyout transactions. Following that was a series of other research conducted on the same topic of valuation, but on different angles such as IPOs and M&A deals. Although there were some of them available, there are not many of them, creating a shortage situation of empirical literature. One possible

explanation has been mentioned by many researchers is that valuation models are too complex to write in a research, especially DCF methods. In addition to that, valuation is more towards practical applications than towards research aspects. Considering prior empirical research, the researcher has learned that there is a huge shortage of research attempting to estimate the intrinsic value of publicly-listed companies. Motivating by this, I decided to conduct a research on this area to fulfill the shortage. The research of valuing 100 U.S. corporates using the DCF method, therefore, will be one of the pioneers in this area.

4.3. Data Collection

This research is conducted using secondary data. Data are characterized by a wide range of attributes, such as verifiability, elusiveness, abstractness and closeness to the phenomenon (Cooper & Schindler 2013, 85). Amongst these, the characteristic of closeness to the phenomenon show distinctions between primary and secondary data by reflecting their truthfulness. While secondary data have gone through at least one level of interpretation, primary data are more truthful with just a small margin of errors. (ibid.) Elaborating on secondary data, Greener (2008, 73) added that these data are not originally collected by researchers or intended to serve for their research purposes, but collected by and served for some other people, such as institutions and other researchers. With regards to the truthfulness, Greener (2008, 77) also believed that we cannot assume those data with 100% of truth as they reflect the pre-conceptions and intentions of the original collectors. Agreed with Greener, Zikmund, Babin, Carr, & Griffin (2013, 161) recognized that secondary data are generated and documented by someone else, serving for different purposes than the current study. Secondary data are usually seen as a form of historical and already accumulated data. (ibid.)

Secondary data are usually cheap and quick to researchers. Because they can be found on the internet or offered by libraries with no cost at all. Using these data can save a lot of time since researchers do not have to conduct questionnaires and surveys or follow up with respondents. (Greener 2008, 75.) On the other hand, it is not easy to check the quality of secondary data. The best thing we could do is to examine the credibility and professionalism of the organization publishing these data. To further assessing the data, we could also study about methods of collecting data used by those sources. (ibid., 77.) Zikmund et al. (2013, 161) also pointed out the advantages of

secondary data over primary data by their availability and cost effectiveness. In many cases, the secondary data can be instantly obtained if they are stored in the digital format. Secondary data are essential in case we cannot collect primary data from respondents. For example, some information can only be obtained governments, not individual researchers or private companies. (ibid.) There are also some disadvantages to keep in mind when using secondary data. Zikmund et al. (2013, 161) indicated the first and foremost issue with these data is the relevance. Before adopting the data, researchers are advised to examine the fit of data to their studies since the data are not originally designed for their research purposes. The other problem is that the data is available but not sufficient for their studies. In this case, those data may partly address half of the study but not all. Some of the reasons could be the obsolescence of information, the differences in defined concepts, the variances in measurements, and the possibility to check data's accuracy. (ibid.)

Data used for this research are mainly company's balance sheet, income statement, and cash flows. Due to the nature of information, these data are publicly available. Primary data is not suitable for this research because it is highly impossible for the author to conduct surveys, questionnaires, or interviews to obtain these numbers directly from targeted firms. Additionally, accessing those data directly and privately seems to be illegal. In the financial sector, there is a crime called Insider Trading, the term refers to those people who have information before the public and use it to benefit themselves. Secondary data used for this research is unbiased because it is not designed for any particular research purpose, but to comply with the accounting law.

Sampling is an important part of the research. Essentially, it is a procedure that chooses a portion of a population representing the whole population in a research. A good sample is the one that has the similar characteristics across the whole population. To make a good sample, the first step should be taken is to determine the population of research by answering these questions "Who is to be sampled?" and "Who do we want the sample to reflect?" Although a larger sample yields a better representation, proper probability sampling can produce a reliable result. As part of the procedure, we have to choose sampling units. One of the most popular methods is single random sampling, which allows every unit within a population to be picked with an equal chance. (Zikmund et al. 2013.)

There are several ways to sample a data. Many major sampling techniques are classified in these two categories which are probability and nonprobability sampling. For probability, every unit within a population has a chance to be chosen to use in the research. On the contrary, the nonprobability technique allows researchers to choose sampling unit with intentions. (Zikmund et al. 2013, 395.) There are several methods to deploy if researchers choose nonprobability sampling, they are convenience sampling, judgment sampling, quota sampling, and snowball sampling. Similarly, for probability sampling researchers can choose various methods, such as simple random sampling, systematic sampling, stratified sampling, proportional or disproportional sampling, cluster sampling, and multistage area sampling. (Zikmund et al. 2013.)

This thesis uses nonprobability sampling, particularly judgment sampling. As it said, judgment sampling is the method that requires researchers to generate a sample based on their experiences (Zikmund et al. 2013, 396). This method proved to be helpful when researchers need to choose some specific sample units that satisfy certain criteria and research purposes. (ibid.) With the purpose of estimating company values, this study needs to obtain 7-year historical financial data from 2010 to 2016, some of them are balance sheet, income statement, and cash flows. Therefore, some companies may not be qualified to be chosen, for example, those who are founded during or after the year of 2010. In addition to that, bankrupted firms are also not eligible since the study only analyze ongoing firms. Finally, this thesis examines ten specific sectors, including technology, transportation, energy, public utilities, health care, consumer services, consumer non-durables, consumer durables, capital goods, and basic industries, within the NYSE, therefore those companies belong to other sectors than these are not selected. A total of 100 companies are picked and every sector has 10 companies. I randomly picked firms that are qualified these criteria.

The next step after sampling is data gathering. There are two methods of collecting data which are obtrusive and unobtrusive approach. While obtrusive method requires certain interactions between researchers and organizations, unobtrusive one does not need to disturb organizations to get data. (Zikmund et al. 2013, 69.) By using accounting data as inputs, this study finds the unobtrusive method as a good fit. According to Zikmund et al. (2013), all secondary data sources can be categorized into two groups which are internal to or external to the organization. While internal data are those generated, recorded, and created by the organization, external data are those generated by other entities. (171-172.) This study used the accounting data

which are created by firms, therefore they belong to internal data. Zikmund et al. (2013, 171) also confirmed that accounting document is one of the sources of internal data.

Regarding the distribution channel to obtain data, there are many sources that researchers could approach. They are libraries, the internet, vendors, producers, books and periodicals, government sources, media sources, trade association sources, and commercial sources. (Zikmund et al. 2013, 72-76.) This dissertation uses the internet to access accounting data. The data are collected mostly from the following websites Yahoo! Finance, World Bank, U.S. Department of the Treasury, Rocket, and Stockrow. This dissertation uses different sources in order to ensure the quality and the sufficiency of the information. Furthermore, each source has its weakness so using a combination of them will address these challenges. For example, while research needs 7-year data from 2010 to 2015, sources like Yahoo! Finance, Bloomberg, Money CNN and Morningstar either provide only 4-year data from 2012 to 2016 or 5-year data. Rocket and Stockrow, on the other hand, provide 10-year data. Having all sources at one place help the author choose the best sources for each component and variable of DCF valuation model more conveniently.

4.4. Data Analysis

As Cooper and Schindler (2013) has put researchers are people who collect raw data, process it and generate the required information serving for further purposes, such as decision-making process and investment strategies. Data analysis is the process that may involve many steps, including reducing the size of collected data, making relevant summaries, displaying general patterns of the result, and utilizing statistical techniques. (86.) While Zikmund et al. (2013) agreed with all points mentioned above, they added that the statistical tools should be chosen based on the characteristics of the research, requirements from assignors, and the attributes of the data. Besides that, Cooper and Schindler (2013) believed that researchers must be able to interpret the results with regards to research questions or determine whether the findings are consistent theories and hypotheses or not.

This research has collected data of 100 U.S. corporates within 10 sectors listed on the New York Stock Exchange. These companies are categorized into sectors by NYSE,

not by the researcher. For each sector, there is a total of 10 selected companies amongst hundreds of them. Appendix 1 showed the list of all these companies.

This is the list of 10 selected sectors:

- Basic Industries
- Capital Goods
- Consumer Durables
- Consumer Non-Durables
- Energy
- Health Care
- Public Utilities
- Technology
- Transportation

Overall, there was a total of 243,828 pieces of data have been collected for this research. The study has collected approximately a total of 42,700 pieces of financial data of 100 firms from Income Statement, Cash Flows, and Balance Sheet for a period of 7 years starting from 2010 to 2016. These data were collected at Stock Row at <https://stockrow.com/> It is an approximate estimate because the real number would be a little fewer or more. It is fewer because several chosen companies might be recently founded during or after the year of 2010, therefore they only have 4-year or 5-year data. It is more because there are some companies that have an additional data section expressing their financial data in different currencies.

The following is the typical types of data have been collected.

- For Income Statement, 22 data types have been collected, including revenues; cost of revenue; gross profit; selling, general and administrative expense; research and development expense; operating expenses; operating income; interest expense; earnings before tax; income tax expense; net income to non-controlling interests; net income; preferred dividends income statement impact; net income common stock; earnings per basic share; earnings per diluted share; weighted average shares; weighted average shares diluted; dividends per basic common share; gross margin; earnings before interest,

taxes, and depreciation amortization (EBITDA); earnings before interest and taxes (EBIT).

- For Cash Flows, 14 data types have been collected, including share-based compensation; depreciation, amortization and accretion; net cash flow from operations; net cash flow – business acquisitions and disposals; net cash flow – investment acquisitions and disposals; capital expenditure; net cash flow from investing; issuance (repayment) of debt securities; issuance (purchase) of equity shares; payment of dividends and other cash distributors; net cash flow from financing; effect of exchange rate changes on cash; net cash flow/ change in cash and cash equivalents; free cash flow.
- For Balance Sheet, 25 data types have been collected, including cash and equivalents; investments current; trade and non-trade receivables; inventory; current assets; property, plant, and equipment net; tax assets; goodwill and intangible assets; investments non-current; assets non-current; total assets; debt current; trade and non-trade payables; current liabilities; tax liabilities; deferred revenue; debt non-current; deposit liabilities; liabilities non-current; total liabilities; accumulated other comprehensive income; accumulated retained earnings; shareholders equity; investments; total debt.

Apart from financial data, the research has approximately collected 176,300 pieces of daily market data of these companies for the same 7-year period, serving for calculating Beta. For the same reason above, this is an approximate estimate, the real number could be a little fewer or more. Data were trading prices at the different point of time within a day, including opening, high point, low point, closing, adjusted close, and the trading volume. Data were from 31 December 2009 to 31 December 2016, and collected at Yahoo! Finance at <https://uk.finance.yahoo.com/>

Besides that, 23,928 pieces of daily market data have been collected to serve the purpose of calculating market risk premium. Data were daily risk-free rate and market risk premium. Data were from 01 July 1926 to 28 February 2017 and collected from Tuck School of Business of Dartmouth College at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html#Research.

Serving for the purpose of estimating company values, the researcher uses Rocket at <http://www.rocketfinancial.com/> to collect 7-year data of accrued expenses (700 pieces of data) since they are not shown on the balance sheet. Using the same source,

the number of diluted shares outstanding is also obtained (100 pieces of data). Also, stock price of every firm at the last trading date relative to the date of valuing the company is collected at Yahoo! Finance at <https://uk.finance.yahoo.com/> (100 pieces of data). Finally, the risk-free rate was collected from the U.S. Department of the Treasury, the rate was taken on the latest available date relative to the valuing date and it was the rate for 10 years (100 pieces of data).

The research has built a DCF model on Microsoft Excel with the instruction from Wall Street Prep, and it reduced these massive data significantly. the DCF model uses all data from above sources selectively as inputs for the model, as follows

- For Income Statement, the model uses only revenue and EBIT from Stockrow. This means 1,400 pieces of data have been used.
- For Cash Flows, it uses only depreciation and amortization from Stockrow. This means 700 pieces of data have been used.
- For Balance Sheet, it uses cash; accounts receivable; inventories; accounts payable; total debt (only the year of 2016); gross property, plant, and equipment from Stockrow. This means 35,1000 pieces of data have been used.
- For daily market data of 100 companies, all 176,300 pieces have been used. Linear regression formulation has been performed on these data and produced 100 different betas for all of them.
- For calculating market risk premium, only 6,804 pieces of daily market data amongst 23,928 pieces have been used to calculate. These data were from 01 January 1990 to 31 December 2016. This range of data was used because many specialists suggested that the whole stock market has gone through several financial crises so it may not be accurate if we use data starting from 01 July 1926.
- 700 pieces of accrued expenses from Rocket, 100 pieces of stock prices from Yahoo! Finance, and 100 pieces of the risk-free rate from U.S. Department of the Treasury have been used as inputs for the DCF model.
- Finally, the tax rate was obtained from corporate tax rates table of KPMG at <https://home.kpmg.com/xx/en/home/services/tax/tax-tools-and-resources/tax-rates-online/corporate-tax-rates-table.html>, and cost of debt used in the model was the average lending rate in the US, obtained from lending interest rate by World Bank, accessed at <http://data.worldbank.org/indicator/FR.INR.LEND>.

In summary, the researcher has initially collected approximately 243,928 pieces of data and used approximately 221,304 as inputs for the DCF model.

To illustrate what a typical DCF model looks like in the Excel, I have included three figures 2, 3 and 4 below. The model below was used to value Exar Corporation with the stock ticker EXAR. This company belongs to Technology sector.

Valuation Date:	6-Apr-17	Company:	Exar Corporation	DISCOUNTED CASH FLOW ANALYSIS																			
Share Price on Valuation Date:	13			Source: Wall Street Prep Channel																			
Diluted Shares Outstanding:	48,200,000																						
Select Operating Data																							
Currency: Dollar (\$)		2010	2011	2012	2013	2014	2015	Projected Annual Forecast					2016	2017	2018	2019	2020						
Revenue		149,378,000	162,050,000	125,322,000	122,026,000	130,566,000	146,005,000	134,878,000	139,478,786	144,236,507	149,156,518	154,244,354											
Revenue Growth Rate (%)			8.48%		-2.63%	7.00%	11.82%	-7.62%	3.41%	3.41%	3.41%	3.41%											
EBITDA																							
EBITDA Margin (%)																							
EBIT		(16,499,000)	(42,999,000)	(2,521,000)	1,858,000	(27,790,000)	(34,155,000)	(27,277,000)	2,123,741	2,196,183	2,271,096	2,348,565											
EBIT Margin (%)					1.52%				1.52%	1.52%	1.52%	1.52%											
Depreciation & Amortization		20,825,000	19,414,000	14,898,000	10,809,000	12,947,000	18,424,000	19,431,000	16,659,401	17,227,666	17,815,314	18,423,007											
D&A as a % of revenue		13.94%	11.98%	11.89%	8.86%	9.92%	12.62%	14.41%	11.94%	11.94%	11.94%	11.94%											
Select Balance Sheet And Other Data																							
Cash		25,486,000	15,039,000	8,714,000	14,718,000	14,614,000	55,233,000	55,070,000	55,070,000	55,070,000	55,070,000	55,070,000											
Accounts Receivable		17,784,000	12,970,000	11,372,000	15,988,000	18,332,000	29,122,000	19,877,000	20,709,429	22,133,480	23,655,454	25,282,084											
Inventories		15,000,000	21,962,000	18,374,000	19,430,000	28,982,000	30,767,000	20,807,000	22,845,081	25,082,795	27,539,697	30,237,257											
Accounts Payable		9,828,000	8,794,000	7,823,000	9,455,000	15,488,000	13,526,000	11,258,000	11,889,779	12,557,011	13,261,688	14,005,910											
Accrued Expenses		13,700,000	6,100,000	4,700,000	4,400,000	5,800,000	9,600,000	6,100,000	6,484,828	6,893,934	7,328,849	7,791,201											
Accrued Expenses (Raw data)		13.70	6.10	4.70	4.40	5.80	9.60	6.10															
Debt								1,285,000															
Gross PP&E (increases annual by CAPEX)		42,941,000	38,009,000	27,793,000	24,100,000	21,280,000	26,077,000	20,299,000	21,421,207	22,605,453	23,855,169	25,173,974											
Accounts Receivable Growth (%)			-27.07%	-12.32%	40.59%	14.66%	58.86%	-33.46%	6.88%	6.88%	6.88%	6.88%											
Inventories Growth (%)			46.41%	-16.34%	5.75%	49.16%	6.16%	-32.37%	9.80%	9.80%	9.80%	9.80%											
Prepaid Expenses Growth (%)																							
Accounts Payable Growth (%)			-10.52%	-11.04%	20.86%	63.81%	-12.67%	-16.77%	5.61%	5.61%	5.61%	5.61%											
Accrued Expenses Growth (%)				-22.95%	-6.38%	31.82%	65.52%	-36.46%	6.31%	6.31%	6.31%	6.31%											
Capital Expenditures Growth (%)			-11.49%				22.54%		5.53%	5.53%	5.53%	5.53%											
Free Cash Flow Buildup																							

Figure 2. Discounted Cass Flow Model – part 1

Free Cash Flow Buildup																								
		2010	2011	2012	2013	2014	2015	Projected Annual Forecast					2016	2017	2018	2019	2020							
Period								1	2	3	4	5												
Total Revenues								134,878,000	139,478,786	144,236,507	149,156,518	154,244,354												
EBITDA								-	-	-	-	-												
EBIT								(27,277,000)	2,123,741	2,196,183	2,271,096	2,348,565												
Tax rate								40%	40%	40%	40%	40%												
EBIAT								(16,366,200)	1,274,244	1,317,710	1,362,658	1,409,139												
Depreciation & Amortization								19,431,000	16,659,401	17,227,666	17,815,314	18,423,007												
Accounts receivable								9,745,000	(1,332,429)	(1,424,051)	(1,521,974)	(1,626,630)												
Inventories								9,960,000	(2,038,081)	(2,237,714)	(2,456,902)	(2,697,560)												
Accounts payable								(2,268,000)	631,779	667,233	704,677	744,222												
Accrued expenses								(3,500,000)	384,828	409,106	434,915	462,352												
Capital expenditures								5,778,000	(1,122,207)	(1,184,246)	(1,249,716)	(1,318,805)												
Unlevered free cash flows								22,779,800	14,457,536	14,775,702	15,088,971	15,395,725												
Discount Rate (WACC)								5.70%	5.70%	5.70%	5.70%	5.70%												
Present value of free cash flows								21,550,888	12,939,718	12,511,055	12,087,060	11,667,464												
Sum of present values of FCFs								70,756,185																
Terminal Value																								
Growth in perpetuity method:																								
Long term growth rate								2.60%																
WACC								5.70%																
Free cash flow (t+1)								11,970,818																
Terminal Value								385,860,143																
Present Value of Terminal Value								292,419,447																
WACC																								

Figure 3. Discounted Cass Flow Model – part 2

WACC				
Share Price	13			
Diluted Shares Outstanding	48,200,000			
Cost of Debt	3.30%			
Tax Rate	40.00%			
After-tax Cost of Debt	1.98%	RF	Beta	RM-RF
Cost of Equity	5.71%	2.35	1.05	3.20
Total Debt (\$)	1,285,000			
Total Equity (\$)	627,082,000			
Total Capital	628,367,000			
Debt Weighting	0.20%			
Equity Weighting	99.80%			
WACC =	5.70%			
Enterprise Value to Equity Value				
Enterprise Value	363,175,631			
Less: Net debt	(53,785,000)			
Equity Value	416,960,631			
Diluted Shares Outstanding	48,200,000			
Equity Value Per Share	8.65	Overvalued		

Figure 4. Discounted Cass Flow Model – part 3

There are two types of data in this DCF model, one can be imported directly from data sources, the other cannot be imported from anywhere but require calculations.

The “imported” ones are revenue; EBITDA; EBIT; depreciation and amortization; cash; accounts receivable; inventories; accounts payable; accrued expenses; debt; gross property, plant, and equipment; tax rate; stock price of the last trading date relative to the valuing date; and the number of diluted shares outstanding. It is worth noting that all of these data were imported in the place of years from 2010 to 2016, but not in 2017, 2018, 2019, and 2020 because they need to be calculated. However, for debt, we only take the data of the last available year is enough for this model, possibly 2015 or 2016.

The first set of “calculated” ones are: (These formulas are applied for the years from 2010 to 2016 only)

- $Revenue\ growth\ rate\ (\%) = \left(\frac{Revenue\ of\ this\ year}{Revenue\ of\ the\ previous\ year} - 1 \right) \times 100$
- $EBIT\ Margin\ (\%) = \left(\frac{EBIT\ of\ this\ year}{Revenue\ of\ this\ year} - 1 \right) \times 100$
- $Depreciation\ and\ Amortization\ (\%) = \left(\frac{D\&A\ of\ this\ year}{Revenue\ of\ this\ year} - 1 \right) \times 100$
- $Accounts\ Receivable\ Growth\ (\%) = \left(\frac{Accounts\ Receivable\ of\ this\ year}{Accounts\ Receivable\ of\ previous\ year} - 1 \right) \times 100$
- $Inventories\ Growth\ (\%) = \left(\frac{Inventories\ of\ this\ year}{Inventories\ of\ previous\ year} - 1 \right) \times 100$
- $Accounts\ Payable\ Growth\ (\%) = \left(\frac{Accounts\ Payable\ of\ this\ year}{Accounts\ Payable\ of\ previous\ year} - 1 \right) \times 100$

- *Accrued Expenses Growth (%)* = $\left(\frac{\text{Accrued Expenses of this year}}{\text{Accrued Expenses of previous year}} - 1\right) \times 100$
- *Capital Expenditures Growth (%)* = $\left(\frac{\text{Gross PP\&E of this year}}{\text{Gross PP\&E of previous year}} - 1\right) \times 100$

The second set of “calculated” ones are: (These formulas are applied for the years from 2017 to 2020)

- Revenue growth rate (%) = Average of all previous revenue growth rates. However, there are some adjustments made if the average is a minus number or too high (possibly over 100%) since the minus average does not reflect the future growth of the company and may eventually give the value of a company a minus number which is not realistic. Because of that, outliers within this data is removed from this average equation. Outliers are mostly minus rates or those which have absurdly high rates. These modifications are necessary since they prevent the model yield unrealistic company value.
- EBIT Margin (%) = Average of all previous EBIT margins. The additional condition is the same as above.
- Depreciation and Amortization (%) = Average of all previous D&A rates. The additional condition is the same as above.
- Accounts Receivable Growth (%) = Average of all previous accounts receivable growth rates. The additional condition is the same as above.
- Inventories Growth (%) = Average of all previous inventories growth rates. The additional condition is the same as above.
- Accounts Payable Growth (%) = Average of all previous accounts payable growth rates. The additional condition is the same as above.
- Accrued Expenses Growth (%) = Average of all previous accrued expenses growth rates. The additional condition is the same as above.
- Capital Expenditures Growth (%) = Average of all previous capital expenditures growth rates. The additional condition is the same as above.

After doing a series of importing and calculating above, the DCF model has almost all inputs it needs. Moving forward, there are essentially four big steps to go through in this DCF model to generate the intrinsic value, including estimating future free cash

flows, calculating the WACC, estimating terminal value, and estimating company value.

Firstly, starting with the estimating future free cash flows for the period of 5 years from 2016 to 2020. This study also forecasts free cash flows for the year 2016 since some firms have not published their financial data yet at this point of writing. The following are the formulas for calculating necessary entries within Free Cash Flow Buildup shown in figure 3.

- Total revenues, EBITDA, EBIT, and depreciation and amortization are just taken down from previous calculations and input to this section. These numbers are totally the same as those calculated before. Bringing down these numbers to this section will make it easier to go through calculations.
- Tax rate is 40%. The number is taken from KPMG.
- EBIAT is earnings before interest after taxes. $EBIAT = EBIT \times (1 - \text{Tax Rate})$
- Accounts receivable = accounts receivable of the previous year – accounts receivable of this year. This is because the increase in accounts receivable causes total revenues to increase but makes cash flows decreases.
- Inventories = inventories of the previous year – inventories of this year.
- Accounts payable = accounts payable of the previous year – accounts payable of this year.
- Capital expenditures = capital expenditures of the previous year – capital expenditures of this year
- Unlevered free cash flows = a sum of EBIAT, depreciation, and amortization, accounts receivable, inventories, accounts payable, accrued expenses, and capital expenditures.
- Discount rate (WACC) calculation will be mentioned in the next section.
- Present value of free cash flows =

$$\text{Unlevered free cash flows} / (1 + \text{WACC})^n$$
 n equals to 1, 2, 3, 4, 5 for 2016, 2017, 2018, 2019, 2020, respectively.
- Sum of present values of FCFs = a sum of all present value of free cash flows from 2016 to 2020. This is the final number that we need for this section.

Secondly, it is the process of calculating the WACC.

- Share price and diluted shares outstanding of each company are taken either from Stockrow or from Yahoo! Finance, depending on the availability of these two sources.
- Cost of debt = 3.3%. It is the average lending interest rate in the United States in 2015, the latest available data. It was taken from The World Bank at <http://data.worldbank.org/indicator/FR.INR.LEND>
- Tax rate = 40%. It is taken from KPMG as mentioned above.
- After-tax Cost of Debt (%) = Cost of Debt x (1 – Tax Rate)
- RF (%) = 10-year risk-free rate, collected from the U.S. Department of the Treasury at <https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldYear&year=2017>. The rate was taken on the same date of the valuing date.
- RM-RF (%) = 3.2%. The number is the average of market return from 01 January 1990 to 31 December 2016. Data were taken from Tuck School of Business of Dartmouth College at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html#Research
- Beta was calculated for each company by using Linear Regression equation on Excel. Input data were used are daily market risk premium and daily return of valuing company from 31 December 2009 to 31 December 2016.
- Cost of Equity (%) = RF + (RM-RF * Beta).
- Total debt is just taken down from the previous section. It is the debt of the last available year, depending on the availability of data.
- Total equity = Share price x Diluted shares outstanding
- Debt Weighting = Total debt / Total Capital
- Equity Weighting = Total equity/ Total Capital
- WACC (%) = (Cost of Equity x Equity Weighting) + (After-tax Cost of Debt x Debt Weighting)

Finally, it is the process of calculate enterprise value and equity value.

- Enterprise value = Sum of present values of FCFs + Present value of terminal value
- Net Debt = Total debt (last year) – Cash (last year)
- Equity value = Enterprise value – Net debt

- Diluted shares outstanding is the same as above.
- Equity value per share = Equity value / Diluted shares outstanding

After finishing this step, we have all information we need for answering the research questions. Three most important numbers here is the enterprise value, equity value, and equity value per share. As Cooper and Schindler (2013) said data analysis also includes showing a general pattern of the result. There are three critical patterns for the enterprise value, equity value, and equity value per share.

For the enterprise value

- The enterprise value is undervalued if calculated value in DCF > Market capitalization + Total debt
- The enterprise value is overvalued if calculated value in DCF < Market capitalization + Total debt
- The enterprise value is matched with market value if calculated valued in DCF = Market capitalization + Total debt

For the equity value

- The equity value is undervalued if calculated value in DCF > Market capitalization
- The equity value is overvalued if calculated value in DCF < Market capitalization
- The equity value is matched with market value if calculated value in DCF = Market capitalization

For the equity value per share

- The equity value per share is undervalued if calculated value in DCF > Share price on the stock market
- The equity value per share is undervalued if calculated value in DCF < Share price on the stock market
- The equity value per share is matched with market value if calculated value in DCF = Share price on the stock market

4.5. Validity and Reliability

According to Cooper and Schindler (2013), there are many forms of validity, however, the two major forms are internal validity and external validity. A research is considered external validity when its data has the ability to generalize across people, times, and settings. As for internal validity, it is about the match between the measures chosen and their abilities to accurately measure what they aim for. (257.) Zikmund et al. (2013) added that validity generally means the accuracy of the measurement that considered having a good match with a concept. For instance, the chosen measures for job performance must truly reflect job performance. There are four fundamental approaches to ensure validity, including face validity, content validity, criterion validity, and construct validity. (307.)

Face validity refers to a consensus amongst professionals about chosen scales that accurately reflects the concept being measured. However, depending on types of conducted research, some professionals may not agree or dismiss the effort of establishing face validity. The reason is that people may have different views on a controversial concept and could not reach an agreement. This leads people to find other sources of validity. (Zikmund et al. 2013, 307.)

Content validity is perceived as the extent to which a measure covers the range of concept. The following essential question may clarify the idea of it. Do the measures cover the whole scope of the research that it tries to reach? (Zikmund et al. 2013, 307-308.)

Criterion validity relates to the practical aspects of the research. The concept is sometimes called pragmatic validity, helping a research address the question, “How well my measure function in reality?” A research may fall into one of these two categories within criterion validity, concurrent validity, and predictive validity. They are different on the basics of timing; it would be concurrent validity when a measure is taken at the same time as the criterion measure; it would be predictive validity when a measure aims for predicting a scenario in the future. (Zikmund et al. 2013, 308.)

Construct validity is displayed when a measure accurately and reliably represents a unique concept. To be more specific, construct validity has a handful of components, including criterion validity, discriminant validity, face validity, convergent validity, and content validity. (Zikmund et al. 2013, 308.)

This research satisfied both internal and external validity. As for external aspect, the research could be generalized across people, times, and settings. The analytical technique of DCF model is universal, researchers around the globe can use the same technique as I do for their research. Concepts are universally agreed amongst professionals including DCF valuation technique, free cash flows, risk-free rate, and market risk premium. Therefore, the research can also be generalized across times and settings. For internal validity, there is no doubt about the accuracy of chosen measures for the purpose of this thesis. The formula of calculating a company value using DCF was clearly listed in the literature review as follows.

$$V = \frac{CF_1}{1+k} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \dots + \frac{CF_n + VR_n}{(1+k)^n}$$

All variables related to the above formula have been discussed in the data analysis part in detail. They are accurately picked according to theories and concepts defined them, such as the weighted average cost of capital, risk-free rate, risk premium, beta, and free cash flows. Considering face validity, the research satisfied this condition since chosen measures accurately reflect the concept being measured. For content validity, chosen measures have fully covered the range of concept. Mentioned in data analysis part, details for every formula and data were presented, and all of them contributed to the final step of finding firms' values. For criterion validity, it is clear that this research belongs to predictive validity school since the value of a company calculated by DCF indicates that its situation of undervaluation or overvaluation may be gradually adjusted to its correct value later in the future by the stock market itself. As a result, it implies that the market may automatically and gradually adjust stock prices of these companies to suitable values in the future. The study also achieved the final construct validity. Measures chosen were accurately and reliably represents a unique concept. A series of formulas and variables introduced in this research in order to specifically reach the final goal or finding true value of companies using the DCF valuation model, which is the unique concept across the research.

Moving on to reliability, Cooper and Schindler (2013) and Zikmund et al. (2013) both agreed that reliability is closely related to validity. It is one of the contributors to validity but not sufficiently the only condition. By definition, a research achieved reliability when it generates consistent results, instead of unpredictable and uncontrollable ones. (ibid.)

The study has fully achieved reliability since it displayed a clear and consistent pattern of research result. As stated in analysis part, there are three major result patterns for this research. The values of companies were generated from the DCF valuation model and then compared with the market values to determine whether the stock market has undervalued, overvalued, or exactly valued them. Values that were being compared are enterprise values, equity values, and equity value per share. Taking the valuation of technology sector of this research as an example, considering equity value per share there are six overvalued companies and four undervalued firms. For overvalued firms, the market prices of their stocks are traded at a higher rate than their equilibrium prices. In contrast, the market prices of undervalued companies are traded at a lower rate than their intrinsic values. Details of these findings will be mentioned in the Results chapter.

5. Results

With a large volume of findings resulted from 100 companies, this chapter will organize the content in the order of sector-by-sector, instead of presenting results in the order of company-by-company.

This research will report the result of ten sectors. Each sector will be illustrated by one table detailing all types of values, including enterprise value, equity value, equity per share value, share price, market capitalization, and the sum of market capitalization and total debt. In addition to that table, there will be three charts using for purpose of comparison between the values calculated by DCF and market values. These tables to answer the given research questions. Analyses and interpretations are also given out to interpret the results and implications.

In order to simplify tables and charts and make them physically fit into the research paper, the author uses a stock ticker symbol of companies to illustrate their identities, instead of their full names.

5.1. Technology Sector

As can be seen in Table 4, ten companies in the technology sector have been valued are EXAR, KAI, UIS, TNC, AER, CRM, EPAM, GWRE, JBL, and ETN. The values calculated by the DCF model are Enterprise Value, Equity Value, and Equity Value

Per Share, the values are taken from the stock market are Share Price, Market Capitalization. The sum of Market Capitalization and Total Debt are self-calculated based on data of market capitalization from the stock market and data of total debt from company's balance sheet.

This table is used for multiple purposes. Firstly, it summarizes all information in one place, enabling readers to understand the whole context easily. In addition to that, some company's values are too large or too small to fit in charts, therefore, their values can only be displayed in this table, not in charts.

While all companies have positive values in all categories, AER has negative values for Enterprise Value, Equity value, and Equity Value Per Share at -\$761,167,835,776; -\$786,520,207,776; and -\$16,317.85, respectively. In fact, these numbers imply an unfavorable interpretation. AER will run out of cash or in debt within 5 years in the future if the company continue to operate at the average level of 7 years ago. The reason is that this DCF model has performed the valuation based on the data of the past 7 years.

Table 4. All values of ten companies in Technology Sector

	Order	Company symbol	Enterprise Value (\$)	Equity Value (\$)	Equity Value Per Share (\$)	Share price (\$)	Total debt (\$)	Market Capitalization (\$)	Market Capitalization+ Total Debt (\$)
Technology Sector	1	EXAR	363,175,631	416,960,631	8.65	13.01	1,285,000	662,080,000	663,365,000
	2	KAI	500,718,947	536,404,947	48.32	58.15	31,250,000	636,020,000	667,270,000
	3	UIS	2,147,802,166	2,218,402,166	44.28	13.25	300,000,000	663,740,000	963,740,000
	4	TNC	907,928,331	930,284,331	51.68	73.9	36,194,000	1,310,000,000	1,346,194,000
	5	AER	(761,167,835,776)	(786,520,207,776)	(16,317.85)	45.46	27,716,999,000	8,010,000,000	35,726,999,000
	6	CRM	3,049,330,346	2,647,488,346	3.78	84.17	2,008,391,000	59,550,000,000	61,558,391,000
	7	EPAM	4,309,161,904	4,649,180,904	87.39	74.44	25,048,000	3,810,000,000	3,835,048,000
	8	GWRE	1,024,071,888	1,061,995,888	14.39	60.5	-	4,470,000,000	4,470,000,000
	9	JBL	23,272,988,309	22,065,225,309	114.45	28	2,119,822,000	5,100,000,000	7,219,822,000
	10	ETN	42,696,385,385	34,962,385,385	76.59	74.65	8,277,000,000	33,570,000,000	41,847,000,000

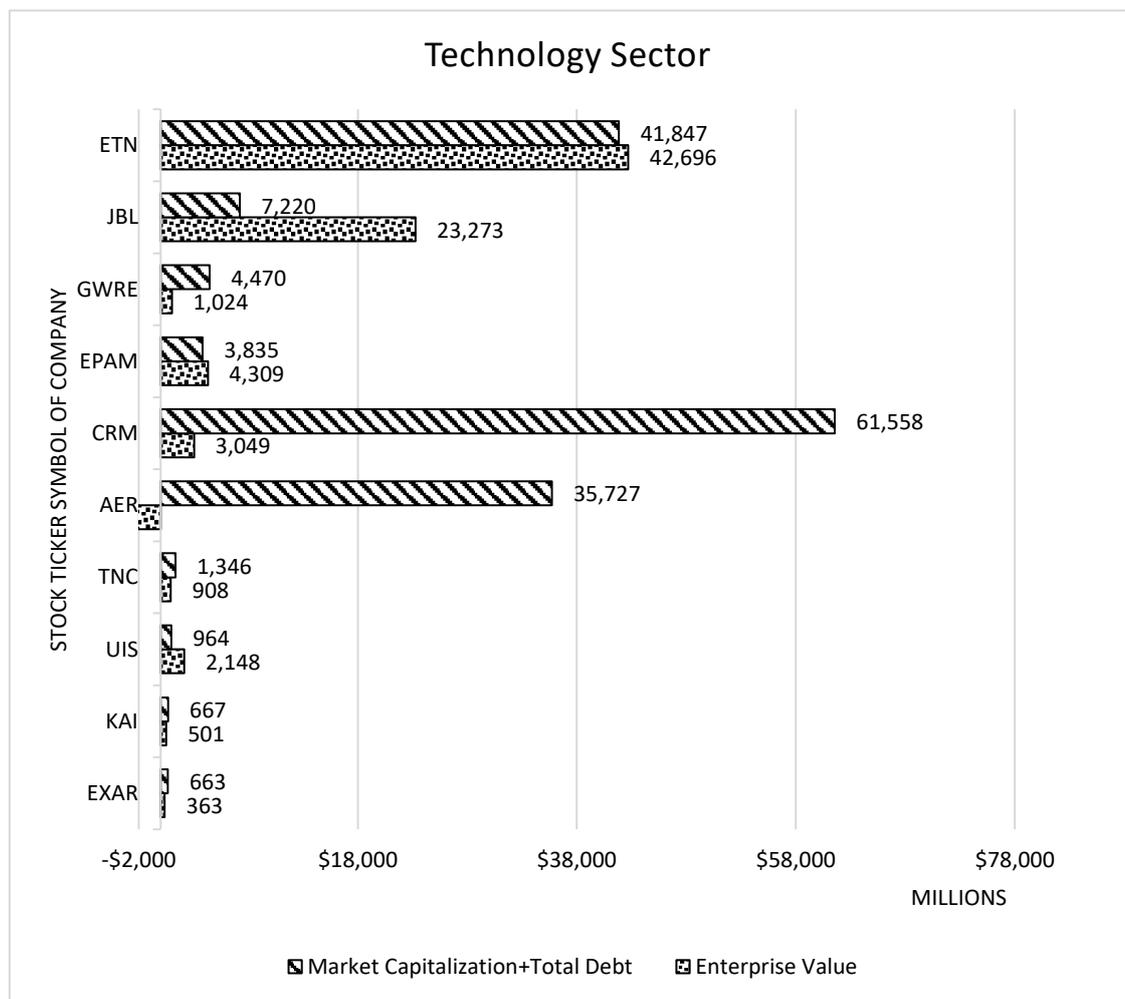


Figure 5. Technology sector: Market Capitalization + Total Debt versus Enterprise Value

Overall, there are four undervalued and six overvalued companies within this sector regarding enterprise values. Undervalued companies are ETN, JBL, EPAM, and UIS. Overvalued companies are GWRE, CRM, AER, TNC, KAI, and EXAR. (See Figure 5.) The reason of a firm to be considered undervalued or overvalued is that its value calculated by the DCF model is bigger or smaller the value on the stock market, respectively. Among all companies, CRM and AER are the two having the biggest gap between the DCF-calculated value and market value. While the DCF value of CRM is about 20 times smaller than the market value, the DCF value of AER is a minus number. CRM is valued at \$3.049 billion by the DCF model, but valued at \$61.558 billion by the market.

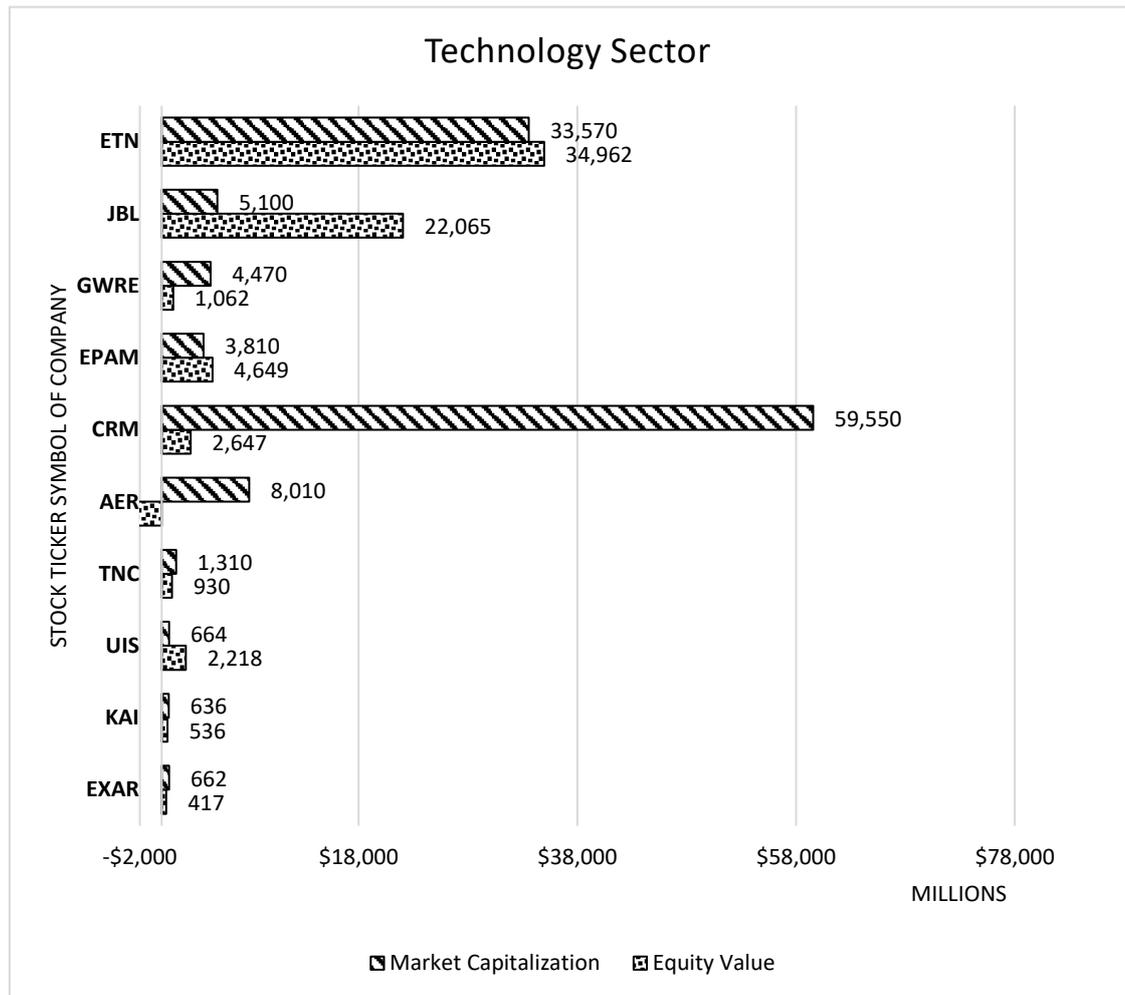


Figure 6. Technology sector: Market Capitalization versus Equity Value

Similarly, while the equity value of four companies is undervalued, six of them are overvalued. Undervalued companies are ETN, JBL, EPAM, and UIS. Overvalued companies are GWRE, CRM, AER, TNC, KAI, and EXAR. (See Figure 6.) Among all companies, CRM and AER are also the two having the biggest gap between the DCF-calculated value and market value. CRM is valued at \$2.647 billion by the DCF model, but valued at \$59.550 billion by the market. Although AER is valued at \$8.01 billion by the market but has a negative value when valued by the DCF model. Finally, JBL is the most undervalued company. While its market value is at \$5.1 billion, the DCF value is at \$22.065 billion.

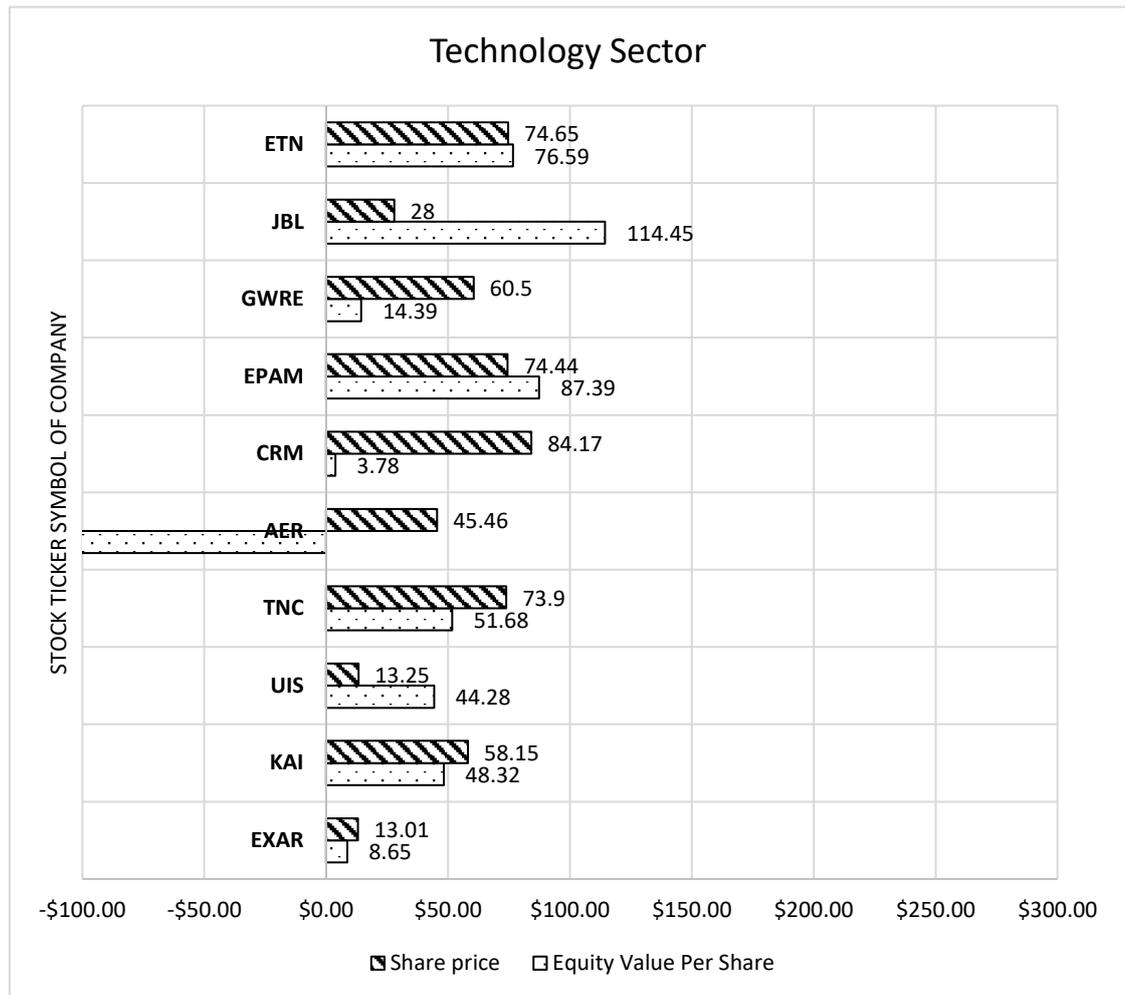


Figure 7. Technology sector: Share price versus Equity value per share

Similarly, while the equity value per share of four companies is undervalued, six of them are overvalued. Undervalued companies are ETN, JBL, EPAM, and UIS. Overvalued companies are GWRE, CRM, AER, TNC, KAI, and EXAR. (See Figure 7.) Among all companies, CRM and AER are also the two having the biggest gap between the DCF-calculated value and market value. Equity value per share of CRM is valued \$3.78 by the DCF model, but valued at \$84.17 by the market. Although AER is valued at \$45.46 per share by the market but has a negative value when valued by the DCF model. Finally, JBL is the most undervalued company. While its market value is at \$28, the DCF value is at \$114.45.

With this valuation, stock investors should consider buying stocks of ETN, JBL, EPAM, and UIS because their share prices may increase in the future. In contrast, they should consider betting against the market on these stocks: GWRE, CRM, AER, TNC, KAI, and EXAR because their share prices may drop in the future.

5.2. Transportation Sector

As can be seen in Table 5, ten companies in the transportation sector have been valued are ALK, CP, FDX, FRO, STNG, GWR, KSU, LUV, UAL, and NSC. The values calculated by the DCF model are Enterprise Value, Equity Value, and Equity Value Per Share, the values are taken from the stock market are Share Price, Market Capitalization. The sum of Market Capitalization and Total Debt are self-calculated based on data of market capitalization from the stock market and data of total debt from company's balance sheet.

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While all companies have positive values in all categories, FDX and KSU have negative values for Enterprise Value, Equity value, and Equity Value Per Share. These numbers signify that both companies may run out of cash or in debt within 5 years in the future if they continue to operate at the average level of 7 years ago. The reason is that this DCF model has performed the valuation based on the data of the past 7 years. Among all, the numbers of FDX are the worst on these categories, its enterprise value, equity value, and equity value per share are at -\$13.7 billion, -\$24.32 billion, and -\$87.18, respectively.

Table 5. All values of ten companies in Transportation Sector

	Order	Company symbol	Enterprise Value (\$)	Equity Value (\$)	Equity Value Per Share (\$)	Share price (\$)	Total debt (\$)	Market Capitalization (\$)	Market Capitalization+ Total Debt (\$)
Transportation Sector	11	ALK	13,741,777,693	11,105,777,693	89.27	89.43	2,964,000,000	11,010,000,000	13,974,000,000
	12	CP	28,467,866,528	22,167,189,985	146.80	150.25	6,464,676,543	21,970,000,000	28,434,676,543
	13	FDX	(13,694,108,568)	(24,322,108,568)	(87.18)	195.99	14,162,000,000	52,310,000,000	66,472,000,000
	14	FRO	11,189,813,115	9,988,335,115	63.62	6.69	1,404,557,000	1,140,000,000	2,544,557,000
	15	STNG	28,933,393,088	27,150,599,088	155.47	4.28	1,882,681,000	752,650,000	2,635,331,000
	16	GWR	4,474,826,036	2,147,692,036	36.84	67.75	2,359,453,000	4,180,000,000	6,539,453,000
	17	KSU	(1,556,954,197)	(3,864,554,197)	(35.85)	87.63	2,478,200,000	9,350,000,000	11,828,200,000
	18	LUV	38,620,059,962	36,913,059,962	58.31	53.38	3,387,000,000	33,560,000,000	36,947,000,000
	19	UAL	86,674,767,431	79,521,767,431	240.76	70.22	11,705,000,000	22,300,000,000	34,005,000,000
	20	NSC	27,419,414,174	18,163,414,174	61.36	115.88	10,212,000,000	33,680,000,000	43,892,000,000

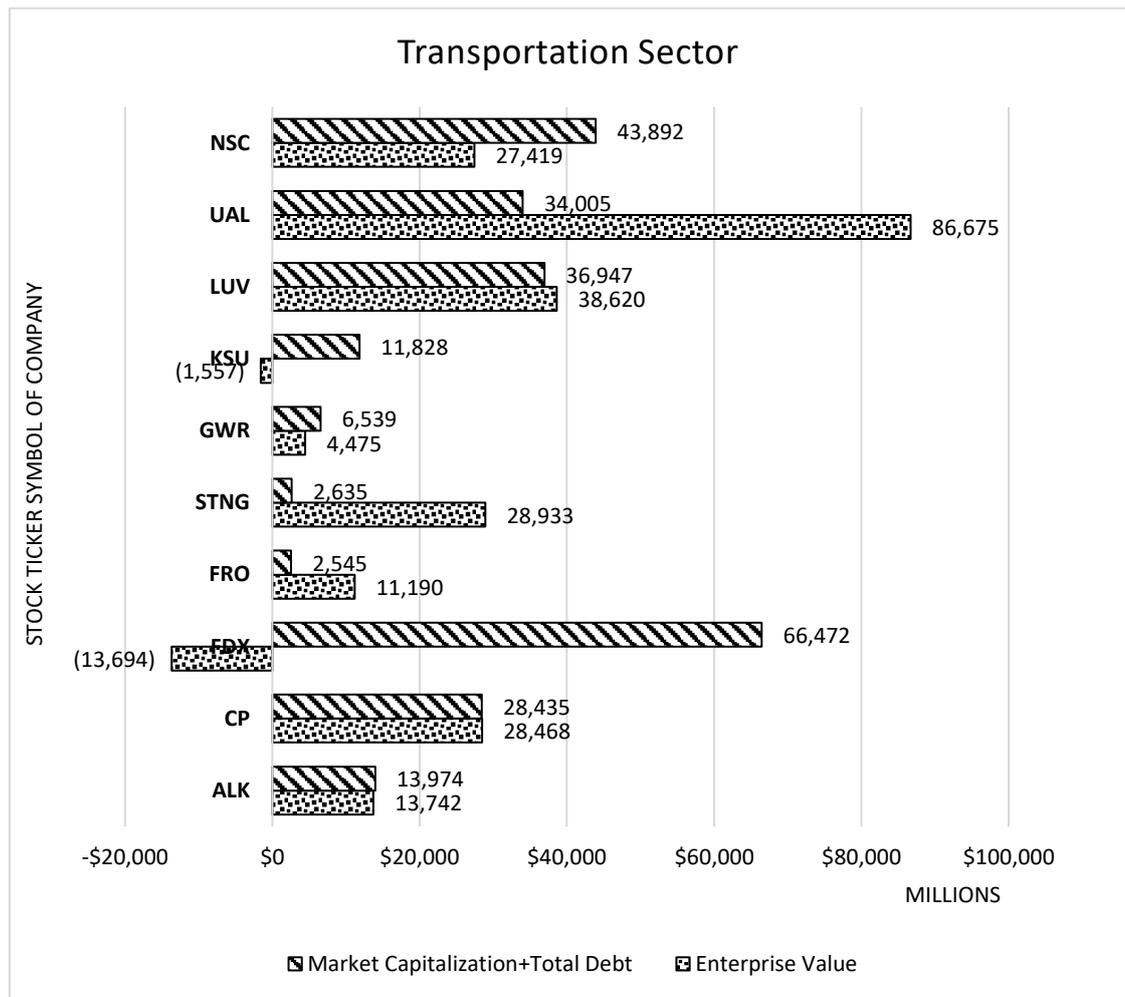


Figure 8. Transportation sector: Market Capitalization + Total Debt versus Enterprise Value

Overall, there are five undervalued and five overvalued companies within this sector regarding enterprise values. Undervalued companies are UAL, LUV, STNG, FRO and CP. Overvalued companies are NSU, KSU, GWR, FDX, and ALK. (See Figure 8.) A firm is considered undervalued or overvalued when its value calculated by the DCF model is bigger or smaller than the value on the stock market, respectively. Among all companies, KSU and FDX are the two having the biggest gap between the DCF-calculated value and market value. Both companies have minus values for the enterprise value, which is calculated by the DCF model. FDX is valued at -\$13.694 billion by the DCF model, but valued at \$66.472 billion by the market.

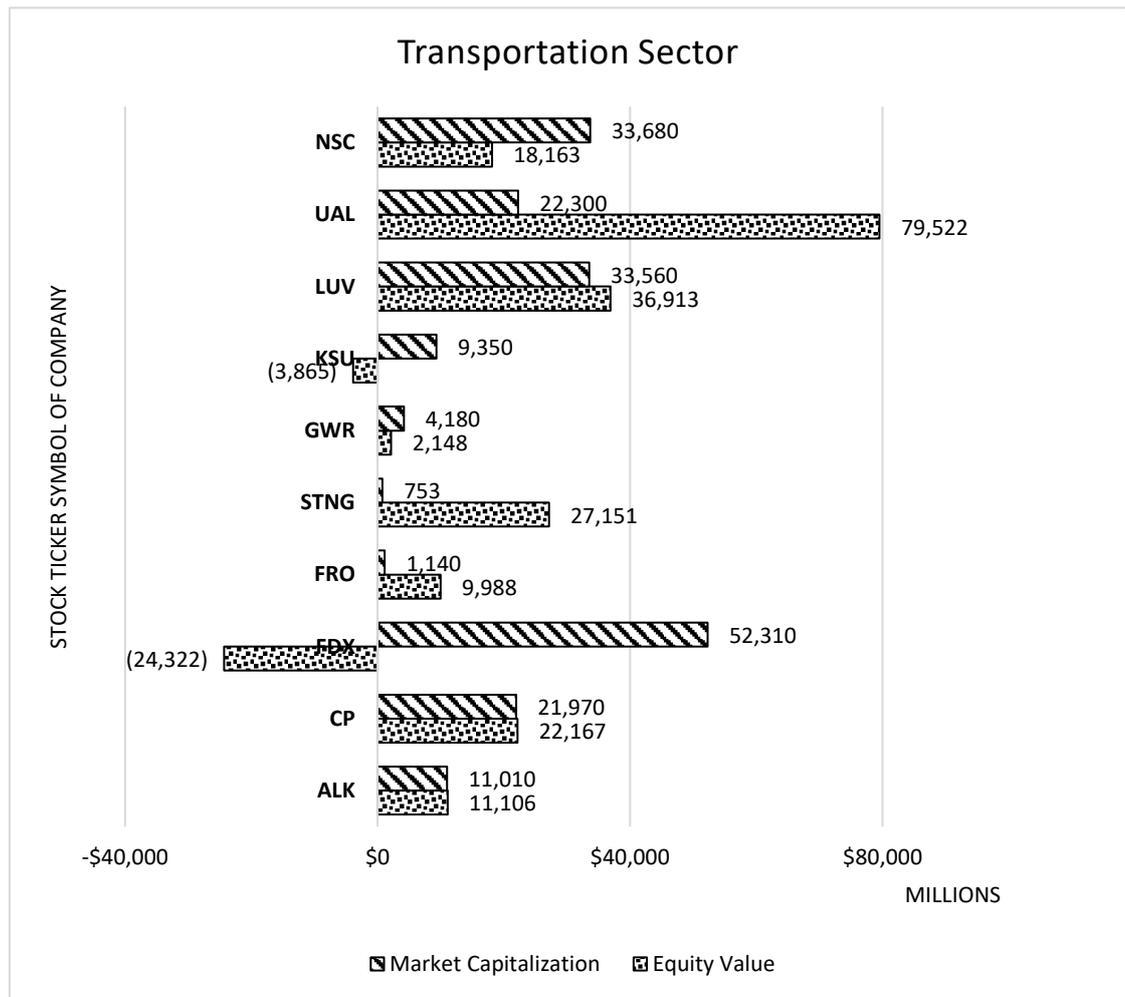


Figure 9. Transportation sector: Market Capitalization versus Equity value

Figure 9 shows that the equity value of six companies is undervalued and four of them are overvalued. Undervalued companies are UAL, LUV, STNG, FRO, CP, and ALK. Overvalued companies are NSC, KSU, GWR, and FDX. Among all companies, KSU and FDX are also the two having the biggest gap between the DCF-calculated value and market value. Both companies have minus values for the equity value, which is calculated by the DCF model. KSU is valued at -\$3.865 billion by the DCF model, but valued at \$9.35 billion by the market. Similarly, FDX has the DCF value at -\$24.322 billion but has the market value at \$52.31 billion. Finally, concerning companies having positive DCF-calculated values, STNG is the most undervalued company. While its market value is at \$753 million, the DCF value is at \$27.151 billion.

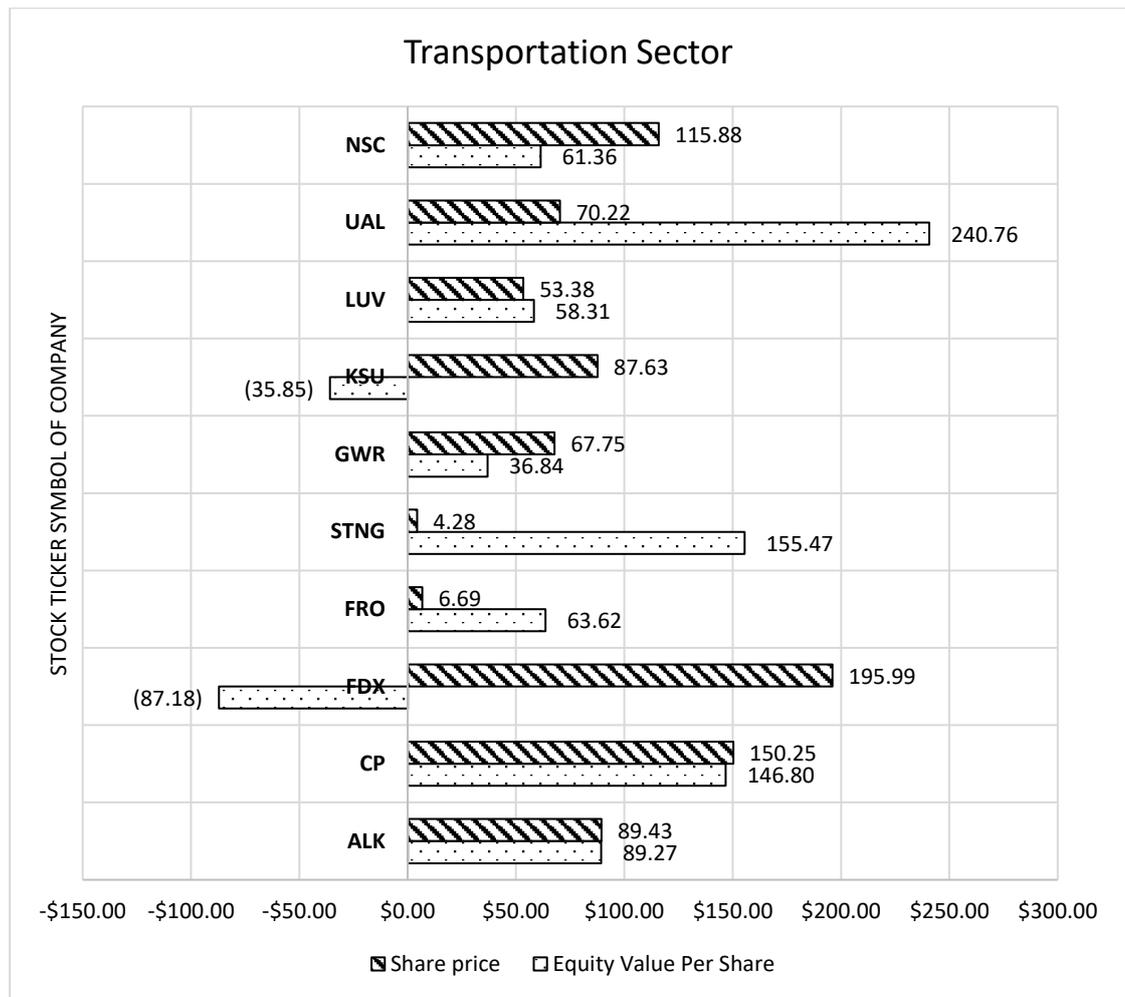


Figure 10. Transportation sector: Share price versus Equity value per share

Figure 10 shows that the equity value per share of four companies is undervalued and six of them are overvalued. Undervalued companies are UAL, LUV, STNG, and FRO. Overvalued companies are NSC, KSU, GWR, FDX, CP, and ALK. Among all companies, KSU and FDX are also the two having the biggest gap between the DCF-calculated value and market value. Equity value per share of KSU is valued -\$35.85 by the DCF model, but valued at \$87.63 by the market. Similarly, FDX has the DCF value at -\$87.18 but has the market value at \$194.99. Finally, concerning companies having positive DCF-calculated values, STNG is the most undervalued company. While its market value is at \$4.28, the DCF value is at \$155.47.

With this valuation, stock investors should consider buying stocks of UAL, LUV, STNG, and FRO because their share prices may increase in the future. In contrast, they should consider betting against the market on these stocks: NSC, KSU, GWR, FDX, CP, and ALK because their share prices may drop in the future.

5.3. Energy Sector

As can be seen in Table 6, ten companies in the energy sector have been valued are ALJ, DKL, BC, BGG, BHI, CVE, HEP, CHK, NOV, and SWN. The values calculated by the DCF model are Enterprise Value, Equity Value, and Equity Value Per Share, the values are taken from the stock market are Share Price, Market Capitalization. The sum of Market Capitalization and Total Debt are self-calculated based on data of market capitalization from the stock market and data of total debt from company's balance sheet.

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While all companies have positive values in all categories, DKL has negative values for Enterprise Value, Equity value, and Equity Value Per Share at -\$109,298,828; -\$582,839,828; and -\$47.39, respectively. These numbers signify that DKL may run out of cash or in debt within 5 years in the future if they continue to operate at the average level of 7 years ago. The reason is that this DCF model has performed the valuation based on the data of the past 7 years.

Table 6. All values of ten companies in Energy Sector

	Order	Company symbol	Enterprise Value (\$)	Equity Value (\$)	Equity Value Per Share (\$)	Share price (\$)	Total debt (\$)	Market Capitalization (\$)	Market Capitalization+ Total Debt (\$)
Energy Sector	21	ALJ	4,177,560,444	3,785,896,444	78.55	11.39	527,966,000	817,360,000	1,345,326,000
	22	DKL	(190,298,828)	(582,839,828)	(47.39)	31.4	392,600,000	763,920,000	1,156,520,000
	23	BC	3,513,674,079	3,504,874,079	38.10	57.8	442,400,000	5,170,000,000	5,612,400,000
	24	BGG	1,326,137,313	1,194,637,313	27.65	21.42	221,339,000	916,920,000	1,138,259,000
	25	BHI	23,483,923,543	25,037,923,543	57.69	61.28	3,018,000,000	26,060,000,000	29,078,000,000
	26	CVE	18,670,269,932	16,058,269,932	19.27	10.96	6,332,000,000	9,130,000,000	15,462,000,000
	27	HEP	18,609,895,373	17,369,640,373	289.98	36.05	1,243,912,000	2,260,000,000	3,503,912,000
	28	CHK	47,006,258,385	47,445,858,385	515.72	6.2	442,400,000	5,620,000,000	6,062,400,000
	29	NOV	10,630,648,271	8,824,648,271	23.47	38.89	3,214,000,000	14,730,000,000	17,944,000,000
	30	SWN	6,489,083,874	3,259,083,874	7.19	8.4	4,653,000,000	4,180,000,000	8,833,000,000

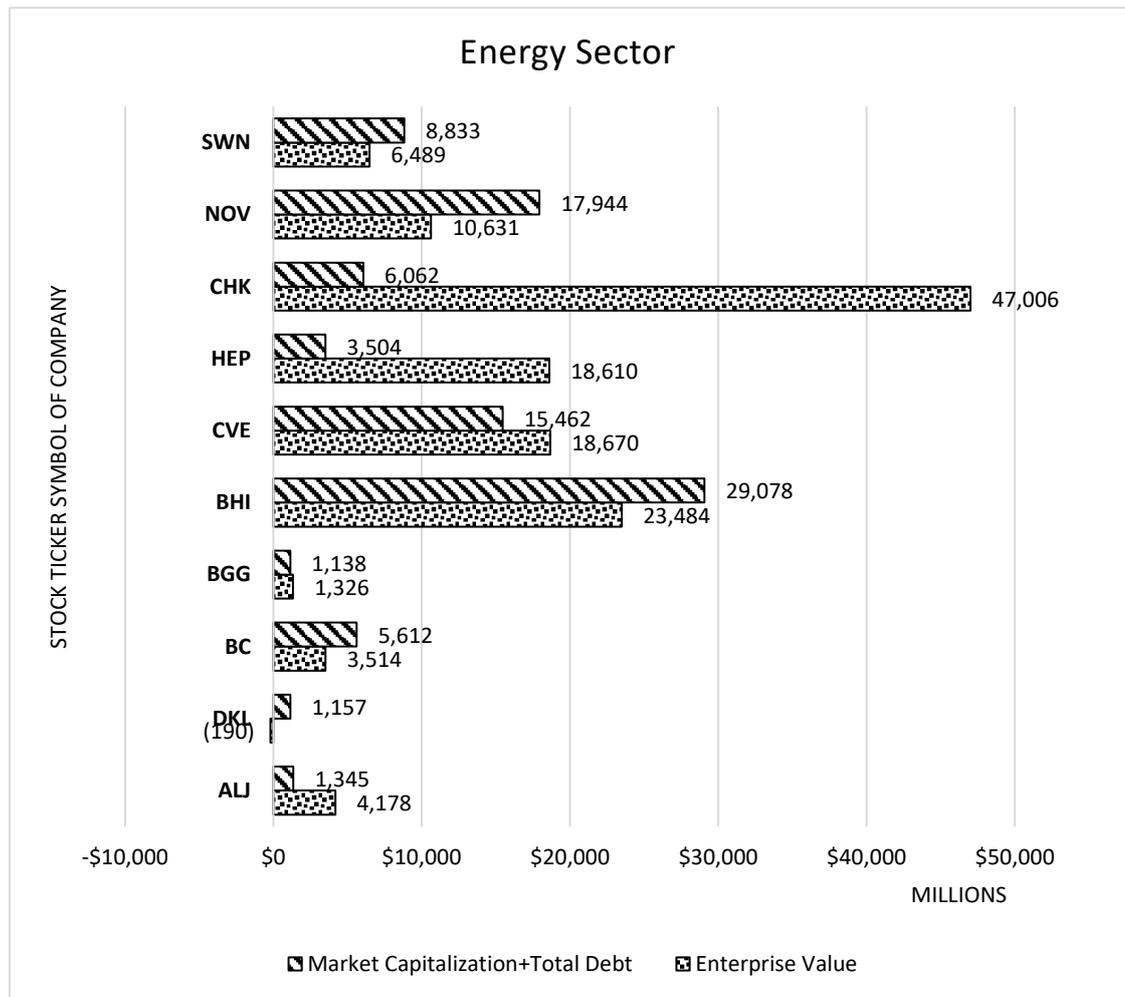


Figure 11. Energy sector: Market Capitalization + Total Debt versus Enterprise Value

Overall, five companies are undervalued and the other five are overvalued within this sector regarding their enterprise values. Undervalued companies are CHK, HEP, CVE, ALJ, and BGG. Overvalued companies are SWN, NOV, BHI, BC, and DKL. (See Figure 11.) A firm is considered undervalued or overvalued when its value calculated by the DCF model is bigger or smaller than the value on the stock market, respectively. Among all companies, CHK and DKL are the two having the biggest gap between the DCF-calculated value and market value. While the DCF value of CHK is nearly 8 times bigger than the market value, the DCF value of DKL is a minus number. CHK is valued at \$47 billion by the DCF model, but valued at \$6.062 billion by the market.

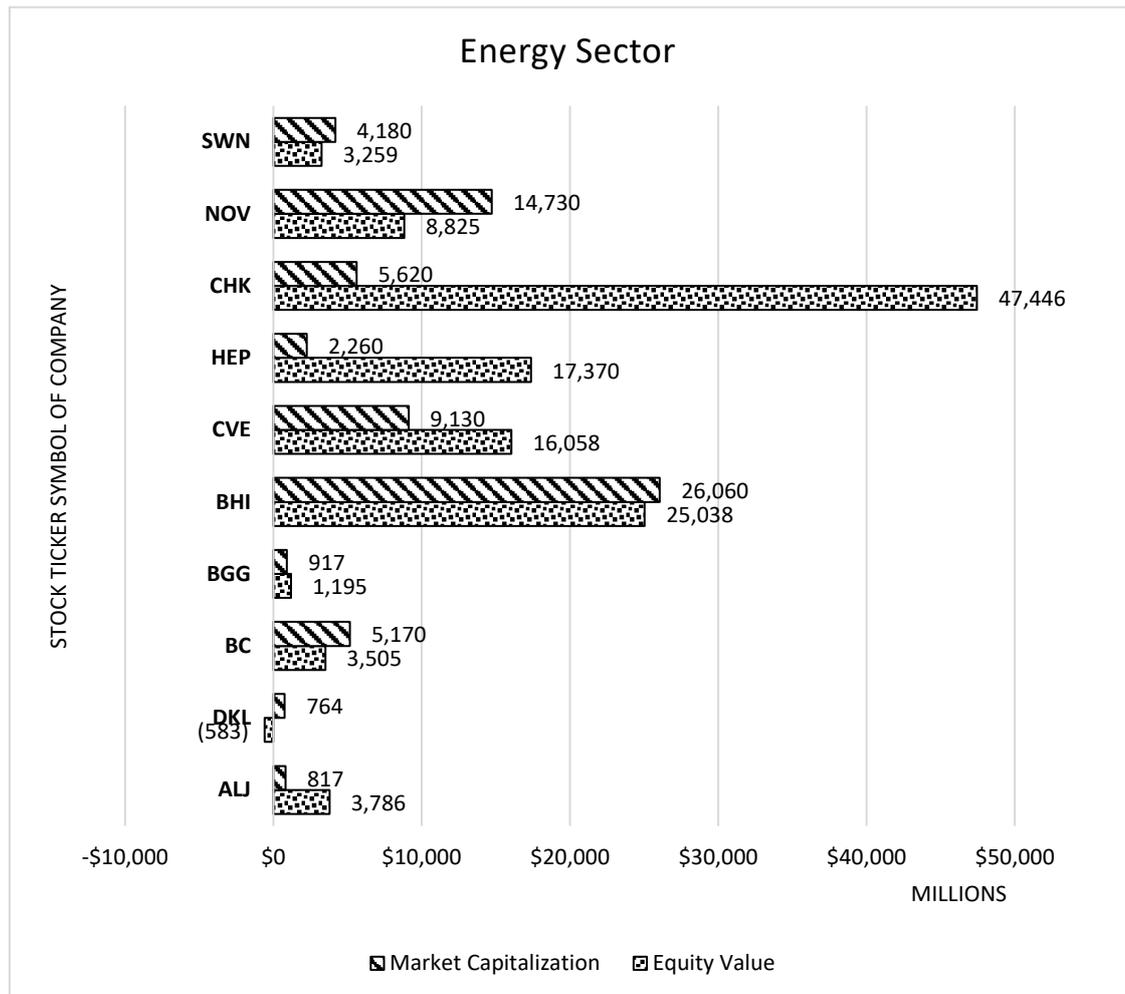


Figure 12. Energy sector: Market Capitalization versus Equity Value

Similarly, the equity value of five companies is undervalued and that of five others are overvalued. Undervalued companies are CHK, HEP, CVE, BGG, and ALJ.

Overvalued companies are SWN, NOV, BHI, BC, and DKL. (See Figure 12.) Among all companies, CHK and DKL are also the two having the biggest gap between the DCF-calculated value and market value. CHK is valued at \$47.446 billion by the DCF model, but valued at \$5.62 billion by the market. Although AER is valued at \$764 million by the market but has a negative value at -\$582 million when valued by the DCF model. Finally, CHK, DKL, and HEP are the most undervalued company. For HEP, while its market value is at \$2.26 billion, the DCF value is at \$17.37 billion.

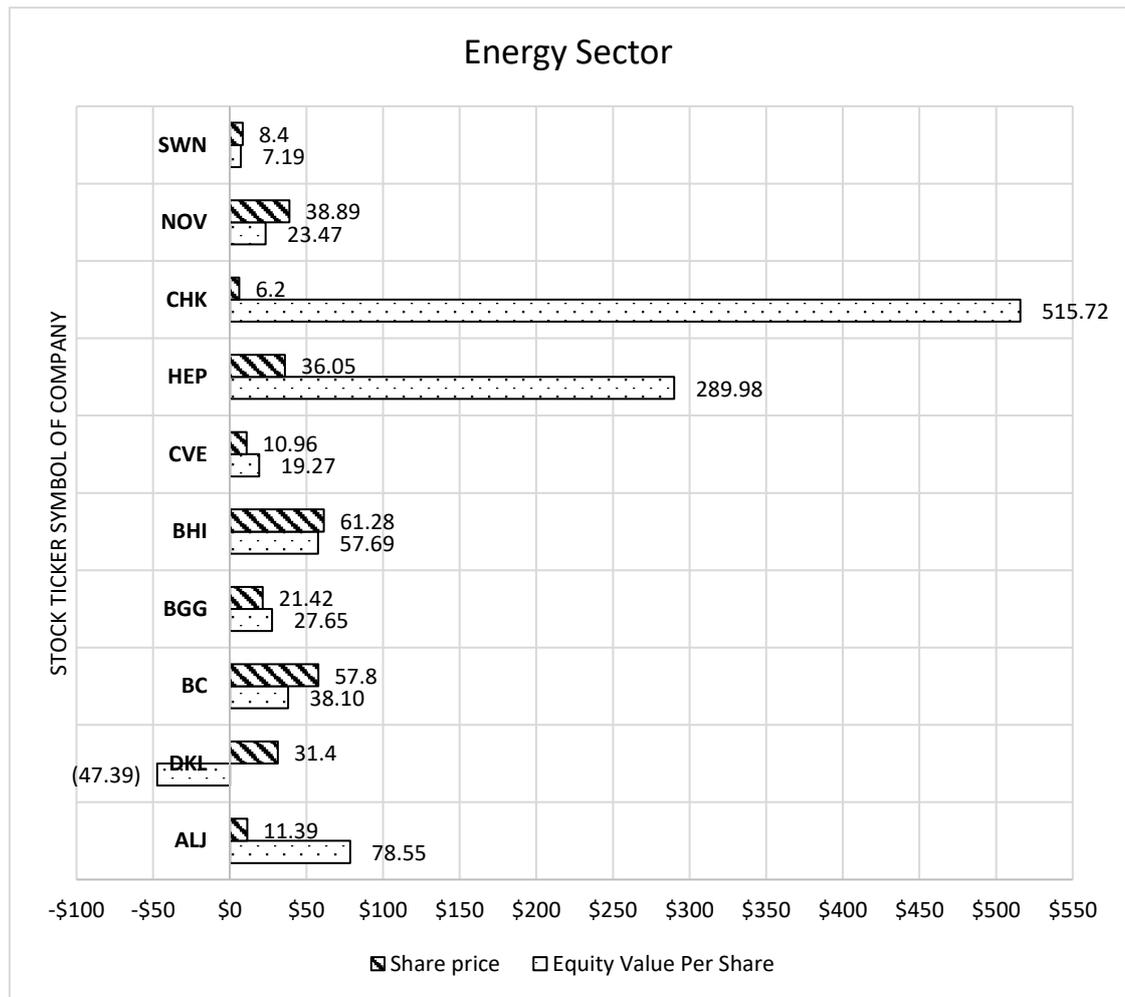


Figure 13. Energy sector: Share price versus Equity value per share

Similarly, while the equity value per share of five companies is undervalued, the other five are overvalued. Undervalued companies are CHK, HEP, CVE, BGG, and ALJ. Overvalued companies are SWN, NOV, BHI, BC, and DKL. (See Figure 13.) Among all companies, CHK and DKL are also the two having the biggest gap between the DCF-calculated value and market value. Equity value per share of CHK is valued \$515.72 by the DCF model, but valued at \$6.2 by the market. Although DKL is valued at \$31.4 per share by the market but has a negative value at -\$47.39 when valued by the DCF model. Finally, CHK, DKL, and HEP are the most undervalued company. For HEP, while its market value is at \$36.05, the DCF value is at \$289.98.

With this valuation, stock investors should consider buying stocks of CHK, HEP, CVE, BGG, and ALJ because their share prices may increase in the future. In contrast, they should consider betting against the market on these stocks: SWN, NOV, BHI, BC, and DKL because their share prices may drop in the future.

5.4. Public Utilities Sector

As can be seen in Table 7, ten companies in the energy sector have been valued are ALE, CEL, IDT, UTL, WGL, AEE, ENLC, KMI, NWN, and SEP. The values calculated by the DCF model are Enterprise Value, Equity Value, and Equity Value Per Share, the values are taken from the stock market are Share Price, Market Capitalization. The sum of Market Capitalization and Total Debt are self-calculated based on data of market capitalization from the stock market and data of total debt from company's balance sheet.

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ALE, UTL, WGL, and SEP are the four companies having negative values for Enterprise Value, Equity value, and Equity Value Per Share. These numbers signify that these companies may run out of cash or in debt within 5 years in the future if they continue to operate at the average level of 7 years ago. The reason is that this DCF model has performed the valuation based on the data of the past 7 years. Among all, the numbers of SEP are the worst on these categories, its enterprise value, equity value, and equity value per share are at -\$280,035,174,445, -\$287,032,174,445, and -\$959.97, respectively.

Table 7. All values of ten companies in Public Utilities Sector

	Order	Company symbol	Enterprise Value (\$)	Equity Value (\$)	Equity Value Per Share (\$)	Share price (\$)	Total debt (\$)	Market Capitalization (\$)	Market Capitalization+ Total Debt (\$)
Public Utilities Sector	31	ALE	(22,801,278,843)	(24,331,878,843)	(491.55)	68.7	1,558,100,000	3,440,000,000	4,998,100,000
	32	CEL	26,480,347,248	23,651,347,248	234.87	10.33	4,069,000,000	1,040,000,000	5,109,000,000
	33	IDT	826,707,956	1,035,066,956	45.40	13.21	-	305,130,000	305,130,000
	34	UTL	(2,519,583,880)	(2,940,583,880)	(210.04)	45.45	426,800,000	639,320,000	1,066,120,000
	35	WGL	(4,431,384,256)	(6,192,241,256)	(122.38)	81.96	1,766,430,000	4,200,000,000	5,966,430,000
	36	AEE	31,306,756,598	23,481,756,598	96.63	54.52	7,834,000,000	13,230,000,000	21,064,000,000
	37	ENLC	1,561,523,136	(1,722,076,864)	(9.57)	19.4	3,295,300,000	3,490,000,000	6,785,300,000
	38	KMI	180,026,576,589	140,660,576,589	63.08	21.56	40,050,000,000	48,130,000,000	88,180,000,000
	39	NWN	2,212,950,331	1,441,620,331	51.86	59.5	774,851,000	1,700,000,000	2,474,851,000
	40	SEP	(280,035,174,445)	(287,032,174,445)	(959.97)	43.81	7,213,000,000	13,530,000,000	20,743,000,000

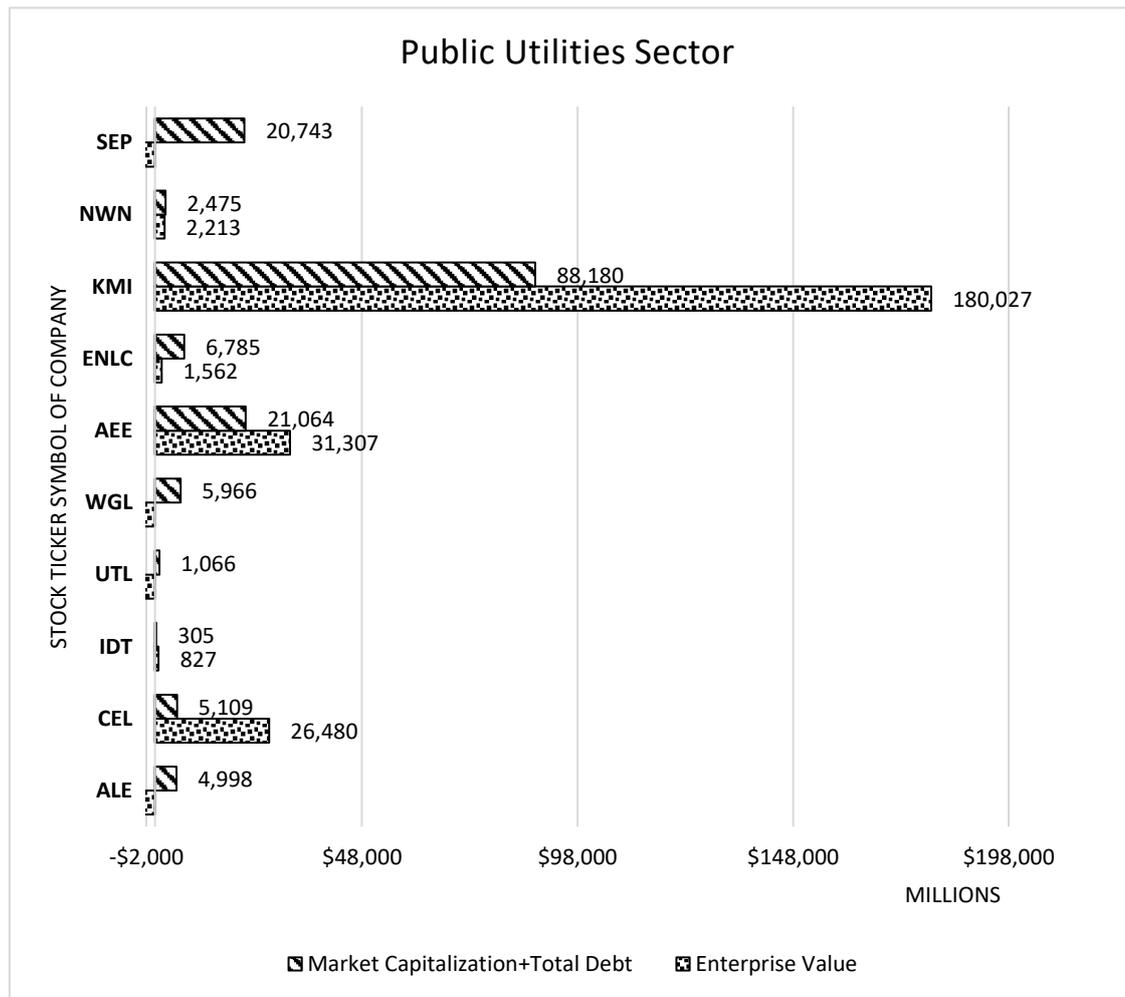


Figure 14. Public Utilities sector: Market Capitalization + Total Debt versus Enterprise Value

Overall, four companies are undervalued and the other six are overvalued within this sector regarding their enterprise values. Undervalued companies are KMI, AEE, IDT, and CEL. Overvalued companies are SEP, NWN, ENLC, WGL, UTL, and ALE. (See Figure 14.) A firm is considered undervalued or overvalued when its value calculated by the DCF model is bigger or smaller than the value on the stock market, respectively. Concerning companies having positive DCF-calculated values, KMI and CEL are the two having the biggest gap between the DCF value and market value. While the DCF value of CEL is more than 5 times bigger than the market value, the DCF value of KMI is 2 times bigger than the market value. CEL is valued at \$26.480 billion by the DCF model, but valued at \$5.109 billion by the market.

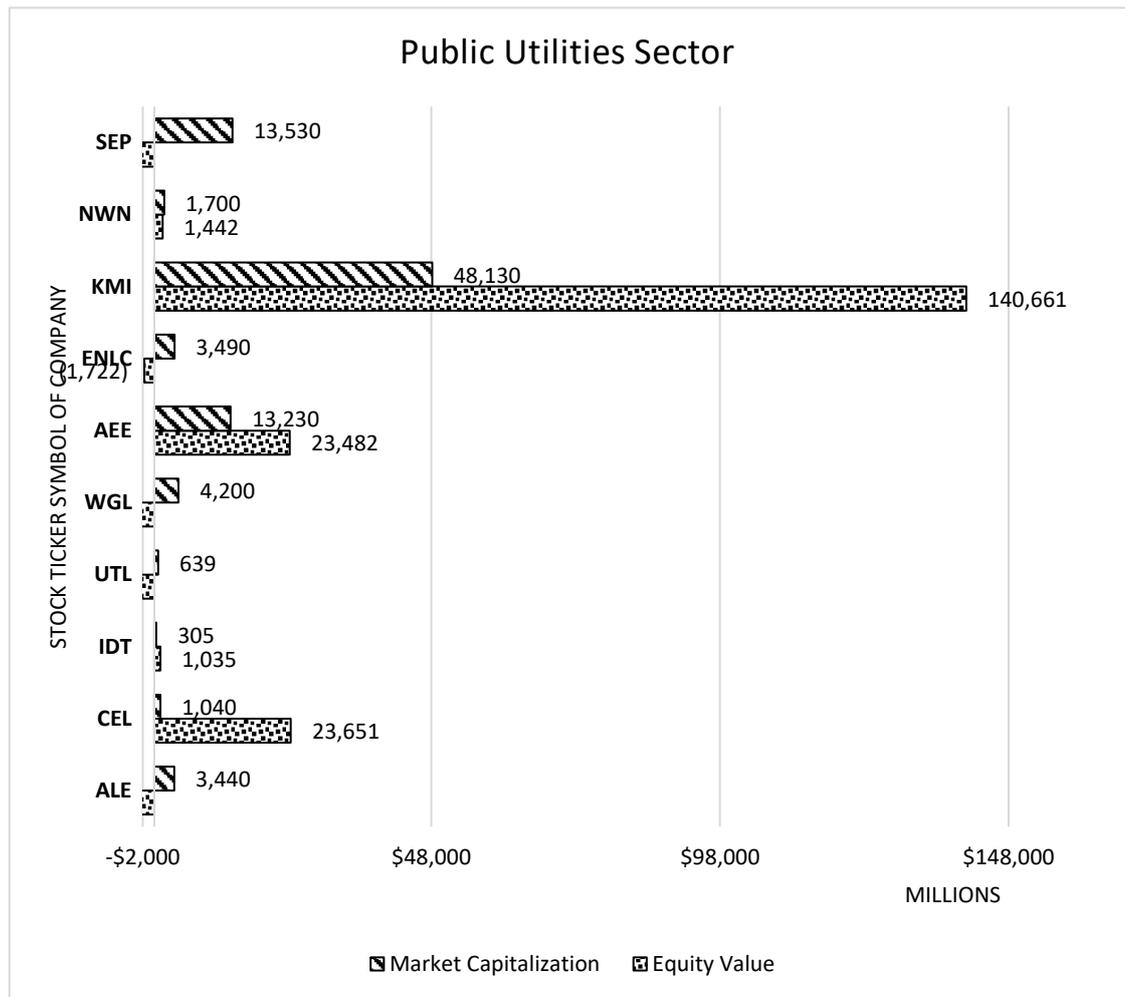


Figure 15. Public utilities sector: Market Capitalization versus Equity Value

Similarly, the equity value of four companies is undervalued and that of six others are overvalued. Undervalued companies are KMI, AEE, IDT, and CEL. Overvalued companies are SEP, NWN, ENLC, WGL, UTL, and ALE. (See Figure 15.)

Concerning companies having positive DCF-calculated values, KMI and CEL are also the two having the biggest gap between the DCF value and market value. KMI is valued at \$140.661 billion by the DCF model, but valued at \$48.130 billion by the market. CEL is valued at \$23.651 billion by the DCF model, but valued at \$1.040 billion by the market.

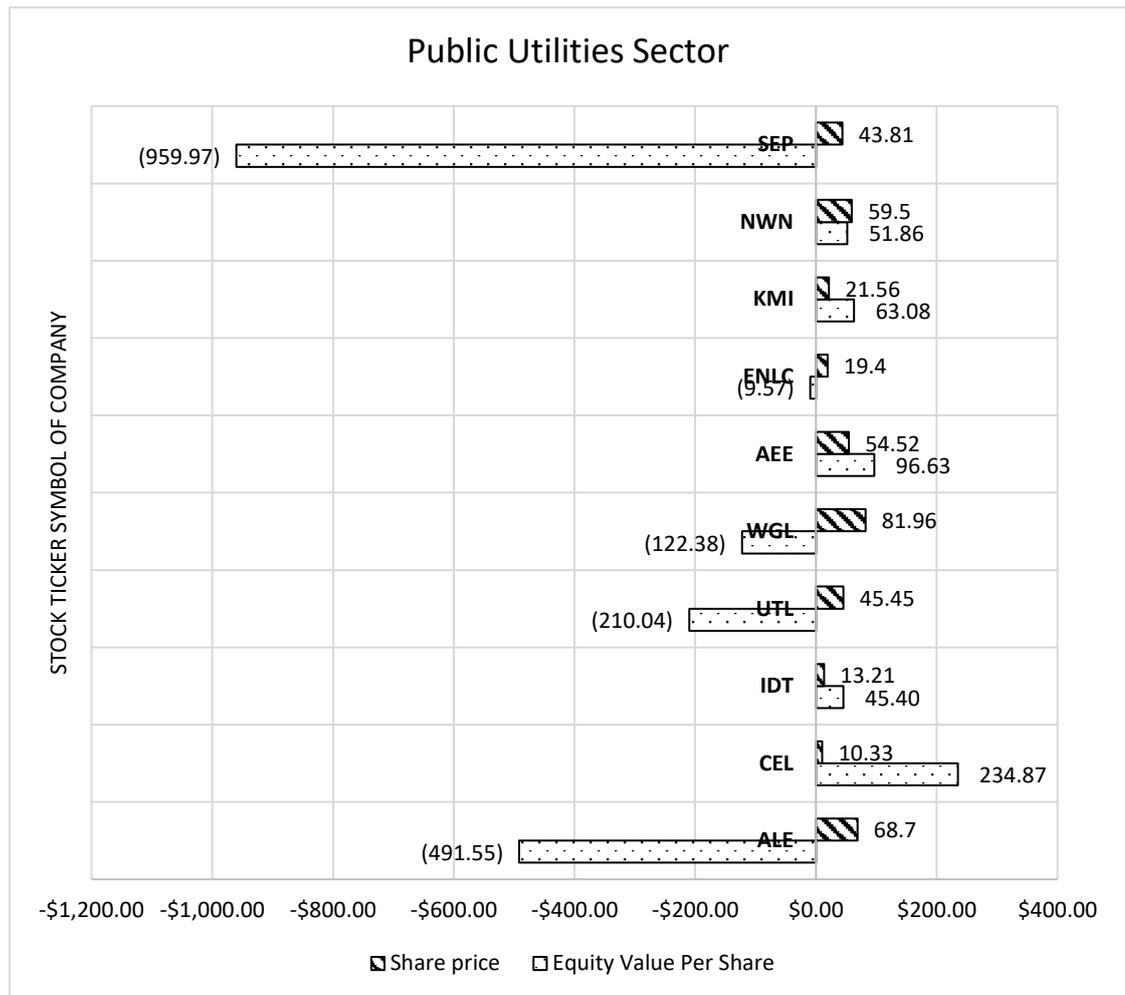


Figure 16. Public utilities sector: Share price versus Equity value per share

Similarly, while the equity value per share of four companies is undervalued, the other six are overvalued. Undervalued companies are KMI, AEE, IDT, and CEL.

Overvalued companies are SEP, NWN, ENLC, WGL, UTL, and ALE. (See Figure 16.) Among all companies, SEP and ALE are the two having the biggest gap between the DCF-calculated value and market value. Equity value per share of SEP is valued - \$959.97 by the DCF model, but valued at \$43.81 by the market. Although ALE is valued at \$68.7 per share by the market but has a negative value at -\$491.55 when valued by the DCF model. These companies are also the most undervalued ones. However, concerning companies having positive DCF-calculated values, CEL is the most undervalued one. While its share price is at \$234.87 when valued by the DCF model, it has the market value at \$10.33.

With this valuation, stock investors should consider buying stocks of KMI, AEE, IDT, and CEL because their share prices may increase in the future. In contrast, they should

consider betting against the market on these stocks: SEP, NWN, ENLC, WGL, UTL and ALE because their share prices may drop in the future.

5.5. Health Care Sector

As can be seen in Table 8, ten companies in the energy sector have been valued are PFE, CRY, CSU, CYH, LCI, ABT, COO, CI, HLF, and LH. The values calculated by the DCF model are Enterprise Value, Equity Value, and Equity Value Per Share, the values are taken from the stock market are Share Price, Market Capitalization. The sum of Market Capitalization and Total Debt are self-calculated based on data of market capitalization from the stock market and data of total debt from company's balance sheet.

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CSU, CYH, and LCI are the four companies having negative values for Enterprise Value, Equity value, and Equity Value Per Share. These numbers signify that these companies may run out of cash or in debt within 5 years in the future if they continue to operate at the average level of 7 years ago. The reason is that this DCF model has performed the valuation based on the data of the past 7 years. Among all, the numbers of CYH are the worst on these categories, its enterprise value, equity value, and equity value per share are at -\$392,971,784,289, -\$407,977,784,289, and -\$3,685.44, respectively.

Table 8. All values of ten companies in Health Care Sector

	Order	Company symbol	Enterprise Value (\$)	Equity Value (\$)	Equity Value Per Share (\$)	Share price (\$)	Total debt (\$)	Market Capitalization (\$)	Market Capitalization+ Total Debt (\$)
Health Care Sector	41	PFE	328,928,652,853	289,437,652,853	46.99	34.1	42,086,000,000	202,960,000,000	245,046,000,000
	42	CRY	4,256,958,333	4,242,026,333	129.33	15.9	71,574,000	524,390,000	595,964,000
	43	CSU	(19,323,661,939)	(20,215,509,939)	(721.98)	13.9	939,171,000	417,490,000	1,356,661,000
	44	CYH	(392,971,784,289)	(407,977,784,289)	(3,685.44)	8.86	15,244,000,000	1,010,000,000	16,254,000,000
	45	LCI	(9,236,729,705)	(10,073,808,705)	(269.35)	23.6	1,061,848,000	877,670,000	1,939,518,000
	46	ABT	217,207,470,730	213,976,470,730	144.29	43.83	22,006,000,000	75,740,000,000	97,746,000,000
	47	COO	13,600,377,294	12,367,477,294	252.40	197	1,333,700,000	9,640,000,000	10,973,700,000
	48	CI	115,583,259,078	113,736,259,078	437.45	152.04	5,032,000,000	39,080,000,000	44,112,000,000
	49	HLF	16,355,326,688	15,751,426,688	182.94	58.09	1,447,900,000	5,410,000,000	6,857,900,000
	50	LH	65,077,076,062	59,661,176,062	572.02	34.1	5,849,500,000	14,670,000,000	20,519,500,000

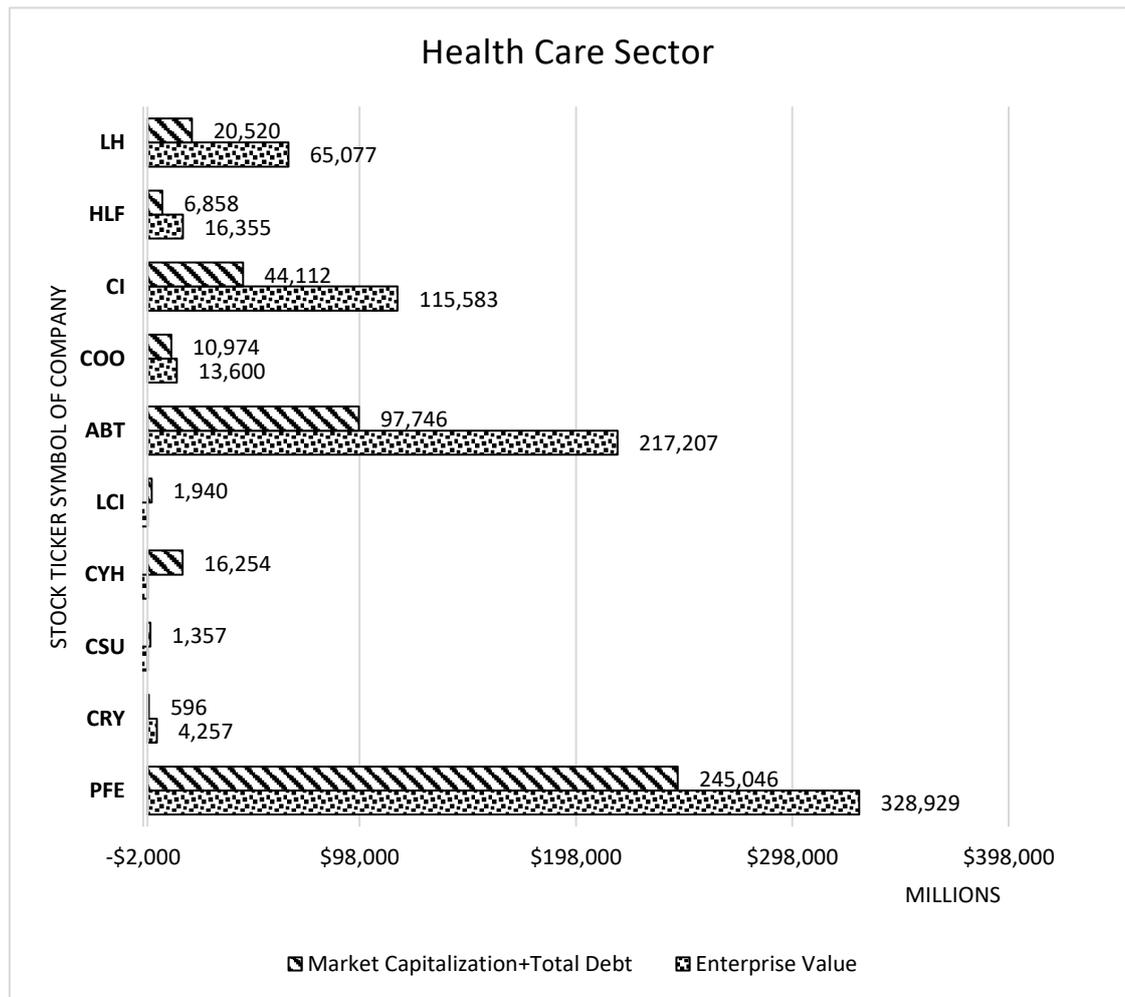


Figure 17. Health care sector: Market Capitalization + Total Debt versus Equity Value

Overall, seven companies are undervalued and the other three are overvalued within this sector regarding their enterprise values. Undervalued companies are LH, HLF, CI, COO, ABT, CRY, and PFE. Overvalued companies are LCI, CYH, and CSU. (See Figure 17.) A firm is considered undervalued or overvalued when its value calculated by the DCF model is bigger or smaller than the value on the stock market, respectively. Concerning companies having positive DCF-calculated values, LH and CI are the two having the biggest gap between the DCF value and market value. While the DCF value of LH is more than 3 times bigger than the market value, the DCF value of CI is about 2.5 times bigger than the market value. LH is valued at \$65.077 billion by the DCF model, but valued at \$20.520 billion by the market.

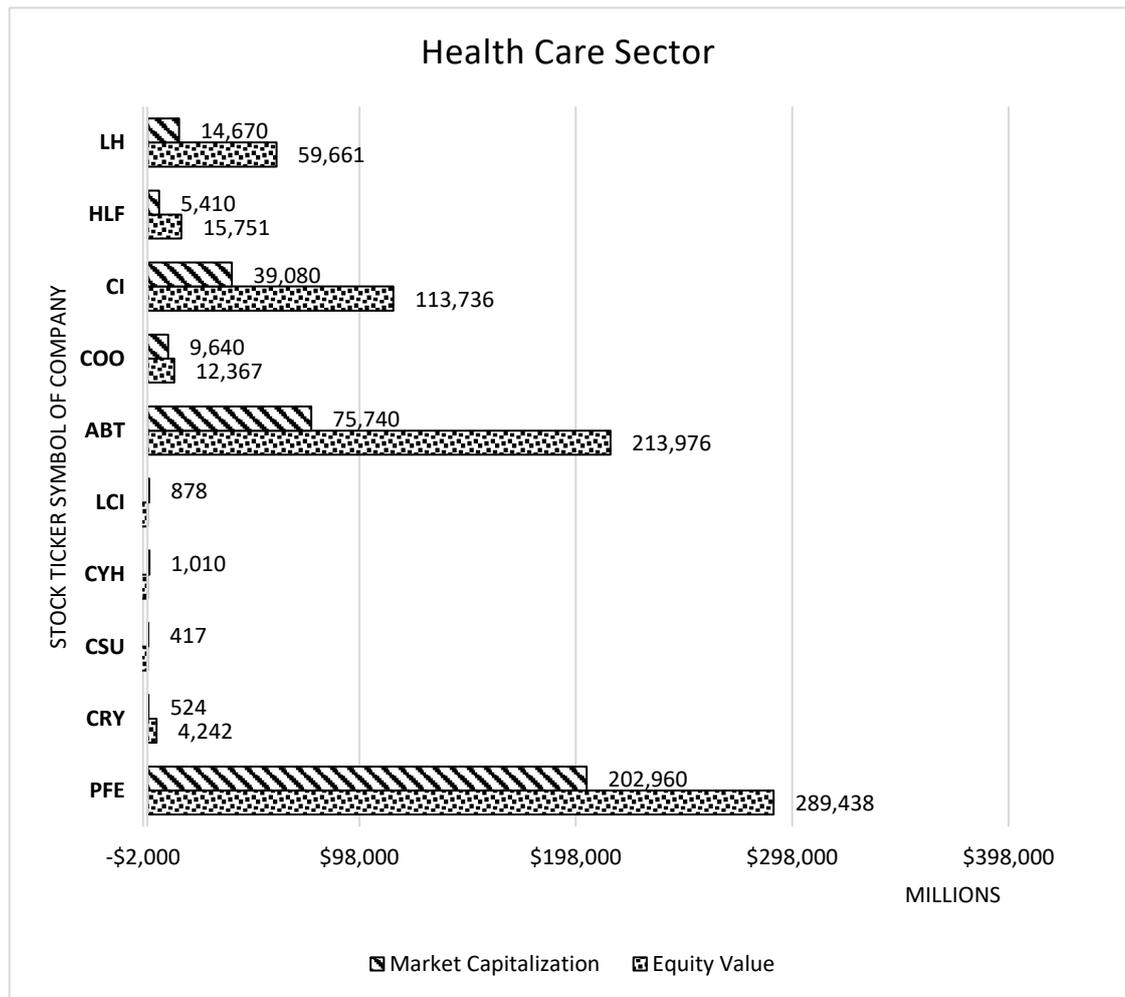


Figure 18. Health care sector: Market Capitalization versus Equity Value

Similarly, the equity value of seven companies is undervalued and that of four others are overvalued. Undervalued companies are LH, HLF, CI, COO, ABT, CRY, and PFE. Overvalued companies are LCI, CYH, and CSU. (See Figure 18.) Concerning companies having positive DCF-calculated values, LH and CI are also the two having the biggest gap between the DCF value and market value. LH is valued at \$59.661 billion by the DCF model, but valued at \$14.670 billion by the market. CI is valued at \$113.736 billion by the DCF model, but valued at \$39.080 billion by the market.

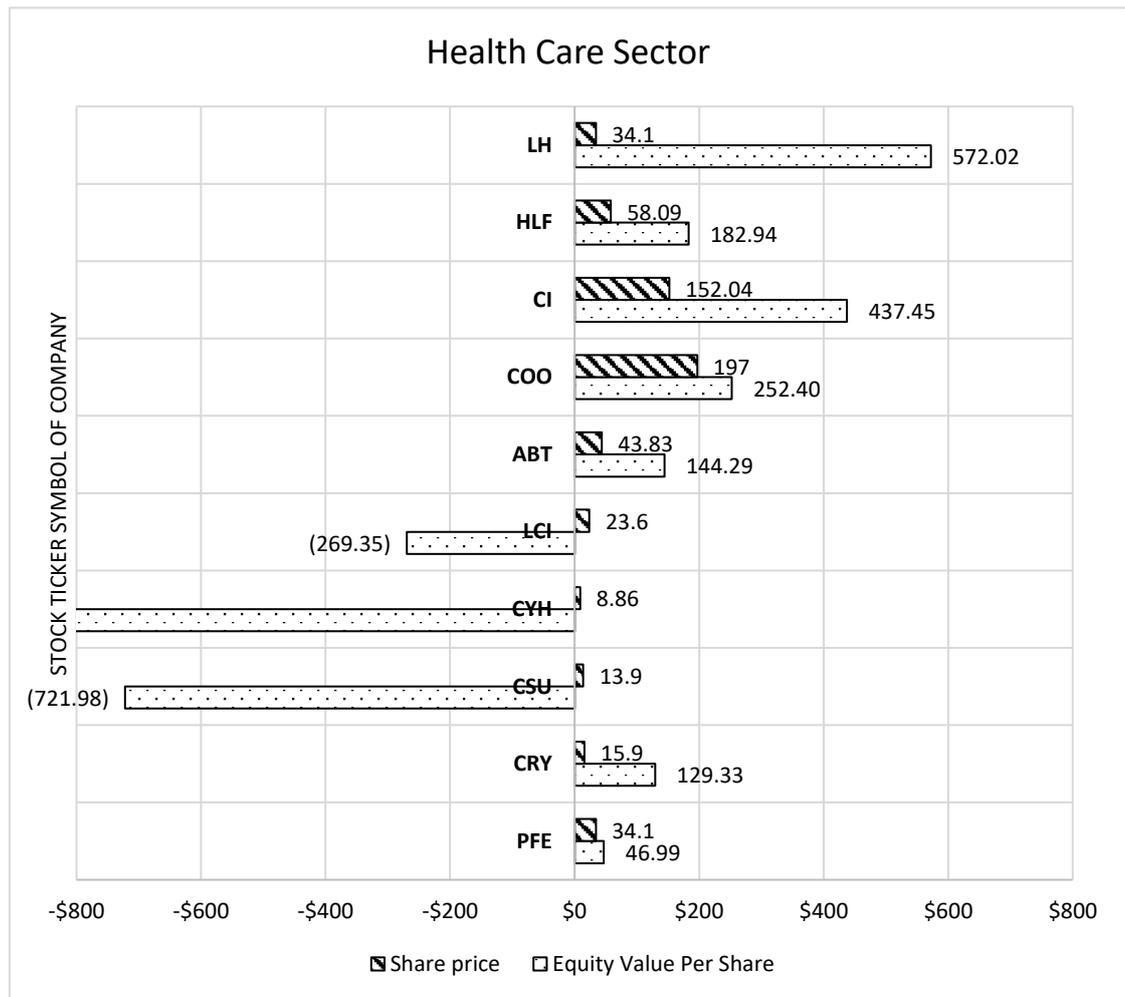


Figure 19. Health care sector: Share price versus Equity value per share

Similarly, while the equity value per share of seven companies is undervalued, the other three are overvalued. Undervalued companies are LH, HLF, CI, COO, ABT, CRY, and PFE. Overvalued companies are LCI, CYH, and CSU. (See Figure 19.) Among all companies, LCI, CYH, and CSU are the three having the biggest gap between the DCF-calculated value and market value. Equity value per share of CSU is valued $-\$721.98$ by the DCF model, but valued at $\$13.9$ by the market. Although LCI is valued at $\$23.6$ per share by the market but has a negative value at $-\$269.35$ when valued by the DCF model. These companies are also the most undervalued ones. However, concerning companies having positive DCF-calculated values, LH is the most undervalued one. While its share price is at $\$572.02$ when valued by the DCF model, it has the market value at $\$34.1$.

With this valuation, stock investors should consider buying stocks of LH, HLF, CI, COO, ABT, CRY, and PFE because their share prices may increase in the future. In contrast, they should consider betting against the market on these stocks: LCI, CYH, and CSU because their share prices may drop in the future.

5.6. Consumer Services Sector

As can be seen in Table 9, ten companies in the energy sector have been valued are CBL, CSV, O, SGU, SYX, CAB, CBS, NLY, PSO, and SKT. The values calculated by the DCF model are Enterprise Value, Equity Value, and Equity Value Per Share, the values are taken from the stock market are Share Price, Market Capitalization. The sum of Market Capitalization and Total Debt are self-calculated based on data of market capitalization from the stock market and data of total debt from company's balance sheet.

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While all companies have positive values in all categories, O and SKT have negative values for Enterprise Value, Equity value, and Equity Value Per Share. These numbers signify that both companies may run out of cash or in debt within 5 years in the future if they continue to operate at the average level of 7 years ago. The reason is that this DCF model has performed the valuation based on the data of the past 7 years. Among all, the numbers of O are the worst on these categories, its enterprise value, equity value, and equity value per share are at -\$60,665,319,451, -\$66,495,504,451, and -\$260.15, respectively.

Table 9. All values of ten companies in Consumer Services Sector

	Order	Company symbol	Enterprise Value (\$)	Equity Value (\$)	Equity Value Per Share (\$)	Share price (\$)	Total debt (\$)	Market Capitalization (\$)	Market Capitalization+ Total Debt (\$)
Consumer Services Sector	51	CBL	14,302,627,529	9,856,284,529	57.74	9.1	4,465,294,000	1,570,000,000	6,035,294,000
	52	CSV	1,702,826,401	1,366,215,401	78.07	27.09	339,897,000	451,340,000	791,237,000
	53	O	(60,665,319,451)	(66,495,504,451)	(260.15)	60.75	5,839,605,000	15,800,000,000	21,639,605,000
	54	SGU	7,364,232,823	7,411,779,823	130.03	9.12	91,641,000	509,700,000	601,341,000
	55	SYX	243,631,193	393,331,193	10.57	12.24	-	452,200,000	452,200,000
	56	CAB	4,799,206,162	317,749,162	5.94	143.39	4,745,282,000	3,630,000,000	8,375,282,000
	57	CBS	23,393,837,233	14,616,837,233	32.63	68.22	9,375,000,000	27,940,000,000	37,315,000,000
	58	NLY	720,218,679,240	648,690,469,240	668.68	68.22	73,067,956,000	11,610,000,000	84,677,956,000
	59	PSO	4,429,115,415	3,420,115,415	4.20	7.86	2,468,000,000	6,460,000,000	8,928,000,000
	60	SKT	(1,712,727,634)	(3,388,530,634)	(33.38)	32.6	1,688,025,000	3,140,000,000	4,828,025,000

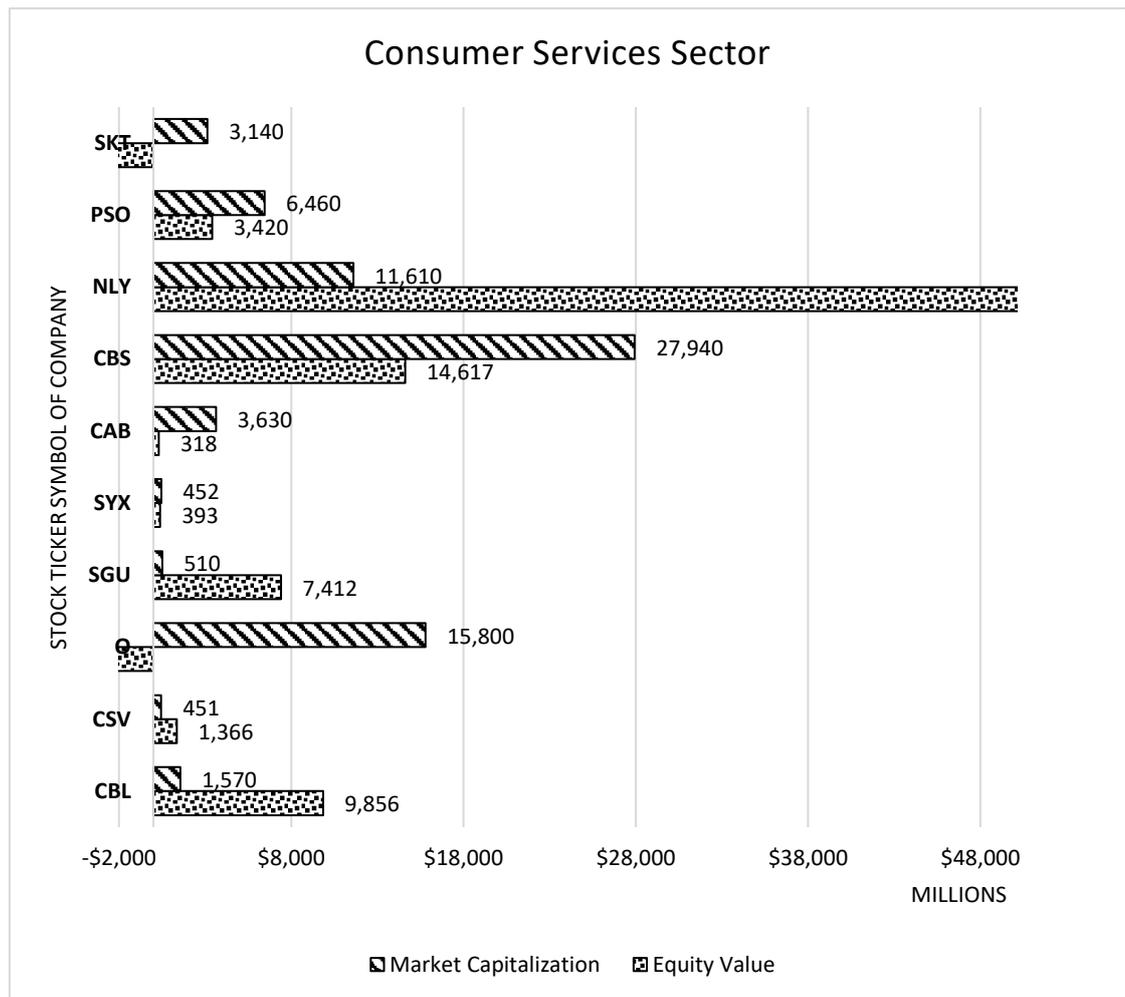


Figure 21. Consumer services sector: Market Capitalization versus Equity Value

Figure 21 shows that the equity value of four companies is undervalued and six of them are overvalued. Undervalued companies are NLY, SGU, CVS, and CBL. Overvalued companies are SKT, PSO, CBS, CAB, SYX, and O. Among all companies, SKT and O are also the two having the biggest gap between the DCF-calculated value and market value. Both companies have minus values for the equity value, which is calculated by the DCF model. SKT is valued at -\$3.388 billion by the DCF model, but valued at \$3.14 billion by the market. Similarly, O has the DCF value at -\$66.496 billion but has the market value at \$15.8 billion. Finally, concerning companies having positive DCF-calculated values, NLY is the most undervalued company. While its market value is at \$11.61 billion, the DCF value is at \$648.49 billion, which is 55 times higher than the market value.

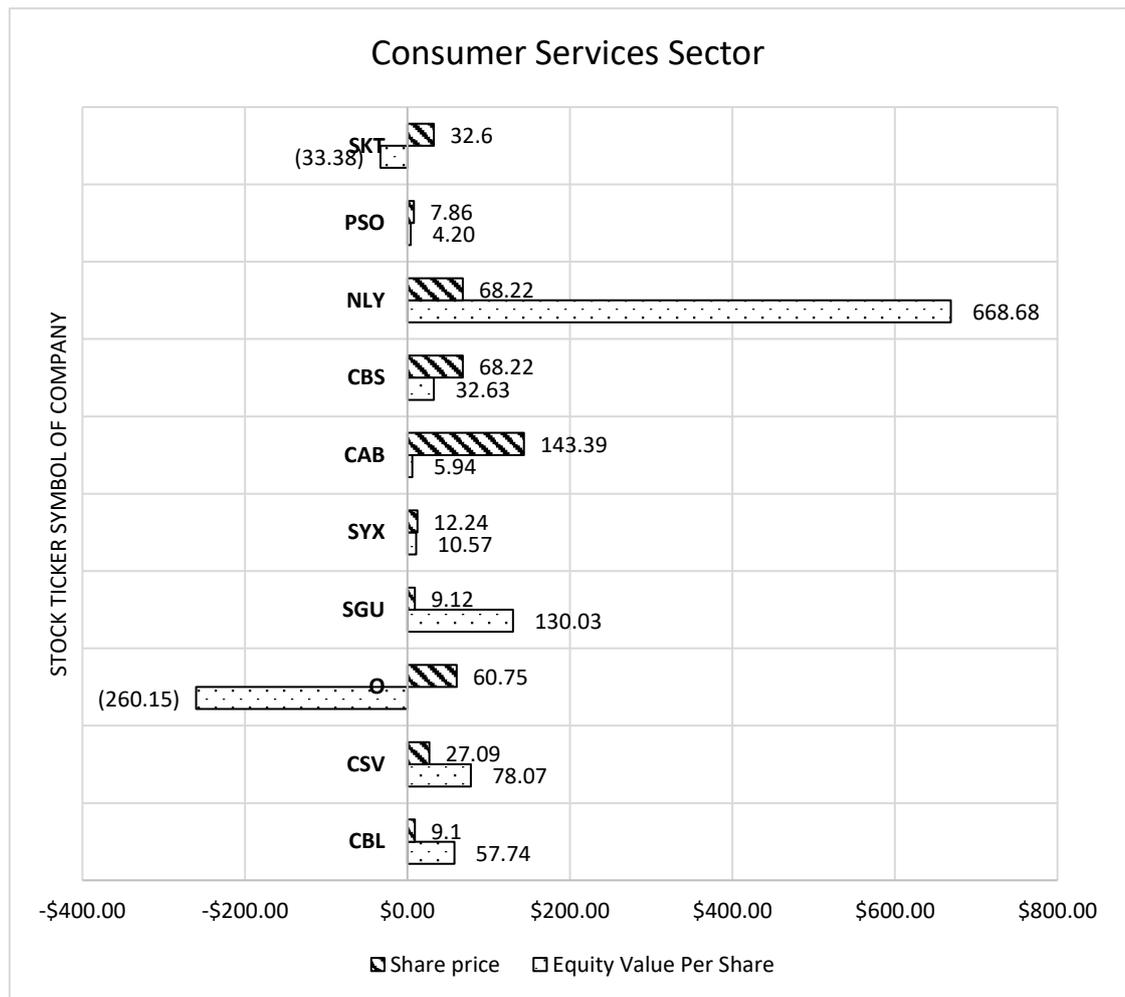


Figure 22. Consumer services sector: Share price versus Equity value per share

Figure 22 shows that the equity value per share of four companies is undervalued and six of them are overvalued. Undervalued companies are NLY, SGU, CVS, and CBL. Overvalued companies are SKT, PSO, CBS, CAB, SYX, and O. Among all companies, SKT and O are also the two having the biggest gap between the DCF-calculated value and market value. Equity value per share of SKT is valued $-\$33.38$ by the DCF model, but valued at $\$32.6$ by the market. Similarly, O has the DCF value at $-\$260.15$ but has the market value at $\$60.75$. Finally, concerning companies having positive DCF-calculated values, CAB is the most undervalued company. While its market value is at $\$5.94$, the DCF value is at $\$143.39$.

With this valuation, stock investors should consider buying stocks of NLY, SGU, CVS, and CBL because their share prices may increase in the future. In contrast, they should consider betting against the market on these stocks: SKT, PSO, CBS, CAB, SYX, and O because their share prices may drop in the future.

5.7. Consumer Non-Durables Sector

As can be seen in Table 10, ten companies in the energy sector have been valued are ATR, GNC, MYE, NLS, UFI, CL, DPS, LUK, TAP, and TUP. The values calculated by the DCF model are Enterprise Value, Equity Value, and Equity Value Per Share, the values are taken from the stock market are Share Price, Market Capitalization. The sum of Market Capitalization and Total Debt are self-calculated based on data of market capitalization from the stock market and data of total debt from company's balance sheet.

This table is used for multiple purposes. Firstly, it summarizes all information in one place, enabling readers to understand the whole context easily. In addition to that, some company's values may be too large or too small to fit in charts, therefore, their values can only be displayed in this table, not in charts. Unlike other sectors, all companies within this sector have positive values in all categories.

Table 10. All values of ten companies in Consumer Non-Durables Sector

	Order	Company symbol	Enterprise Value (\$)	Equity Value (\$)	Equity Value Per Share (\$)	Share price (\$)	Total debt (\$)	Market Capitalization (\$)	Market Capitalization+ Total Debt (\$)
Consumer Non-Durables Sector	61	ATR	8,178,473,217	8,470,944,217	130.72	76.89	173,816,000	4,790,000,000	4,963,816,000
	62	GNC	88,517,850,252	87,011,861,252	1,253.77	7.15	1,540,453,000	489,080,000	2,029,533,000
	63	MYE	759,182,539	586,183,539	19.54	16.4	189,522,000	492,360,000	681,882,000
	64	NLS	57,804,047	41,706,047	1.33	17.05	63,972,000	523,450,000	587,422,000
	65	UFI	1,708,100,331	1,603,155,331	87.13	27.21	121,591,000	495,220,000	616,811,000
	66	CL	66,016,934,140	60,798,934,140	67.67	73.73	6,533,000,000	65,090,000,000	71,623,000,000
	67	DPS	54,140,158,051	51,449,158,051	275.72	97.09	4,478,000,000	17,780,000,000	22,258,000,000
	68	LUK	87,110,576,637	76,051,081,637	204.71	26.24	15,724,390,000	9,440,000,000	25,164,390,000
	69	TAP	86,359,891,149	74,848,291,149	350.74	95.89	12,072,500,000	18,890,000,000	30,962,500,000
	70	TUP	5,724,588,912	5,105,888,912	100.71	62.88	711,900,000	3,190,000,000	3,901,900,000

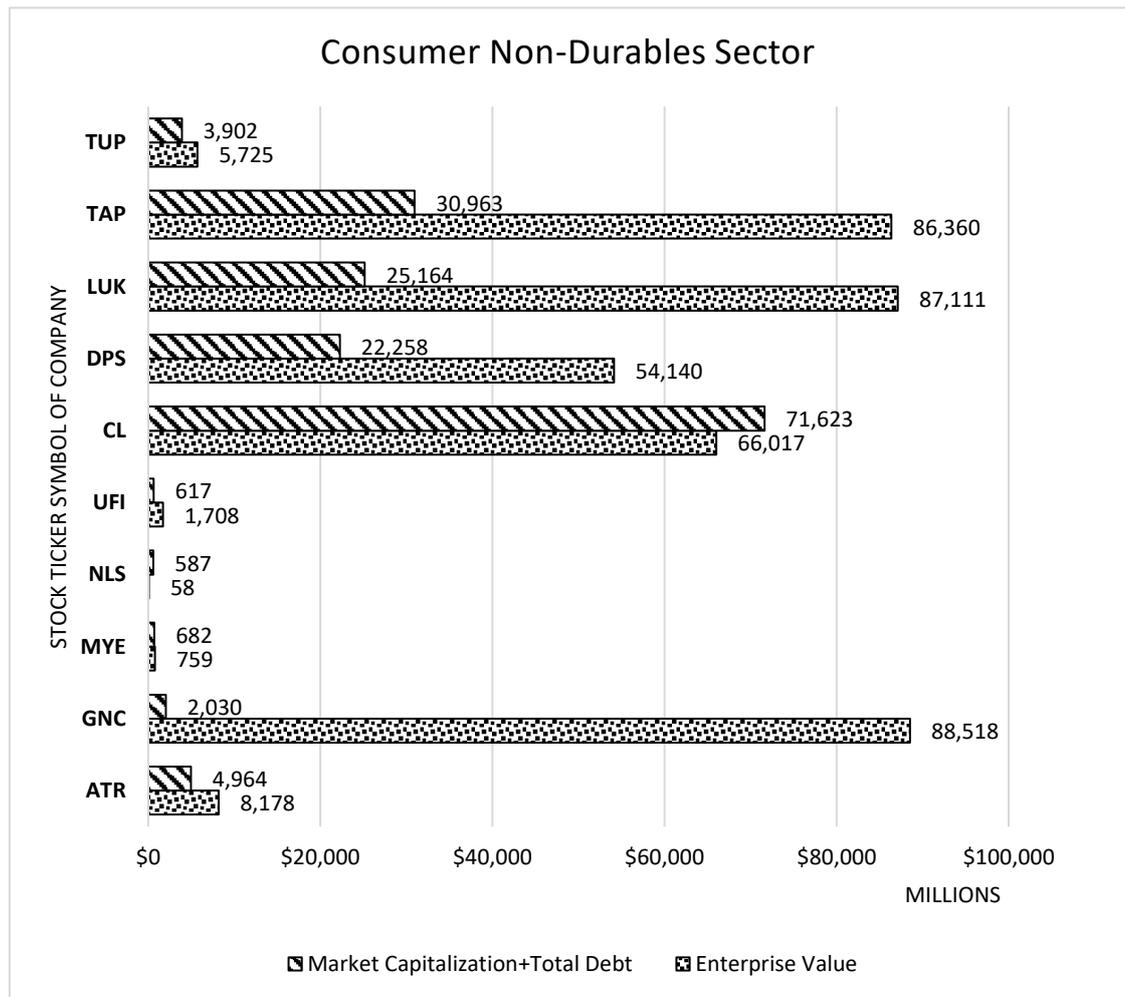


Figure 23. Consumer non-durables sector: Market Capitalization + Total Debt versus Equity Value

Overall, eight companies are undervalued and the other two are overvalued within this sector regarding their enterprise values. Undervalued companies are TUP, TAP, LUK, DPS, UFI, MYE, GNC, and ATR. Overvalued companies are CL and NLS. (See Figure 23.) A firm is considered undervalued or overvalued when its value calculated by the DCF model is bigger or smaller than the value on the stock market, respectively. Among all companies, LUK and GNC are the two having the biggest gap between the DCF-calculated value and market value. While the DCF value of LUK is nearly 3 times bigger than the market value, the DCF value of GNC is 44 times bigger than the market value. GNC is valued at \$88.518 billion by the DCF model, but valued at \$2.03 billion by the market.

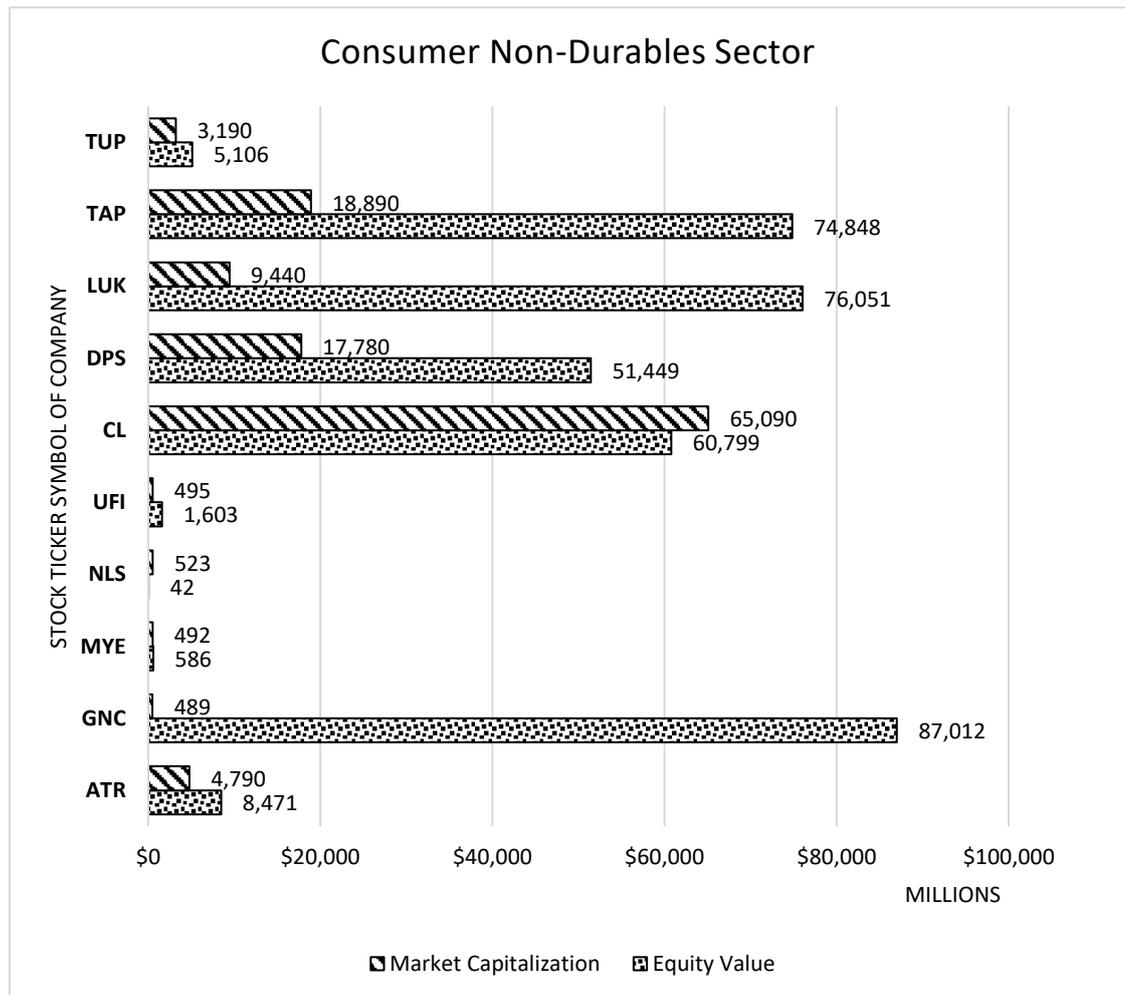


Figure 24. Consumer non-durables sector: Market Capitalization versus Equity Value

Similarly, the equity value of eight companies is undervalued and that of two others are overvalued. Undervalued companies are TUP, TAP, LUK, DPS, UFI, MYE, GNC, and ATR. Overvalued companies are CL and NLS. (See Figure 24.) Among all companies, LUK and GNC are also the two having the biggest gap between the DCF-calculated value and market value. LUK is valued at \$76.051 billion by the DCF model, but valued at \$9.44 billion by the market. GNC is valued at \$87.012 billion by the DCF model, but valued at \$489 million by the market. With these figures, GNC and LUK are the most undervalued companies regarding their equity values.

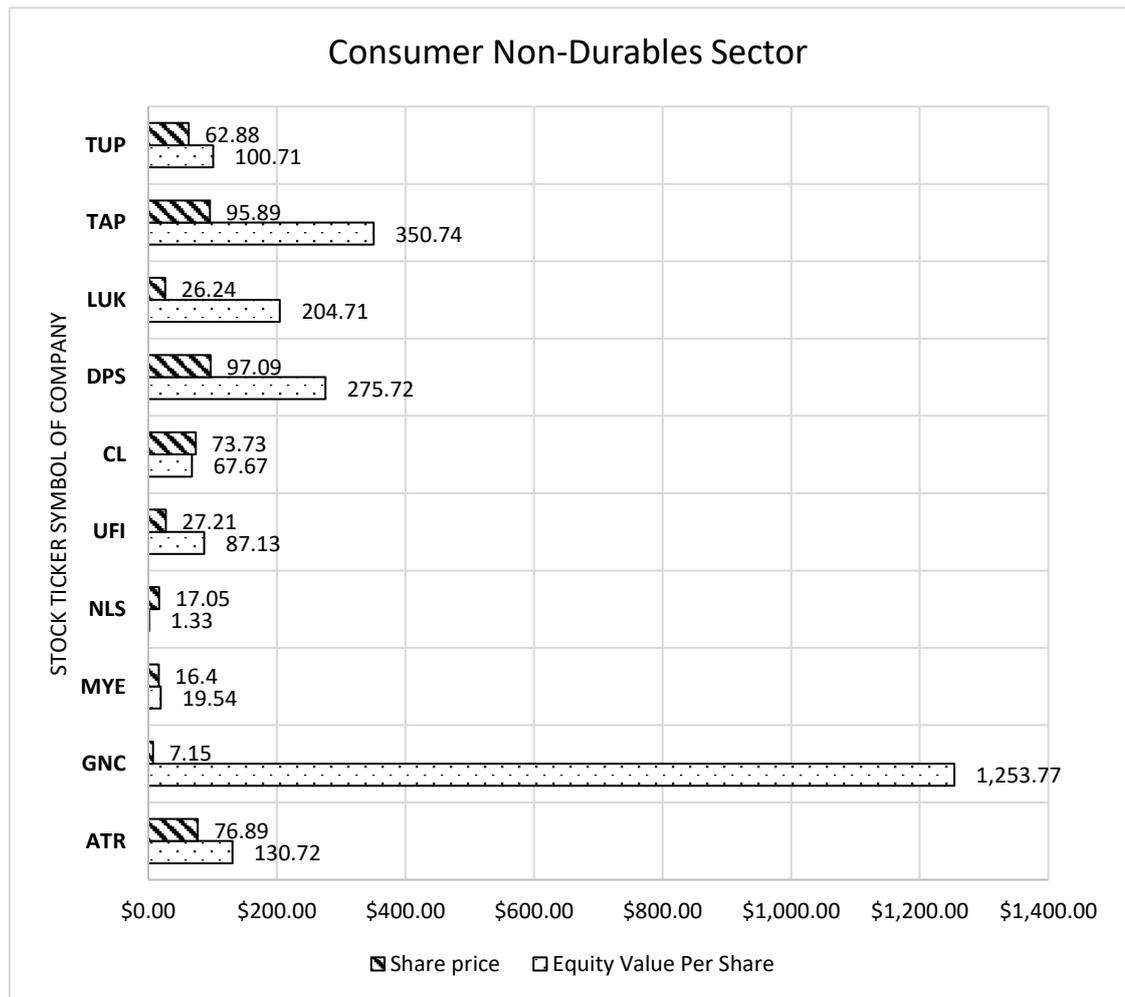


Figure 25. Consumer non-durables sector: Share price versus Equity value per share

Similarly, while the equity value per share of eight companies is undervalued, the other two are overvalued. Undervalued companies are TUP, TAP, LUK, DPS, UFI, MYE, GNC, and ATR. Overvalued companies are CL and NLS. (See Figure 25.) Among all companies, LUK and GNC are also the two having the biggest gap between the DCF-calculated value and market value. Equity value per share of LUK is valued \$204.71 by the DCF model, but valued at \$26.24 by the market. For GNC, it is valued at \$1,253.77 by the DCF model, but valued at \$7.15 by the market. With these figures, GNC and LUK are the most undervalued company regarding their share prices.

With this valuation, stock investors should consider buying stocks of TUP, TAP, LUK, DPS, UFI, MYE, GNC, and ATR because their share prices may increase in the future. In contrast, they should consider betting against the market on these stocks: CL and NLS because their share prices may drop in the future.

5.8. Consumer Durables Sector

As can be seen in Table 11, ten companies in the energy sector have been valued are NC, KMB, ODC, USNA, VCRA, CCK, DLX, KAR, HNI, and OI. The values calculated by the DCF model are Enterprise Value, Equity Value, and Equity Value Per Share, the values are taken from the stock market are Share Price, Market Capitalization. The sum of Market Capitalization and Total Debt are self-calculated based on data of market capitalization from the stock market and data of total debt from company's balance sheet.

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Table 11. All values of ten companies in Consumer Durables Sector

	Order	Company symbol	Enterprise Value (\$)	Equity Value (\$)	Equity Value Per Share (\$)	Share price (\$)	Total debt (\$)	Market Capitalization (\$)	Market Capitalization+ Total Debt (\$)
Consumer Durables Sector	71	NC	842,933,720	788,828,720	114.32	76.5	134,753,000	534,520,000	669,273,000
	72	KMB	83,932,595,453	77,283,595,453	211.33	131.92	7,572,000,000	47,250,000,000	54,822,000,000
	73	ODC	652,843,153	656,174,153	92.42	37.39	15,298,000	275,030,000	290,328,000
	74	USNA	3,142,200,205	3,317,974,205	132.72	56.8	-	1,400,000,000	1,400,000,000
	75	VCRA	130,302,170	165,335,170	6.15	23.74	-	667,020,000	667,020,000
	76	CCK	11,548,439,387	7,196,439,387	51.66	53.16	4,911,000,000	7,520,000,000	12,431,000,000
	77	DLX	6,728,852,986	6,046,778,986	121.42	69.36	758,648,000	3,360,000,000	4,118,648,000
	78	KAR	18,520,857,338	16,270,257,338	116.97	42.42	2,470,300,000	5,800,000,000	8,270,300,000
	79	HNI	1,929,859,540	1,747,744,540	38.41	47.27	218,427,000	2,080,000,000	2,298,427,000
	80	OI	15,534,166,003	10,698,166,003	65.71	20.41	5,328,000,000	3,310,000,000	8,638,000,000

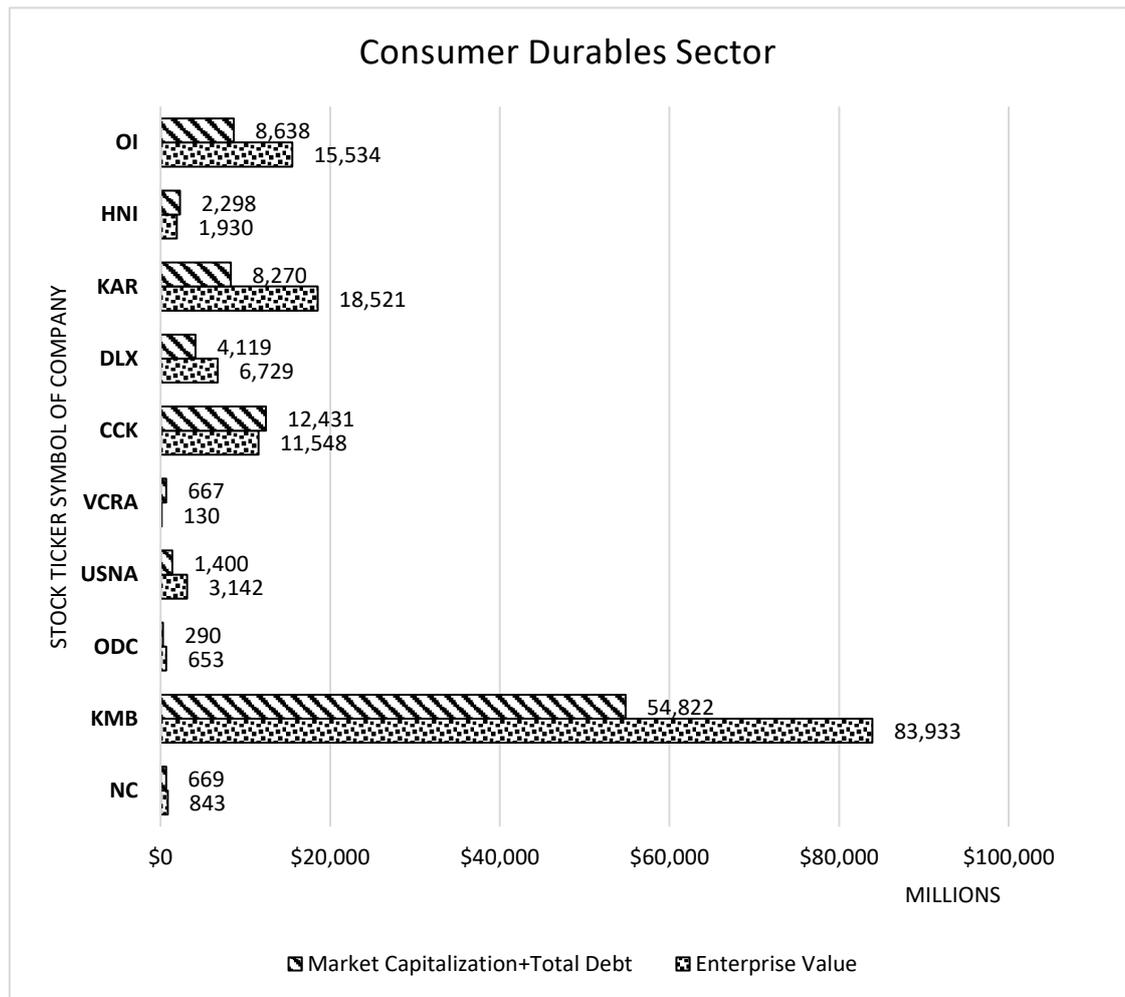


Figure 26. Consumer durables sector: Market Capitalization + Total Debt versus Equity Value

Overall, seven companies are undervalued and the other three are overvalued within this sector regarding their enterprise values. Undervalued companies are OI, KAR, DLX, USNA, ODC, KMB, and NC. Overvalued companies are HNI, CCK, and VCRA. (See Figure 26.) A firm is considered undervalued or overvalued when its value calculated by the DCF model is bigger or smaller than the value on the stock market, respectively. Among all companies, KAR and VCRA are the two having the biggest gap between the DCF-calculated value and market value. While the DCF value of KAR is more than 2 times bigger than the market value, the DCF value of VCRA is more than 5 times smaller than the market value. VCRA is valued at \$130 million by the DCF model, but valued at \$667 million by the market.

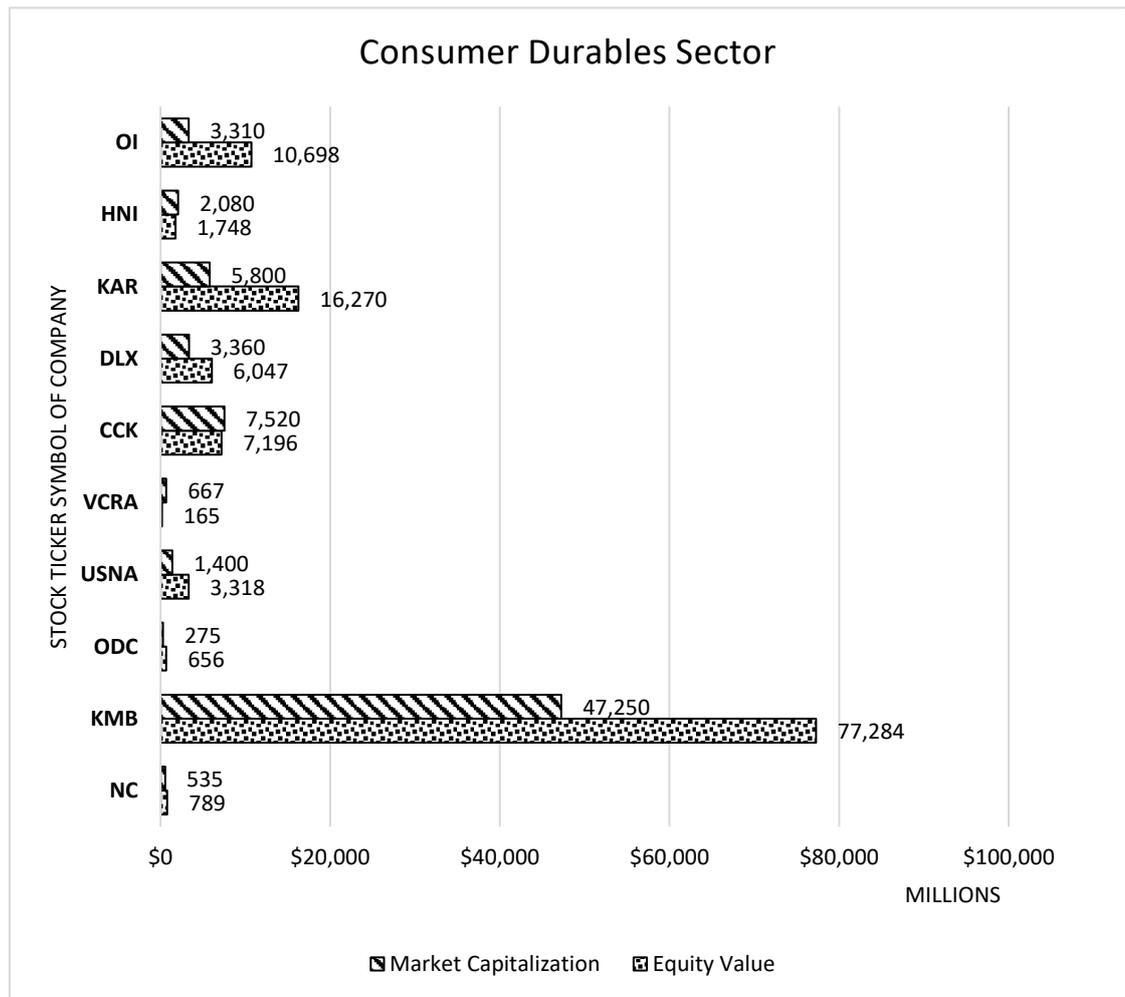


Figure 27. Consumer durables sector: Market Capitalization versus Equity Value

Similarly, the equity value of seven companies is undervalued and that of three others are overvalued. Undervalued companies are OI, KAR, DLX, USNA, ODC, KMB, and NC. Overvalued companies are HNI, CCK, and VCRA. (See Figure 27.) Among all companies, KAR and VCRA are also the two having the biggest gap between the DCF-calculated value and market value. KAR is valued at \$5.8 billion by the DCF model, but valued at \$16.27 billion by the market. VCRA is valued at \$165 million by the DCF model, but valued at \$667 million by the market. With these figures, KAR is the most undervalued firm and VCRA is the most overvalued firm regarding their equity values.

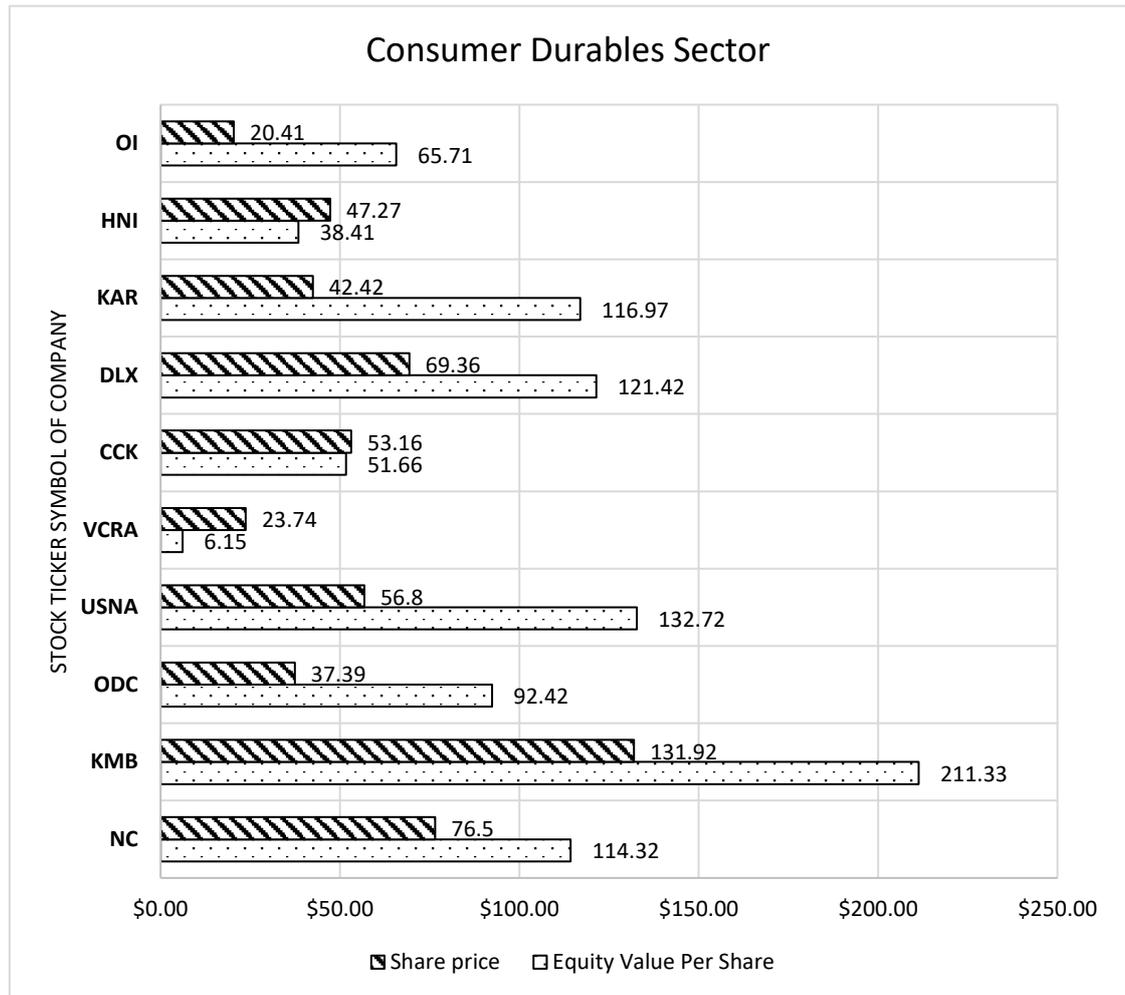


Figure 28. Consumer durables sector: Share price versus Equity value per share

Similarly, while the equity value per share of seven companies is undervalued, the other three are overvalued. Undervalued companies are OI, KAR, DLX, USNA, ODC, KMB, and NC. Overvalued companies are HNI, CCK, and VCRA. (See Figure 28.) Among all companies, OI and VCRA are surprisingly the two having the biggest gap between the DCF-calculated value and market value. Equity value per share of OI is valued \$65.71 by the DCF model, but valued at \$20.41 by the market. For VCRA, it is valued at \$6.15 by the DCF model, but valued at \$23.74 by the market. With these figures, OI is the most undervalued firm and VCR is the most overvalued company regarding their share prices.

With this valuation, stock investors should consider buying stocks of OI, KAR, DLX, USNA, ODC, KMB, and NC because their share prices may increase in the future. In contrast, they should consider betting against the market on these stocks: HNI, CCK, and VCRA because their share prices may drop in the future.

5.9. Capital Goods Sector

As can be seen in Table 12, ten companies in the energy sector have been valued are LNN, MOD, MPX, SUP, WNC, IEX, PII, AGCO, MGA, and KBH. The values calculated by the DCF model are Enterprise Value, Equity Value, and Equity Value Per Share, the values are taken from the stock market are Share Price, Market Capitalization. The sum of Market Capitalization and Total Debt are self-calculated based on data of market capitalization from the stock market and data of total debt from company's balance sheet.

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While all companies have positive values in all categories, KBH has negative values for Enterprise Value, Equity value, and Equity Value Per Share at -\$1,016,473,300; -\$3,064,536,300; and -\$31.82, respectively. These numbers signify that KBH may run out of cash or in debt within 5 years in the future if they continue to operate at the average level of 7 years ago. The reason is that this DCF model has performed the valuation based on the data of the past 7 years.

Table 12. All values of ten companies in Capital Goods Sector

	Order	Company symbol	Enterprise Value (\$)	Equity Value (\$)	Equity Value Per Share (\$)	Share price (\$)	Total debt (\$)	Market Capitalization (\$)	Market Capitalization+ Total Debt (\$)
Capital Goods Sector	81	LNN	909,574,408	895,677,408	82.17	87.08	117,173,000	928,530,000	1,045,703,000
	82	MOD	1,103,166,290	1,009,466,290	21.34	10.9	162,600,000	545,780,000	708,380,000
	83	MPX	239,241,876	241,860,876	6.61	10.98	-	383,830,000	383,830,000
	84	SUP	486,931,959	544,717,959	21.36	23.75	-	592,270,000	592,270,000
	85	WNC	755,052,767	680,683,767	10.69	20.66	237,836,000	1,240,000,000	1,477,836,000
	86	IEX	7,259,663,689	7,277,200,689	94.76	94.31	218,427,000	7,190,000,000	7,408,427,000
	87	PII	4,988,829,412	3,974,244,412	60.95	82.08	1,141,910,000	5,170,000,000	6,311,910,000
	88	AGCO	9,236,066,013	7,970,366,013	91.51	60.78	1,695,400,000	4,830,000,000	6,525,400,000
	89	MGA	5,922,323,025	3,740,323,025	9.52	40.18	3,156,000,000	15,370,000,000	18,526,000,000
	90	KBH	(1,016,473,300)	(3,064,536,300)	(31.82)	20.04	2,640,149,000	1,710,000,000	4,350,149,000

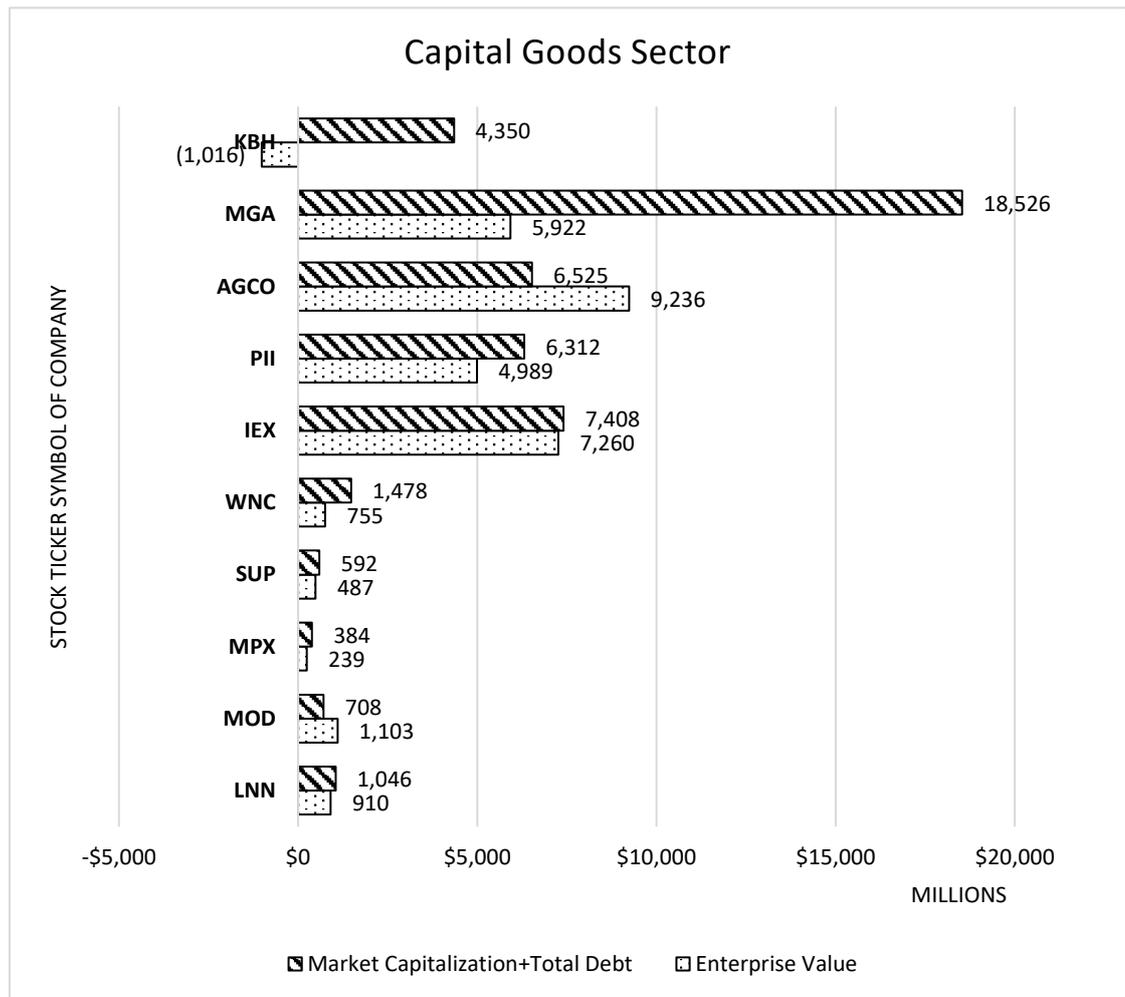


Figure 29. Capital goods sector: Market Capitalization + Total Debt versus Equity Value

Overall, two companies are undervalued and the other eight are overvalued within this sector regarding their enterprise values. Undervalued companies are AGCO and MOD. Overvalued companies are KBH, MGA, PII, IEX, WNC, SUP, MPX, and LNN. (See Figure 29.) A firm is considered undervalued or overvalued when its value calculated by the DCF model is bigger or smaller than the value on the stock market, respectively. Among all companies, KBH and MGA are the two having the biggest gap between the DCF-calculated value and market value. While the DCF value of MGA is more than 3 times smaller than the market value, the DCF value of KBH is a minus number. MGA is valued at \$5.922 billion by the DCF model, but valued at \$18.526 billion by the market.

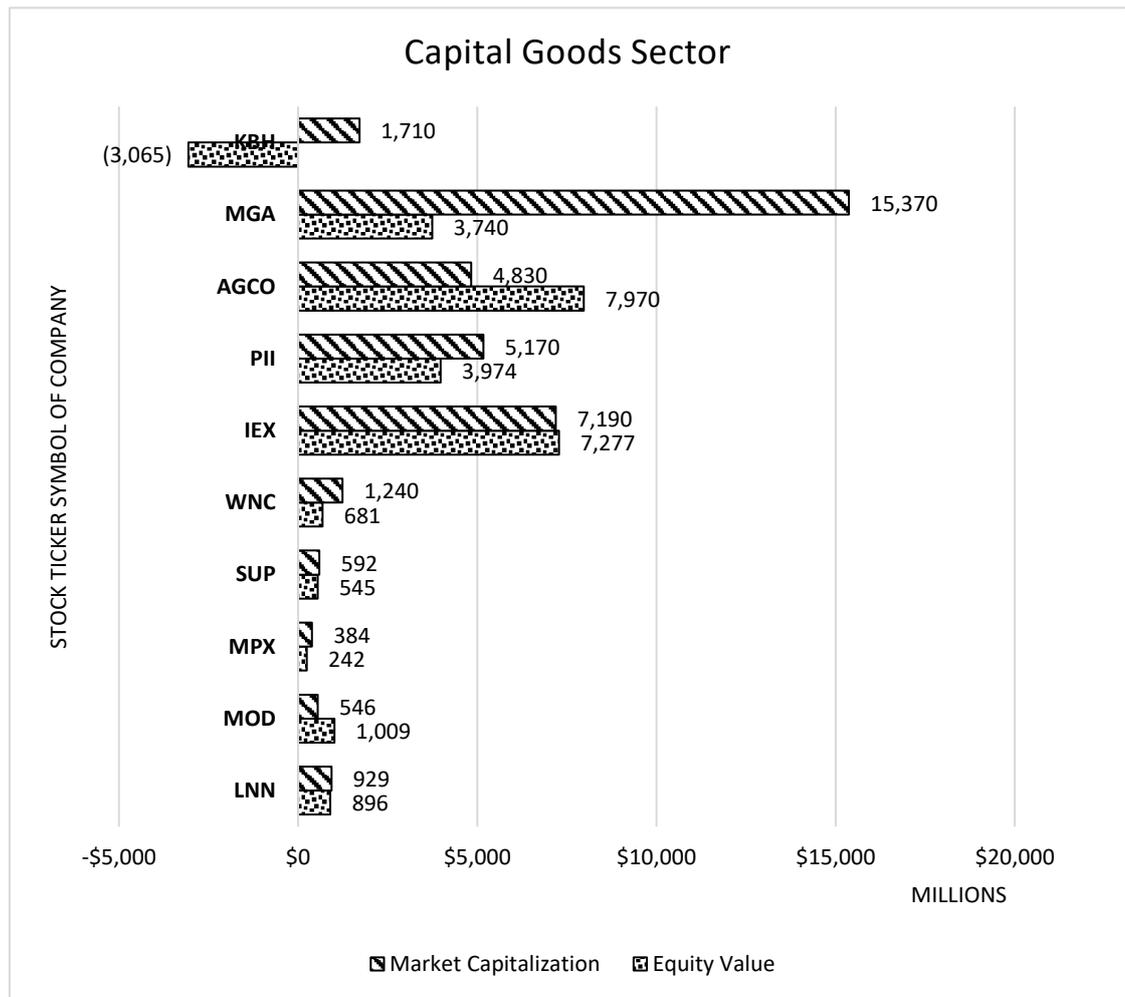


Figure 30. Capital goods sector: Market Capitalization versus Equity Value

Interestingly, the equity value of three companies is undervalued and that of seven others are overvalued. Undervalued companies are AGCO, IEX, and MOD.

Overvalued companies are KBH, MGA, PII, WNC, SUP, MPX, and LNN. (See Figure 30.) Among all companies, KBU and MGA are also the two having the biggest gap between the DCF-calculated value and market value. MGA is valued at \$3.74 billion by the DCF model, but valued at \$15.37 billion by the market. Although KBU is valued at \$1.71 billion by the market but has a negative value at -\$3.065 billion when valued by the DCF model. With these figures, KBU and MGA are the most overvalued companies regarding their equity values.

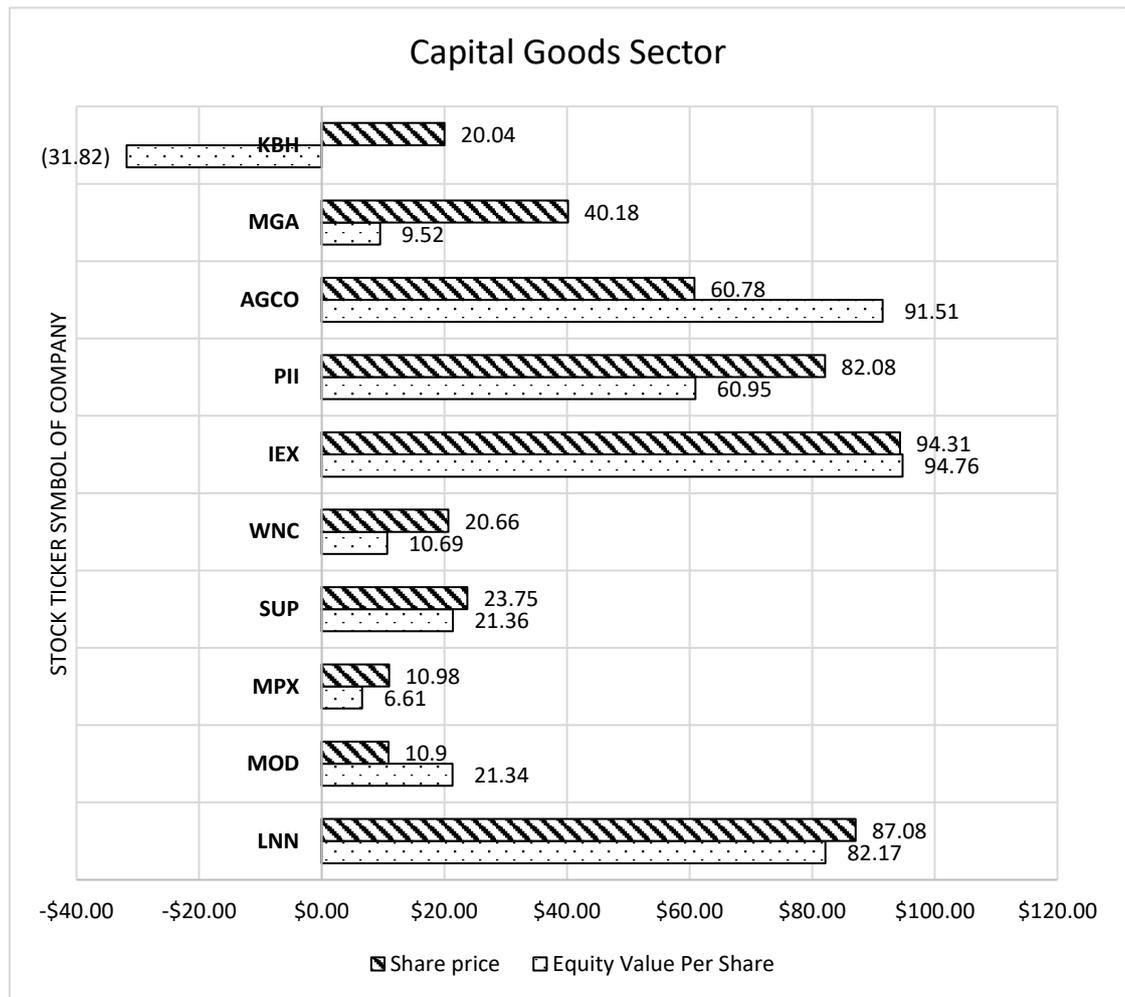


Figure 31. Capital goods sector: Share price versus Equity value per share

The equity value per share of three companies is undervalued, the other seven are overvalued. Undervalued companies are AGCO, IEX, and MOD. Overvalued companies are KBH, MGA, PII, WNC, SUP, MPX, and LNN. (See Figure 31.) Among all companies, KBH and MGA are also the two having the biggest gap between the DCF-calculated value and market value. Equity value per share of MGA is valued \$9.52 by the DCF model, but valued at \$40.18 by the market. Although KBH is valued at \$20.04 per share by the market but has a negative value at -\$31.82 when valued by the DCF model. With these figures, KBU and MGA are the most overvalued companies regarding their share prices.

With this valuation, stock investors should consider buying stocks of AGCO, IEX, and MOD because their share prices may increase in the future. In contrast, they should consider betting against the market on these stocks: KBH, MGA, PII, WNC, SUP, MPX, and LNN because their share prices may drop in the future.

5.10. Basic Industries Sector

As can be seen in Table 13, ten companies in the energy sector have been valued are AGU, BGC, MUX, OLN, SYT, CHMT, FMC, HUN, IFF, and MT. The values calculated by the DCF model are Enterprise Value, Equity Value, and Equity Value Per Share, the values are taken from the stock market are Share Price, Market Capitalization. The sum of Market Capitalization and Total Debt are self-calculated based on data of market capitalization from the stock market and data of total debt from company's balance sheet.

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Table 13. All values of ten companies in Basic Industries Sector

	Order	Company symbol	Enterprise Value (\$)	Equity Value (\$)	Equity Value Per Share (\$)	Share price (\$)	Total debt (\$)	Market Capitalization (\$)	Market Capitalization+ Total Debt (\$)
Basic Industries Sector	91	AGU	19,085,381,063	14,385,381,063	104.17	93.81	5,112,000,000	12,960,000,000	18,072,000,000
	92	BGC	2,002,043,005	1,164,543,005	23.48	18.35	938,600,000	909,630,000	1,848,230,000
	93	MUX	1,096,249,142	1,133,689,142	3.77	3.25	-	973,600,000	973,600,000
	94	OLN	28,044,333,620	24,611,233,620	148.98	30.89	3,617,600,000	5,110,000,000	8,727,600,000
	95	SYT	30,004,847,506	27,164,847,506	294.57	89.68	4,124,000,000	41,510,000,000	45,634,000,000
	96	CHMT	1,688,841,345	1,432,841,345	20.83	33.4	476,000,000	2,110,880,000	2,586,880,000
	97	FMC	2,753,459,307	820,059,307	6.10	74.87	1,997,600,000	10,080,000,000	12,077,600,000
	98	HUN	11,948,176,155	8,177,176,155	34.13	24.39	4,196,000,000	5,850,000,000	10,046,000,000
	99	IFF	13,159,854,560	12,158,475,560	151.98	132.79	1,325,371,000	10,540,000,000	11,865,371,000
	100	MT	89,931,617,661	78,872,617,661	25.78	8.04	13,674,000,000	24,650,000,000	38,324,000,000

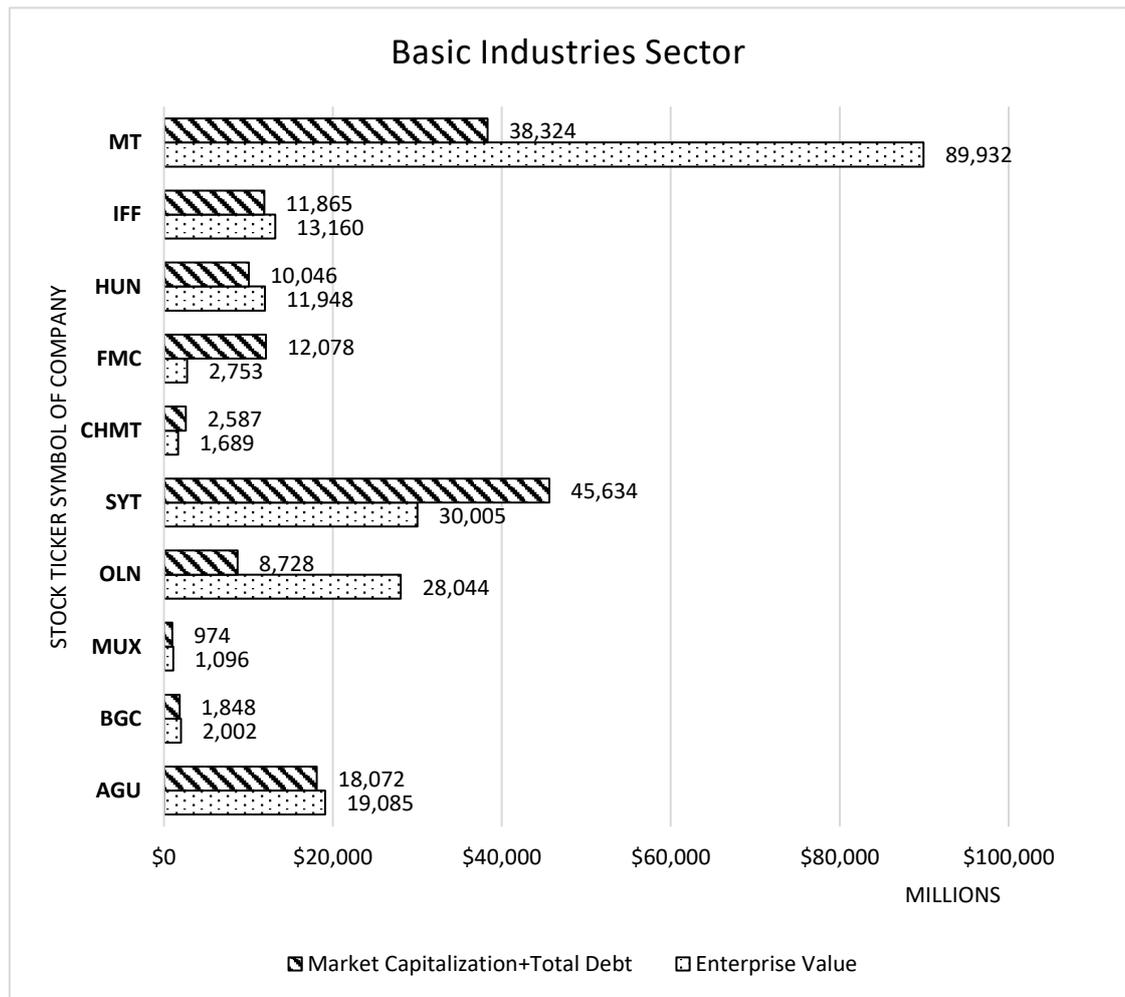


Figure 32. Basic industries sector: Market Capitalization + Total Debt versus Equity Value

Overall, seven companies are undervalued and the other three are overvalued within this sector regarding their enterprise values. Undervalued companies are MT, IFF, HUN, OLN, MUX, BGC, and AGU. Overvalued companies are FMC, CHMT, and SYT. (See Figure 32.) A firm is considered undervalued or overvalued when its value calculated by the DCF model is bigger or smaller than the value on the stock market, respectively. Among all companies, FMC and OLN are the two having the biggest gap between the DCF-calculated value and market value. While the DCF value of FMC is more than 4 times bigger than the market value, the DCF value of OLN is more than 3 times smaller than the market value. FMC is valued at \$12.078 billion by the DCF model, but valued at \$2.753 billion by the market.

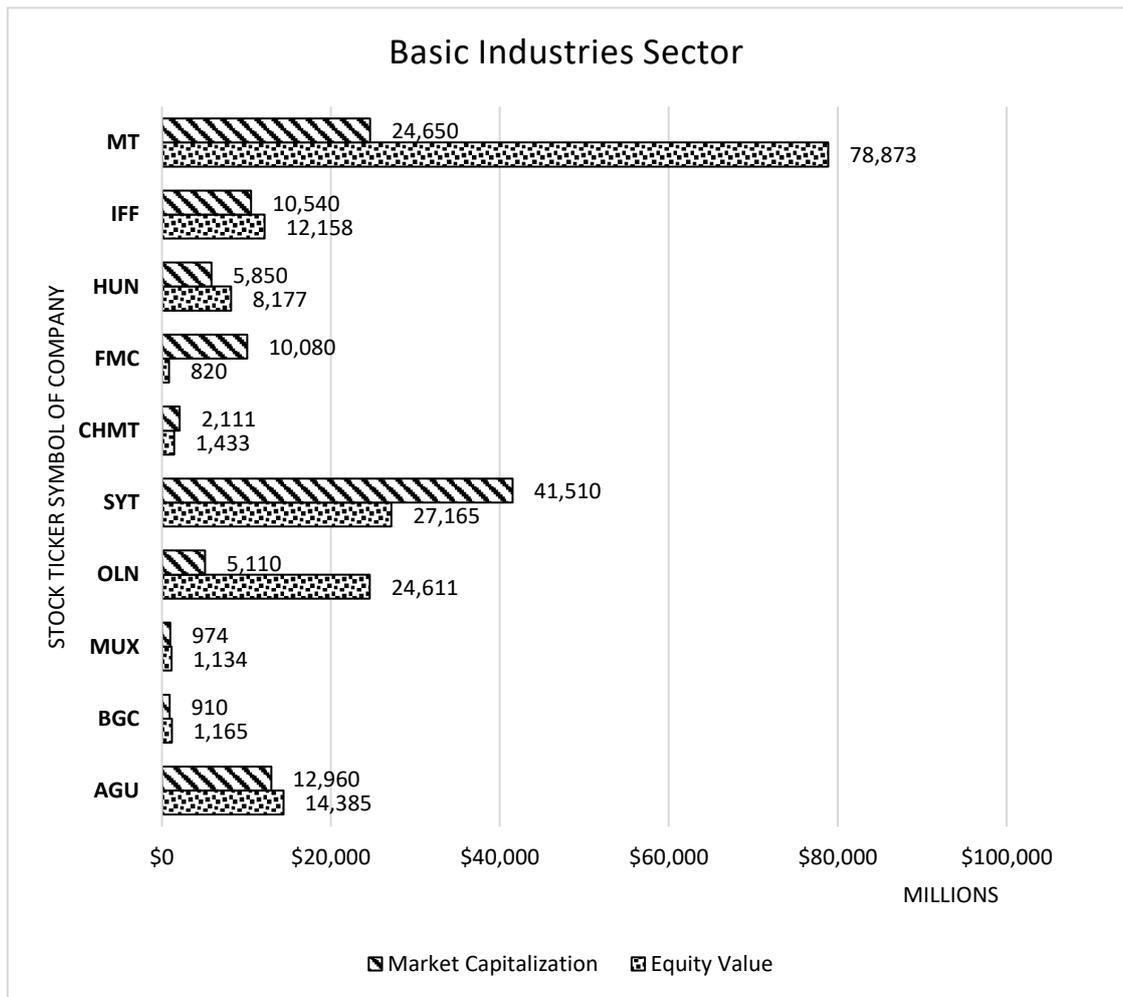


Figure 33. Basic industries sector: Market Capitalization versus Equity Value

Similarly, the equity value of seven companies is undervalued and that of three others are overvalued. Undervalued companies are MT, IFF, HUN, OLN, MUX, BGC, and AGU. Overvalued companies are FMC, CHMT, and SYT. (See Figure 33.) Among all companies, FMC and OLN are also the two having the biggest gap between the DCF-calculated value and market value. FMC is valued at \$820 million by the DCF model, but valued at \$10.08 billion by the market. OLN is valued at \$24.611 billion by the DCF model, but valued at \$5.11 billion by the market. With these figures, FMC is the most undervalued firm and OLN is the most overvalued firm regarding their equity values.

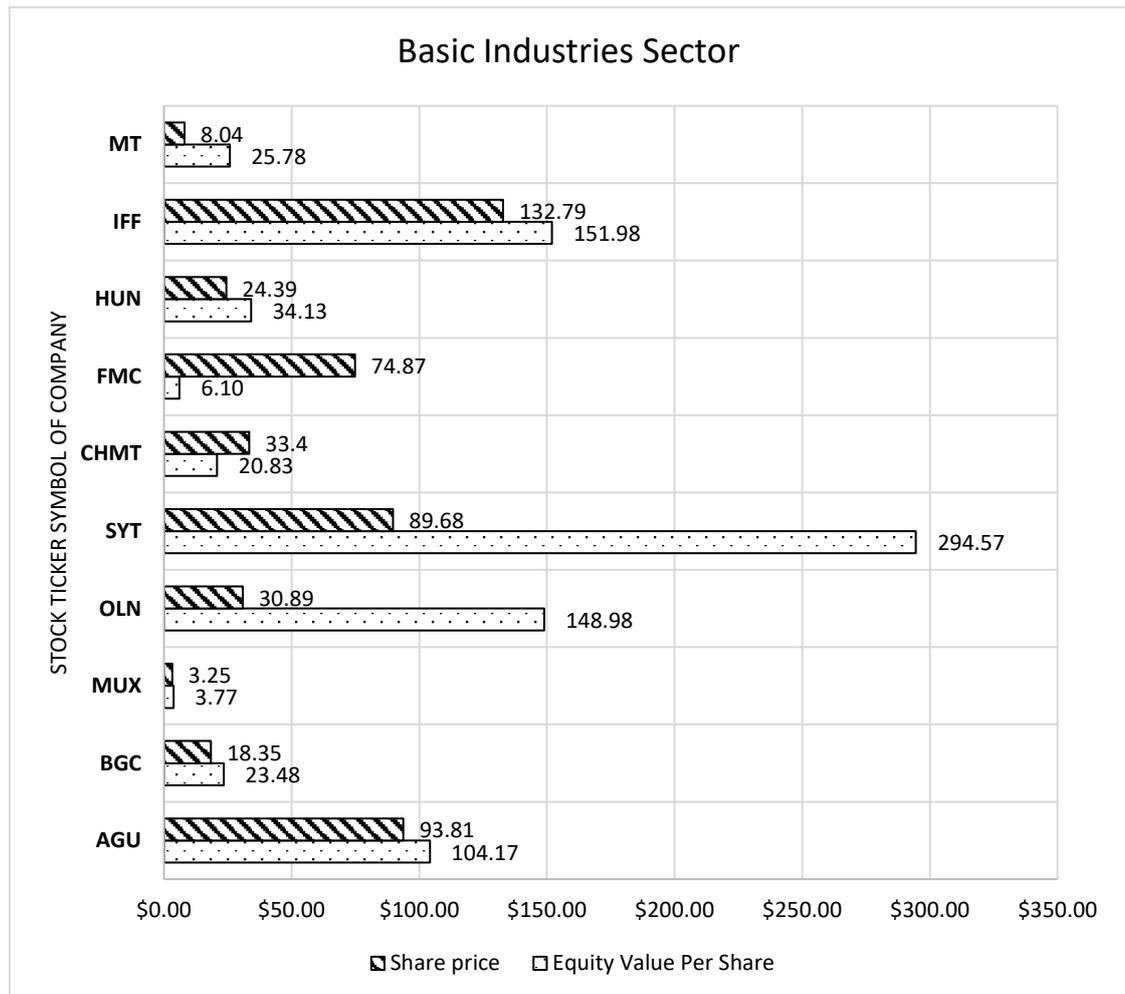


Figure 34. Basic industries sector: Share price versus Equity value per share

Interestingly, the equity value per share of eight companies is undervalued, the other two are overvalued. Undervalued companies are MT, IFF, HUN, SYT, OLN, MUX, BGC, and AGU. Overvalued companies are FMC and CHMT. (See Figure 34.)

Among all companies, FMC and OLN are also the two having the biggest gap between the DCF-calculated value and market value. Equity value per share of FMC is valued \$6.10 by the DCF model, but valued at \$74.87 by the market. For OLN, it is valued at \$148.98 by the DCF model, but valued at \$30.89 by the market. With these figures, OLN is the most undervalued firm and FMC is the most overvalued company regarding their share prices.

With this valuation, stock investors should consider buying stocks of MT, IFF, HUN, SYT, OLN, MUX, BGC, and AGU because their share prices may increase in the future. In contrast, they should consider betting against the market on these stocks: FMC and CHMT because their share prices may drop in the future.

6. Discussion

6.1. Summary of Key Findings

The main goal of the current study was to determine intrinsic values of companies in ten different sectors using the DCF model and then compare them with those determined by the stock market itself. To accomplish this objective, this research was conducted to answer these two following questions:

- The principal research question: Which of 100 U.S. companies analyzed in the sample are overvalued or undervalued?
- The supplementary research question: What investment strategies should stock investors consider for each company?

To answer the main question, it is important to point out that the DCF model has generated three types of value for a company, including enterprise value, equity value, and equity value per share. The findings are summarized as follows

- For enterprise value, there is a total of 53 undervalued firms in which there are four in the technology sector, five in the transportation sector, five in the energy sector, four in the public utilities sector, seven in the health care sector, four in the consumer services sector, eight in the consumer non-durables sectors, seven in the consumer durables sector, two in the capital goods sector, and seven in the basic industries sector. Reversely, there is a total of 47 overvalued firms within the ten sectors.
- For equity value, there is a total of 55 undervalued firms in which there are four in the technology sector, six in the transportation sector, five in the energy sector, four in the public utilities sector, seven in the health care sector, four in the consumer services sector, eight in the consumer non-durables sectors, seven in the consumer durables sector, three in the capital goods sector, and seven in the basic industries sector. Reversely, there is a total of 45 overvalued firms within the ten sectors.
- For equity value per share, there is a total of 54 undervalued firms in which there are four in the technology sector, four in the transportation sector, five in the energy sector, four in the public utilities sector, seven in the health care sector, four in the consumer services sector, eight in the consumer non-

durables sectors, seven in the consumer durables sector, three in the capital goods sector, and eight in the basic industries sector. Reversely, there is a total of 46 overvalued firms within the ten sectors.

In response to the sub-question, this research has made some suggestions as follows. Investors should consider buying stock of 54 companies because their share prices may increase in the future. In contrast, they should consider betting against the market on the stocks of the 46 other companies because their share prices may drop in the future. The following are the “buying” stocks: ETN, JBL, EPAM, UIS, UAL, LUV, STNG, FRO, CHK, HEP, CVE, BGG, ALJ, KMI, AEE, IDT, CEL, LH, HLF, CI, COO, ABT, CRY, PFE, NLY, SGU, CVS, CBL, TUP, TAP, LUK, DPS, UFI, MYE, GNC, ATR, OI, KAR, DLX, USNA, ODC, KMB, NC, AGCO, IEX, MT, IFF, HUN, SYT, OLN, MUX, BGC, and AGU. In contrast, these are the “selling” or “betting-against-the-market” stocks: GWRE, CRM, AER, TNC, KAI, EXAR, NSC, KSU, GWR, FDX, CP, ALK, SWN, NOV, BHI, BC, DKL, SEP, NWN, ENLC, GWL, UTL, ALE, LCI, CYH, CSU, SKT, PSO, CBS, CAB, SYX, O, CL, NLS, HNI, CCK, VCRA, KBH, MGA, PII, WNC, SUP, MPX, LNN, FMC, and CHMT.

6.2. Practical Implications

First of all, this research is an empirical study, not a theoretical study, studying about empirical aspects of valuation, therefore it is practical in nature. One of the clearest evidence could be seen is the research questions. The questions target practical issues and aim to address the practical problems. Concerning the research field, this dissertation contributes significantly to the current shortage of the empirical research about the valuation topic.

The findings of this study have a number of important implications for different people working in and outside these 100 corporates. For internal stakeholders, including managers and shareholders, the findings could significantly help them in their decision-making process. The state of undervaluation or overvaluation of their company may play a crucial role in their decisions about short- and long-term strategies. Although, the findings of this research can be usable in many areas of a company and different circumstances, the following are the two obvious scenarios. If a company’s stock price is found traded at a higher rate than its equilibrium price on the stock market, managers may want to come up with solutions to normalize the trading price by calming the aggression of outside investors and communicating with

the press before the stock becomes an uncontrollable bubble and busts accidentally. In contrast, if a company's stock price is found traded at a lower rate than its equilibrium price on the stock market, managers may need to go with a new strategy to raise the stock performance, protect company's investors, communicate with the press, and calm the public to minimize the possible damages. For external stakeholders, such as outside investors, the findings naturally assist them in making their investment decisions because the sub-question of this research directly target this area. This research has generated the results that show which companies' stocks are undervalued and overvalued among 100 firms. Based on this, investors may want to buy stocks that are undervalued because these stock prices may increase in the future. Reversely, investors may want to sell or bet against the stock market on overvalued stocks because their stock prices may drop in the future. It may help investors to reduce their future losses when selling these stocks or generate future profits when betting against the stock market.

6.3. Limitations and Recommendations

Although the research is conducted thoroughly, it may not avoid some limitations. The first limitation could be the approach of estimating future free cash flows. As noted by Damodaran (2016), there are two ways of doing this, one of which is based on historical performances, the other is to rely on financial analysts' predictions. This research chose to estimated future free cash flows by using historical performances of the company although the past may not always be a good prediction for the future. The reason for choosing historical performances is that it is a more systematic way to do than collecting a random analyst's predictions and inputting his data into the DCF model without any logical justifications. Damodaran (2016) has said that historical data may create unexpected issues for valuation. It may be true in this research, although most of sampled companies valued by the DCF model resulted in positive values, some of them yield negative values. A negative value may indicate that a company may run out of cash within five years from the date of valuation or that the value does not accurately reflect the true value of the company. The researcher found out that most of the problem causing negative values coming from the structure of their earnings and spending in the past. With that said, the structure these companies have used in the past may not be good for its free cash flows in the future. Another reason of using historical data is that analysts' predictions may not be valid to use because we may not know which methods do they use and how they come up with

their predictions. It may also be too subjective to use the viewpoints of others throughout the valuation process. Another limitation could be the use of the risk-free rate. As noted in the literature review, choosing which rate to use for the risk-free rate is still a debatable issue amongst experts. At this point of writing, there is no consensus or universal guidance of how to use the risk-free rate appropriately in different circumstances. For example, which rate to adopt when forecasting the future cash flows five years from now or ten years from now. Choosing a different risk-free rate will affect the final result of company's value, although changes are not too significant. Following the instructions of Damodaran (2008c) who is the expert in valuation, this research chose 10-year risk-free rate for the DCF model. The final limitation is the approach of determining the market-risk premium. Fernandez (2004b) said that there is no universal approach of calculating the market-risk premium and that each analyst may have his own way to do. While there are a number of approaches to use, there are not many instructions or guidance of how to calculate the market-risk premium using each approach. This research, therefore, uses historical market risk premium approach to determine the market-risk premium. Although this approach is not newly-invented, it is one of the most popular ones to use and has detailed instructions to calculate.

To sum up, many other aspects of valuation still need to study further. One of those is the approach of estimating future free cash flows because it is one of the most important components of the DCF model. My recommendation is that researchers should focus on studying only several companies but in depth. The results of these research should be able to demonstrate a systematic way of predicting future free cash flows, replacing the approach of collecting random analysts' predictions. Another recommendation is that researchers should conduct research about constructing DCF models. Although the DCF model is very popular in the corporate world, there are not many research studying profoundly about the way of constructing it. At this point of writing, the majority of literature is about various valuation theories and formulas, not about the approach of constructing a specific DCF model based on this knowledge. The DCF model using in this dissertation is partly based on a DCF model from the Wall Street Prep, and partly based on the theories and formulas of valuation.

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Appendices

Appendix 1. List of 100 U.S. Corporates in 10 Sectors

Symbol	Name	Sector
EXAR	Exar Corporation	Technology
KAI	Kadant Inc	Technology
UIS	Unisys Corporation	Technology
TNC	Tennant Company	Technology
AER	Aercap Holdings N.V.	Technology
CRM	Salesforce.com Inc	Technology
EPAM	EPAM Systems, Inc.	Technology
GWRE	Guidewire Software, Inc.	Technology
ETN	Eaton Corporation, PLC	Technology
JBL	Jabil Circuit, Inc.	Technology
GNRT	Gener8 Maritime, Inc.	Transportation
LPG	Dorian LPG Ltd.	Transportation
NVGS	Navigator Holdings Ltd.	Transportation
SALT	Scorpio Bulkers Inc.	Transportation
STNG	Scorpio Tankers Inc.	Transportation
ALK	Alaska Air Group, Inc.	Transportation
ASR	Grupo Aeroportuario del Sureste, S.A. de C.V.	Transportation
CPA	Copa Holdings, S.A.	Transportation
GOL	Gol Linhas Aereas Inteligentes S.A.	Transportation
ZNH	China Southern Airlines Company Limited	Transportation
ALJ	Alon USA Energy, Inc.	Energy
DKL	Delek Logistics Partners, L.P.	Energy
FELP	Foresight Energy LP	Energy
NRT	North European Oil Royalty Trust	Energy
SBR	Sabine Royalty Trust	Energy
CVE	Cenovus Energy Inc	Energy
HEP	Holly Energy Partners, L.P.	Energy
NBLX	Noble Midstream Partners LP	Energy
NOV	National Oilwell Varco, Inc.	Energy
SSL	Sasol Ltd.	Energy
AROC	Archrock, Inc.	Public Utilities
CEL	Cellcom Israel, Ltd.	Public Utilities
IDT	IDT Corporation	Public Utilities
UTL	UNITIL Corporation	Public Utilities
WAAS	AquaVenture Holdings Limited	Public Utilities
AM	Antero Midstream Partners LP	Public Utilities
ELP	Companhia Paranaense de Energia (COPEL)	Public Utilities
KEP	Korea Electric Power Corporation	Public Utilities
NWN	Northwest Natural Gas Company	Public Utilities
SEP	Spectra Energy Partners, LP	Public Utilities

CIVI	Civitas Solutions, Inc.	Health Care
CRY	CryoLife, Inc.	Health Care
CSU	Capital Senior Living Corporation	Health Care
CYH	Community Health Systems, Inc.	Health Care
LCI	Lannett Co Inc	Health Care
AXON	Axovant Sciences Ltd.	Health Care
COO	Cooper Companies, Inc. (The)	Health Care
CTLT	Catalent, Inc.	Health Care
HLF	Herbalife LTD.	Health Care
LH	Laboratory Corporation of America Holdings	Health Care
CHGG	Chegg, Inc.	Consumer Services
CSV	Carriage Services, Inc.	Consumer Services
OAKS	Five Oaks Investment Corp.	Consumer Services
SGU	Star Gas Partners, L.P.	Consumer Services
SYX	Systemax Inc.	Consumer Services
CBD	Companhia Brasileira de Distribuicao	Consumer Services
CNCO	Cencosud S.A.	Consumer Services
NLY	Annaly Capital Management Inc	Consumer Services
PEB	Pebblebrook Hotel Trust	Consumer Services
STAY	Extended Stay America, Inc.	Consumer Services
AFI	Armstrong Flooring, Inc.	Consumer Non-Durables
GNC	GNC Holdings, Inc.	Consumer Non-Durables
MYE	Myers Industries, Inc.	Consumer Non-Durables
NLS	Nautilus Group, Inc. (The)	Consumer Non-Durables
UFI	Unifi, Inc.	Consumer Non-Durables
CCU	Compania Cervecerias Unidas, S.A.	Consumer Non-Durables
DPZ	Domino's Pizza Inc	Consumer Non-Durables
LUK	Leucadia National Corporation	Consumer Non-Durables
TAP	Molson Coors Brewing Company	Consumer Non-Durables
TUP	Tupperware Brands Corporation	Consumer Non-Durables
NC	NACCO Industries, Inc.	Consumer Durables
NTZ	Natuzzi, S.p.A.	Consumer Durables
ODC	Oil-Dri Corporation of America	Consumer Durables
USNA	USANA Health Sciences, Inc.	Consumer Durables
VCRA	Vocera Communications, Inc.	Consumer Durables
CCK	Crown Holdings, Inc.	Consumer Durables
DLX	Deluxe Corporation	Consumer Durables
KAR	KAR Auction Services, Inc	Consumer Durables
OI	Owens-Illinois, Inc.	Consumer Durables
UNVR	Univar Inc.	Consumer Durables
LNN	Lindsay Corporation	Capital Goods
MOD	Modine Manufacturing Company	Capital Goods
MPX	Marine Products Corporation	Capital Goods
SUP	Superior Industries International, Inc.	Capital Goods
WLH	Lyon William Homes	Capital Goods
IEX	IDEX Corporation	Capital Goods

PII	Polaris Industries Inc.	Capital Goods
AGCO	AGCO Corporation	Capital Goods
MGA	Magna International, Inc.	Capital Goods
KBH	KB Home	Capital Goods
ASIX	AdvanSix Inc.	Basic Industries
BGC	General Cable Corporation	Basic Industries
MUX	McEwen Mining Inc.	Basic Industries
OCIP	OCI Partners LP	Basic Industries
SA	Seabridge Gold, Inc.	Basic Industries
CHMT	Chemtura Corp.	Basic Industries
FNV	Franco-Nevada Corporation	Basic Industries
HUN	Huntsman Corporation	Basic Industries
IFF	Internationa Flavors & Fragrances, Inc.	Basic Industries
MT	ArcelorMittal	Basic Industries

Appendix 10. DCF Valuation of JBL

Valuation Date:	6-Apr-17									
Share Price on Valuation Date:	28									
Diluted Shares Outstanding:	192,800,000	Raw Data		193						

Select Operating Data											
	2010	2011	2012	2013	2014	2015	Projected Annual Forecast				
Currency: Dollar (\$)							2016	2017	2018	2019	2020
Revenue	13,409,411,000	16,518,827,000	16,140,705,000	17,249,493,000	15,762,146,000	17,899,196,000	18,353,086,000	19,431,028,876	20,572,283,221	21,780,567,547	23,059,818,765
Revenue Growth Rate (%)		23.19%	-2.29%	6.87%	-8.62%	13.56%	2.54%	5.87%	5.87%	5.87%	5.87%
EBITDA											
EBITDA Margin (%)											
EBIT	324,509,000	576,985,000	603,641,000	500,136,000	443,079,000	549,571,000	522,780,000	590,760,240	625,457,718	662,193,104	701,086,091
EBIT Margin (%)	2.42%	3.49%	3.74%	2.90%	2.81%	3.07%	2.85%	3.04%	3.04%	3.04%	3.04%
Depreciation & Amortization	283,284,000	319,179,000	353,492,000	418,117,000	487,278,000	529,176,000	696,752,000	513,618,604	543,785,276	575,723,745	609,538,075
D&A as a % of revenue	2.11%	1.93%	2.19%	2.42%	3.09%	2.96%	3.80%	2.64%	2.64%	2.64%	2.64%

Select Balance Sheet And Other Data											
	2010	2011	2012	2013	2014	2015	Projected Annual Forecast				
Cash	744,329,000	888,611,000	1,217,256,000	1,011,373,000	1,000,249,000	913,963,000	912,059,000	912,059,000	912,059,000	912,059,000	912,059,000
Accounts Receivable	1,408,319,000	1,100,926,000	1,125,015,000	1,168,954,000	1,208,516,000	1,467,247,000	1,359,610,000	1,363,516,961	1,367,435,149	1,371,364,597	1,375,305,336
Inventories	2,094,135,000	2,227,339,000	2,268,949,000	2,118,716,000	2,008,077,000	2,507,264,000	2,456,612,000	2,535,323,752	2,616,557,490	2,700,394,020	2,786,916,738
Prepaid Expenses											
Accounts Payable	2,741,719,000	2,885,168,000	2,992,865,000	3,191,328,000	3,060,814,000	3,663,264,000	3,593,195,000	3,768,521,042	3,952,401,927	4,145,255,080	4,347,518,293
Accrued Expenses	672,300,000	892,400,000	808,500,000	1,217,100,000	1,235,100,000	219,300,000	1,929,100,000	2,292,512,085	2,724,385,289	3,237,616,609	3,847,532,634
Accrued Expenses (Raw data)	672.30	892.40	808.50	1,217.10	1,235.10	1,685.60	1,929.10				
Debt							2,119,822,000				
Gross PP&E (increases annual by CA)	1,451,392,000	1,641,335,000	1,779,155,000	2,309,320,000	2,271,705,000	2,804,333,000	3,331,879,000	3,842,276,408	4,430,859,584	5,109,605,495	5,892,325,817
Accounts Receivable Growth (%)		-21.83%	2.19%	3.91%	3.38%	21.41%	-7.34%	0.29%	0.29%	0.29%	0.29%
Inventories Growth (%)		6.36%	1.87%	-6.62%	-5.22%	24.86%	-2.02%	3.20%	3.20%	3.20%	3.20%
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)		5.23%	3.73%	6.63%	-4.09%	19.68%	-1.91%	4.88%	4.88%	4.88%	4.88%
Accrued Expenses Growth (%)		32.74%	-9.40%	50.54%	1.48%			18.84%	18.84%	18.84%	18.84%
Capital Expenditures Growth (%)		13.09%	8.40%	29.80%	-1.63%	23.45%	18.81%	15.32%	15.32%	15.32%	15.32%

Free Cash Flow Buildup											
	2010	2011	2012	2013	2014	2015	Projected Annual Forecast				
Period							2016	2017	2018	2019	2020
Total Revenues							1	2	3	4	5
EBITDA							18,353,086,000	19,431,028,876	20,572,283,221	21,780,567,547	23,059,818,765
EBIT							-	-	-	-	-
Tax rate							522,780,000	590,760,240	625,457,718	662,193,104	701,086,091
EBIAT							40%	40%	40%	40%	40%
Depreciation & Amortization							313,668,000	354,456,144	375,274,631	397,315,862	420,651,654
Accounts receivable							696,752,000	513,618,604	543,785,276	575,723,745	609,538,075
Inventories							107,637,000	(3,906,961)	(3,918,188)	(3,929,447)	(3,940,739)
Prepaid expenses							50,652,000	(78,711,752)	(81,233,738)	(83,836,530)	(86,522,717)
Accounts payable							-	-	-	-	-
Accrued expenses							(70,069,000)	175,326,042	183,880,885	192,853,153	202,263,213
Capital expenditures							1,709,800,000	363,412,085	431,873,204	513,231,320	609,916,025
Unlevered free cash flows							(527,546,000)	(510,397,408)	(588,583,175)	(678,745,911)	(782,720,322)
Discount Rate (WACC)							2,280,894,000	813,796,754	861,078,894	912,612,191	969,185,189
Present value of free cash flows							5.73%	5.73%	5.73%	5.73%	5.73%
Sum of present values of FCFs							2,157,274,350	727,975,070	728,523,852	730,276,581	733,513,571
							5,077,563,423				

Terminal Value	
Growth in perpetuity method:	
Long term growth rate	2.60%
WACC	5.73%
Free cash flow (t+1)	752,584,923
Terminal Value	24,041,458,825
Present Value of Terminal Value	18,195,424,886

WACC	
Share Price	28
Diluted Shares Outstanding	192,800,000
Cost of Debt	3.30%
Tax Rate	40.00%
After-tax Cost of Debt	1.98%
Cost of Equity	7.20%
	RF Beta RM-RF
	2.34 1.52 3.20
Total Debt (\$)	2,119,822,000
Total Equity (\$)	5,398,400,000
Total Capital	7,518,222,000
Debt Weighting	28.20%
Equity Weighting	71.80%
WACC =	5.73%

Enterprise Value to Equity Value	
Enterprise Value	23,272,988,309
Less: Net debt	1,207,763,000
Equity Value	22,065,225,309
Diluted Shares Outstanding	192,800,000
Equity Value Per Share	114.45
	Undervalued

Appendix 18. DCF Valuation of KSU

Valuation Date:	8-Apr-17										
Share Price on Valuation Date:	88										
Diluted Shares Outstanding:	107,800,000	Raw Data								108	

Select Operating Data											
							Projected Annual Forecast				
Currency: Dollar (\$)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue	1,814,800,000	2,098,300,000	2,238,600,000	2,369,300,000	2,577,100,000	2,418,800,000	2,334,200,000	2,440,315,647	2,551,255,443	2,667,238,701	2,788,494,703
Revenue Growth Rate (%)		15.62%	6.69%	5.84%	8.77%	-6.14%	-3.50%	4.55%	4.55%	4.55%	4.55%
EBITDA											
EBITDA Margin (%)											
EBIT	447,500,000	582,500,000	714,700,000	630,300,000	784,200,000	752,700,000	758,600,000	714,648,449	747,137,260	781,103,053	816,612,973
EBIT Margin (%)	24.66%	27.76%	31.93%	26.60%	30.43%	31.12%	32.50%	29.29%	29.29%	29.29%	29.29%
Depreciation & Amortization	184,900,000	186,200,000	198,800,000	223,300,000	258,100,000	284,600,000	305,000,000	251,754,987	263,200,083	275,165,488	287,674,854
D&A as a % of revenue	10.19%	8.87%	8.88%	9.42%	10.02%	11.77%	13.07%	10.32%	10.32%	10.32%	10.32%

Select Balance Sheet And Other Data											
€ Million							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cash	85,400,000	72,400,000	72,600,000	429,500,000	348,000,000	136,600,000	170,600,000	170,600,000	170,600,000	170,600,000	170,600,000
Accounts Receivable	160,000,000	166,000,000	183,600,000	198,300,000	181,600,000	171,900,000	191,000,000	197,273,415	203,752,881	210,445,166	217,357,260
Inventories	101,400,000	109,600,000	125,600,000	121,300,000	111,000,000	137,900,000	152,600,000	164,214,017	176,711,948	190,161,066	204,633,764
Prepaid Expenses											
Accounts Payable	403,000,000	401,100,000	364,600,000	398,600,000	423,900,000	401,500,000	537,700,000	568,832,461	601,767,471	636,609,395	673,468,642
Accrued Expenses	66,400,000	63,700,000	71,200,000	72,700,000	75,100,000	50,900,000	78,700,000	83,357,577	88,290,797	93,515,971	99,050,378
Accrued Expenses (Raw data)	66.40	63.70	71.20	72.70	75.10	50.90	78.70				
Debt							2,478,200,000				
Accrued Expenses (Reverse order)	79	51	75	73	71	64	66				
Gross PP&E (increases annual by CA)	4,902,400,000	5,321,600,000	5,684,800,000	6,356,300,000	7,154,700,000	7,705,400,000	8,069,700,000	8,771,411,359	9,534,140,951	10,363,194,696	11,264,339,898
Accounts Receivable Growth (%)		3.75%	10.60%	8.01%	-8.42%	-5.34%	11.11%	3.28%	3.28%	3.28%	3.28%
Inventories Growth (%)		8.09%	14.60%	-3.42%	-8.49%	24.23%	10.66%	7.61%	7.61%	7.61%	7.61%
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)		-0.47%	-9.10%	9.33%	6.35%	-5.28%	33.92%	5.79%	5.79%	5.79%	5.79%
Accrued Expenses Growth (%)		-4.07%	11.77%	2.11%	3.30%	-32.22%	54.62%	5.92%	5.92%	5.92%	5.92%
Capital Expenditures Growth (%)		8.55%	6.83%	11.81%	12.56%	7.70%	4.73%	8.70%	8.70%	8.70%	8.70%

Free Cash Flow Buildup											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Period							1	2	3	4	5
Total Revenues							2,334,200,000	2,440,315,647	2,551,255,443	2,667,238,701	2,788,494,703
EBITDA							-	-	-	-	-
EBIT							758,600,000	714,648,449	747,137,260	781,103,053	816,612,973
Tax rate							40%	40%	40%	40%	40%
EBIAT							455,160,000	428,789,069	448,282,356	468,661,832	489,967,784
Depreciation & Amortization							305,000,000	251,754,987	263,200,083	275,165,488	287,674,854
Accounts receivable							(19,100,000)	(6,273,415)	(6,479,466)	(6,692,285)	(6,912,094)
Inventories							(14,700,000)	(11,614,017)	(12,497,931)	(13,449,118)	(14,472,698)
Prepaid expenses							-	-	-	-	-
Accounts payable							136,200,000	31,132,461	32,935,009	34,841,924	36,859,247
Accrued expenses							27,800,000	4,657,577	4,933,219	5,225,174	5,534,407
Capital expenditures							(364,300,000)	(701,711,359)	(762,729,592)	(829,053,745)	(901,145,202)
Unlevered free cash flows							526,060,000	(3,264,696)	(32,356,321)	(65,300,731)	(102,493,701)
Discount Rate (WACC)							5.77%	5.77%	5.77%	5.77%	5.77%
Present value of free cash flows							497,370,721	(2,918,318)	(27,346,009)	(52,179,244)	(77,432,246)
Sum of present values of FCFs							337,494,905				

Terminal Value	
Growth in perpetuity method:	
Long term growth rate	2.60%
WACC	5.77%
Free cash flow (t+1)	(79,445,484)
Terminal Value	(2,507,600,014)
Present Value of Terminal Value	(1,894,440,102)

WACC	
Share Price	88
Diluted Shares Outstanding	107,800,000
Cost of Debt	3.30%
Tax Rate	40.00%
After-tax Cost of Debt	1.98%
Cost of Equity	6.76%
	RF
	Beta
	RM-RF
	2.38
	1.37
	3.20
Total Debt (\$)	2,478,200,000
Total Equity (\$)	9,446,514,000
Total Capital	11,924,714,000
Debt Weighting	20.78%
Equity Weighting	79.22%
WACC =	5.77%

Enterprise Value to Equity Value	
Enterprise Value	(1,556,954,197)
Less: Net debt	2,307,600,000
Equity Value	(3,864,554,197)
Diluted Shares Outstanding	107,800,000
Equity Value Per Share	(35.85)
	Overvalued

Appendix 19. DCF Valuation of LUV

Valuation Date:	8-Apr-17										
Share Price on Valuation Date:	53										
Diluted Shares Outstanding:	633,000,000	Raw Data								633	
Select Operating Data											
							Projected Annual Forecast				
Currency: Dollar (\$)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue	12,104,000,000	15,658,000,000	17,088,000,000	17,699,000,000	18,605,000,000	19,820,000,000	20,425,000,000	21,544,707,830	22,725,798,555	23,971,637,213	25,285,773,316
Revenue Growth Rate (%)			9.13%	3.58%	5.12%	6.53%	3.05%	5.48%	5.48%	5.48%	5.48%
EBITDA											
EBITDA Margin (%)											
EBIT	912,000,000	517,000,000	832,000,000	1,340,000,000	1,946,000,000	3,600,000,000	3,669,000,000	2,150,247,845	2,268,125,414	2,392,465,085	2,523,621,114
EBIT Margin (%)	7.53%	3.30%	4.87%	7.57%	10.46%	18.16%	17.96%	9.98%	9.98%	9.98%	9.98%
Depreciation & Amortization	628,000,000	715,000,000	844,000,000	867,000,000	938,000,000	1,015,000,000	1,221,000,000	1,099,800,617	1,160,092,189	1,223,688,973	1,290,772,162
D&A as a % of revenue	5.19%	4.57%	4.94%	4.90%	5.04%	5.12%	5.98%	5.10%	5.10%	5.10%	5.10%
Select Balance Sheet And Other Data											
€ Million							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cash	1,261,000,000	829,000,000	1,113,000,000	1,355,000,000	1,282,000,000	1,583,000,000	1,680,000,000	1,680,000,000	1,680,000,000	1,680,000,000	1,680,000,000
Accounts Receivable	195,000,000	299,000,000	332,000,000	419,000,000	365,000,000	474,000,000	546,000,000	657,693,401	792,235,548	954,300,535	1,149,518,616
Inventories	243,000,000	401,000,000	469,000,000	467,000,000	342,000,000	311,000,000	337,000,000	367,375,466	400,488,822	436,586,848	475,938,567
Prepaid Expenses											
Accounts Payable	739,000,000	1,057,000,000	1,107,000,000	1,247,000,000	1,203,000,000	1,188,000,000	1,178,000,000	1,285,573,357	1,402,970,166	1,531,087,491	1,670,904,317
Accrued Expenses	863,000,000	996,000,000	1,102,000,000	1,229,000,000	1,565,000,000	2,591,000,000	1,985,000,000	2,339,283,394	2,756,799,394	3,248,833,775	3,828,686,600
Accrued Expenses (Raw data)	863.00	996.00	1,102.00	1,229.00	1,565.00	2,591.00	1,985.00				
Debt							3,387,000,000				
Accrued Expenses (Reverse order)	1,985	2,591	1,565	1,229	1,102	996	863				
Gross PP&E (increases annual by CA)	10,578,000,000	12,127,000,000	12,766,000,000	13,389,000,000	14,292,000,000	15,601,000,000	17,044,000,000	18,462,790,959	19,999,686,106	21,664,516,769	23,467,932,664
Accounts Receivable Growth (%)		53.33%	11.04%	26.20%	-12.89%	29.86%	15.19%	20.46%	20.46%	20.46%	20.46%
Inventories Growth (%)		65.02%	16.96%	-0.43%	-26.77%	-9.06%	8.36%	9.01%	9.01%	9.01%	9.01%
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)		43.03%	4.73%	12.65%	-3.53%	-1.25%	-0.84%	9.13%	9.13%	9.13%	9.13%
Accrued Expenses Growth (%)		15.41%	10.64%	11.52%	27.34%	65.56%	-23.39%	17.85%	17.85%	17.85%	17.85%
Capital Expenditures Growth (%)		14.64%	5.27%	4.88%	6.74%	9.16%	9.25%	8.32%	8.32%	8.32%	8.32%
Free Cash Flow Buildup											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Period							1	2	3	4	5
Total Revenues							20,425,000,000	21,544,707,830	22,725,798,555	23,971,637,213	25,285,773,316
EBITDA							-	-	-	-	-
EBIT							3,669,000,000	2,150,247,845	2,268,125,414	2,392,465,085	2,523,621,114
Tax rate							40%	40%	40%	40%	40%
EBIAT							2,201,400,000	1,290,148,707	1,360,875,248	1,435,479,051	1,514,172,669
Depreciation & Amortization							1,221,000,000	1,099,800,617	1,160,092,189	1,223,688,973	1,290,772,162
Accounts receivable							(72,000,000)	(111,693,401)	(134,542,148)	(162,064,986)	(195,218,081)
Inventories							(26,000,000)	(30,375,466)	(33,113,356)	(36,098,026)	(39,351,718)
Prepaid expenses							-	-	-	-	-
Accounts payable							(10,000,000)	107,573,357	117,396,809	128,117,326	139,816,826
Accrued expenses							(606,000,000)	354,283,394	417,516,000	492,034,381	579,852,825
Capital expenditures							(1,443,000,000)	(1,418,790,959)	(1,536,895,147)	(1,664,830,663)	(1,803,415,895)
Unlevered free cash flows							1,265,400,000	1,290,946,249	1,351,329,596	1,416,326,056	1,486,628,786
Discount Rate (WACC)							5.36%	5.36%	5.36%	5.36%	5.36%
Present value of free cash flows							1,201,040,596	1,162,968,292	1,155,449,209	1,149,430,383	1,145,122,170
Sum of present values of FCFs							5,814,010,648				
Terminal Value											
Growth in perpetuity method:											
Long term growth rate							2.60%				
WACC							5.36%				
Free cash flow (t+1)							1,174,895,346				
Terminal Value							42,589,706,638				
Present Value of Terminal Value							32,806,049,314				
WACC											
Share Price	53										
Diluted Shares Outstanding	633,000,000										
Cost of Debt	3.30%										
Tax Rate	40.00%										
After-tax Cost of Debt	1.98%										
Cost of Equity	5.70%										
			RF	Beta	RM-RF						
				2.38	1.04	3.20					
Total Debt (\$)	3,387,000,000										
Total Equity (\$)	33,789,540,000										
Total Capital	37,176,540,000										
Debt Weighting	9.11%										
Equity Weighting	90.89%										
WACC =	5.36%										
Enterprise Value to Equity Value											
Enterprise Value	38,620,059,962										
Less: Net debt	1,707,000,000										
Equity Value	36,913,059,962										
Diluted Shares Outstanding	633,000,000										
Equity Value Per Share	58.31										
	Undervalued										

Appendix 23. DCF Valuation of DKL

Valuation Date:	9-Apr-17										
Share Price on Valuation Date:	31										
Diluted Shares Outstanding:	12,300,000	Raw Data		12							
Select Operating Data											
							Projected Annual Forecast				
Currency: Dollar (\$)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue	504,408,000	744,079,000	1,022,586,000	907,428,000	841,253,000	589,669,000	448,059,000	457,371,155	466,876,848	476,580,101	486,485,019
Revenue Growth Rate (%)		47.52%	37.43%	-11.26%	-7.29%	-29.91%	-24.02%	2.08%	2.08%	2.08%	2.08%
EBITDA											
EBITDA Margin (%)											
EBIT	17,753,000	20,021,000	22,717,000	53,157,000	80,785,000	77,311,000	76,472,000	35,329,333	36,063,594	36,813,115	37,578,214
EBIT Margin (%)	3.52%	2.69%	2.22%	5.86%	9.60%	13.11%	17.07%	7.72%	7.72%	7.72%	7.72%
Depreciation & Amortization	2,810,000	6,061,000	11,343,000	13,738,000	15,022,000	19,692,000	20,813,000	8,993,986	9,180,911	9,371,720	9,566,496
D&A as a % of revenue	0.56%	0.81%	1.11%	1.51%	1.79%	3.34%	4.65%	1.97%	1.97%	1.97%	1.97%
Select Balance Sheet And Other Data											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cash		35,000	23,452,000	924,000	1,861,000	-	59,000	59,000	59,000	59,000	59,000
Accounts Receivable		28,195,000	27,725,000	28,976,000	27,986,000	35,049,000	22,036,000	23,394,861	24,837,518	26,369,136	27,995,203
Inventories		18,859,000	14,351,000	17,512,000	10,316,000	10,451,000	8,875,000	9,119,213	9,370,146	9,627,984	9,892,917
Prepaid Expenses											
Accounts Payable		26,386,000	31,997,000	27,558,000	18,557,000	10,842,000	10,853,000	11,124,084	11,401,940	11,686,735	11,978,644
Accrued Expenses		-	-	-	-	-	-	-	-	-	-
Accrued Expenses (Raw data)		-	-	-	-	-	-	-	-	-	-
Debt							392,600,000				
Accrued Expenses (Reverse order)											
Gross PP&E (increases annual by CAPEX)		133,680,000	191,057,000	224,506,000	254,779,000	253,848,000	251,029,000	276,655,880	304,898,939	336,025,257	370,329,177
Accounts Receivable Growth (%)			-1.67%	4.51%	-3.42%	25.24%		6.17%	6.17%	6.17%	6.17%
Inventories Growth (%)				22.03%		1.31%	-15.08%	2.75%	2.75%	2.75%	2.75%
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)			21.27%	-13.87%			0.10%	2.50%	2.50%	2.50%	2.50%
Accrued Expenses Growth (%)											
Capital Expenditures Growth (%)				17.51%	13.48%	-0.37%	-1.11%	10.21%	10.21%	10.21%	10.21%
Free Cash Flow Buildup											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Period							1	2	3	4	5
Total Revenues							448,059,000	457,371,155	466,876,848	476,580,101	486,485,019
EBITDA							-	-	-	-	-
EBIT							76,472,000	35,329,333	36,063,594	36,813,115	37,578,214
Tax rate							40%	40%	40%	40%	40%
EBIAT							45,883,200	21,197,600	21,638,156	22,087,869	22,546,928
Depreciation & Amortization							20,813,000	8,993,986	9,180,911	9,371,720	9,566,496
Accounts receivable							13,013,000	(1,358,861)	(1,442,656)	(1,531,619)	(1,626,067)
Inventories							1,576,000	(244,213)	(250,933)	(257,838)	(264,933)
Prepaid expenses							-	-	-	-	-
Accounts payable							11,000	271,084	277,855	284,796	291,909
Accrued expenses							-	-	-	-	-
Capital expenditures							2,819,000	(25,626,880)	(28,243,059)	(31,126,318)	(34,303,920)
Unlevered free cash flows							84,115,200	3,232,716	1,160,274	(1,171,389)	(3,789,586)
Discount Rate (WACC)							3.13%	3.13%	3.13%	3.13%	3.13%
Present value of free cash flows							81,565,003	3,039,669	1,057,909	(1,035,663)	(3,248,917)
Sum of present values of FCFs							81,378,000				
Terminal Value											
Growth in perpetuity method:											
Long term growth rate							2.08%				
WACC							3.13%				
Free cash flow (t+1)							(3,316,495)				
Terminal Value							(316,887,956)				
Present Value of Terminal Value							(271,676,828)				
WACC											
Share Price	31										
Diluted Shares Outstanding	12,300,000										
Cost of Debt	3.30%										
Tax Rate	40.00%										
After-tax Cost of Debt	1.98%										
Cost of Equity	4.29%										
			RF	Beta	RM-RF						
				2.38	0.60	3.20					
Total Debt (\$)	392,600,000										
Total Equity (\$)	386,220,000										
Total Capital	778,820,000										
Debt Weighting	50.41%										
Equity Weighting	49.59%										
WACC =	3.13%										
Enterprise Value to Equity Value											
Enterprise Value	(190,298,828)										
Less: Net debt	392,541,000										
Equity Value	(582,839,828)										
Diluted Shares Outstanding	12,300,000										
Equity Value Per Share	(47.39)										
	<i>Overvalued</i>										

Appendix 25. DCF Valuation of BGG

Valuation Date:	9-Apr-17										
Share Price on Valuation Date:	21										
Diluted Shares Outstanding:	43,200,000	Raw Data	43								

Select Operating Data											
	2010	2011	2012	2013	2014	2015	Projected Annual Forecast				
	2016	2017	2018	2019	2020						
Currency: Dollar (\$)											
Revenue	2,027,872,000	2,109,998,000	2,066,533,000	1,862,498,000	1,859,060,000	1,894,750,000	1,808,778,000	1,825,622,712	1,842,624,294	1,859,784,208	1,877,103,929
Revenue Growth Rate (%)		4.05%	-2.06%		-0.18%	1.92%		0.93%	0.93%	0.93%	0.93%
EBITDA											
EBITDA Margin (%)											
EBIT	75,542,000	55,372,000	48,415,000	(33,622,000)	55,600,000	76,490,000	55,389,000	44,276,548	44,688,884	45,105,061	45,525,114
EBIT Margin (%)	3.73%	2.62%	2.34%	-1.81%	2.99%	4.04%	3.06%	2.43%	2.43%	2.43%	2.43%
Depreciation & Amortization	66,232,000	61,828,000	63,714,000	55,752,000	50,343,000	52,260,000	54,400,000	54,107,655	54,611,546	55,120,130	55,633,451
D&A as a % of revenue	3.27%	2.93%	3.08%	2.99%	2.71%	2.76%	3.01%	2.96%	2.96%	2.96%	2.96%

Select Balance Sheet And Other Data											
	2010	2011	2012	2013	2014	2015	Projected Annual Forecast				
	2016	2017	2018	2019	2020						
Cash	116,554,000	209,639,000	156,075,000	188,445,000	194,668,000	118,390,000	89,839,000	89,839,000	89,839,000	89,839,000	89,839,000
Accounts Receivable	286,426,000	249,358,000	223,996,000	190,800,000	220,590,000	215,841,000	191,678,000	193,779,702	195,904,448	198,052,492	200,224,089
Inventories	400,346,000	427,091,000	433,684,000	408,095,000	376,103,000	378,688,000	386,065,000	389,894,104	393,761,187	397,666,625	401,610,797
Prepaid Expenses											
Accounts Payable	171,495,000	183,733,000	151,153,000	143,189,000	169,271,000	182,676,000	181,152,000	184,000,633	186,894,060	189,832,988	192,818,130
Accrued Expenses	185,600,000	157,700,000	151,800,000	131,300,000	133,900,000	152,400,000	137,100,000	137,790,925	138,485,332	139,183,238	139,884,662
Accrued Expenses (Raw data)	185.60	157.70	151.80	131.30	133.90	152.40	137.10				
Debt							221,339,000				
Accrued Expenses (Reverse data)	137	152	134	131	152	158	186				
Gross PP&E (increases annual be CA	337,763,000	329,225,000	301,249,000	287,195,000	297,007,000	314,838,000	326,273,000	330,096,287	333,964,376	337,877,792	341,837,065
Accounts Receivable Growth (%)			-10.17%		15.61%	-2.15%		1.10%	1.10%	1.10%	1.10%
Inventories Growth (%)		6.68%	1.54%	-5.90%		0.69%	1.95%	0.99%	0.99%	0.99%	0.99%
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)		7.14%	-17.73%	-5.27%	18.22%	7.92%	-0.83%	1.57%	1.57%	1.57%	1.57%
Accrued Expenses Growth (%)			-3.74%		1.98%	13.82%	-10.04%	0.50%	0.50%	0.50%	0.50%
Capital Expenditures Growth (%)		-2.53%		-4.67%	3.42%	6.00%	3.63%	1.17%	1.17%	1.17%	1.17%

Free Cash Flow Buildup											
	2010	2011	2012	2013	2014	2015	Projected Annual Forecast				
	2016	2017	2018	2019	2020						
Period							1	2	3	4	5
Total Revenues							1,808,778,000	1,825,622,712	1,842,624,294	1,859,784,208	1,877,103,929
EBITDA							-	-	-	-	-
EBIT							55,389,000	44,276,548	44,688,884	45,105,061	45,525,114
Tax rate							40%	40%	40%	40%	40%
EBIAT							33,233,400	26,565,929	26,813,331	27,063,037	27,315,068
Depreciation & Amortization							54,400,000	54,107,655	54,611,546	55,120,130	55,633,451
Accounts receivable							24,163,000	(2,101,702)	(2,124,747)	(2,148,044)	(2,171,597)
Inventories							(7,377,000)	(3,829,104)	(3,867,083)	(3,905,437)	(3,944,173)
Prepaid expenses							-	-	-	-	-
Accounts payable							(1,524,000)	2,848,633	2,893,428	2,938,927	2,985,142
Accrued expenses							(15,300,000)	690,925	694,407	697,906	701,424
Capital expenditures							(11,435,000)	(3,823,287)	(3,868,089)	(3,913,415)	(3,959,273)
Unlevered free cash flows							76,160,400	74,459,047	75,152,793	75,853,104	76,560,042
Discount Rate (WACC)							5.46%	5.46%	5.46%	5.46%	5.46%
Present value of free cash flows							72,217,706	66,949,358	64,074,989	61,324,108	58,691,406
Sum of present values of FCFs							323,257,566				

Terminal Value	
Growth in perpetuity method:	
Long term growth rate	0.93%
WACC	5.46%
Free cash flow (t+1)	59,237,985
Terminal Value	1,308,207,122
Present Value of Terminal Value	1,002,879,747

WACC			
Share Price	21		
Diluted Shares Outstanding	43,200,000		
Cost of Debt	3.30%		
Tax Rate	40.00%		
After-tax Cost of Debt	1.98%		
Cost of Equity	6.29%		
	RF	Beta	RM-RF
		2.38	1.22
			3.20
Total Debt (\$)	221,339,000		
Total Equity (\$)	925,344,000		
Total Capital	1,146,683,000		
Debt Weighting	19.30%		
Equity Weighting	80.70%		
WACC =	5.46%		

Enterprise Value to Equity Value	
Enterprise Value	1,326,137,313
Less: Net debt	131,500,000
Equity Value	1,194,637,313
Diluted Shares Outstanding	43,200,000
Equity Value Per Share	27.65
	Undervalued

Appendix 30. DCF Valuation of NOV

Valuation Date:	9-Apr-17									
Share Price on Valuation Date:	39									
Diluted Shares Outstanding:	376,000,000	Raw Data		376						

Select Operating Data							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Currency: Dollar (\$)											
Revenue	12,156,000,000	14,658,000,000	17,194,000,000	19,221,000,000	21,440,000,000	14,757,000,000	7,251,000,000	7,686,734,529	8,148,653,664	8,638,330,917	9,157,434,358
Revenue Growth Rate (%)		20.58%	17.30%	11.79%	11.54%	-31.17%		6.01%	6.01%	6.01%	6.01%
EBITDA											
EBITDA Margin (%)											
EBIT	2,455,000,000	2,971,000,000	3,505,000,000	3,381,000,000	3,646,000,000	(488,000,000)	(2,514,000,000)	631,051,795	668,973,607	709,174,255	751,790,681
EBIT Margin (%)	20.20%	20.27%	20.39%	17.59%	17.01%	-3.31%	-34.67%	8.21%	8.21%	8.21%	8.21%
Depreciation & Amortization	507,000,000	555,000,000	616,000,000	738,000,000	778,000,000	747,000,000	703,000,000	370,777,920	393,059,087	416,679,197	441,718,710
D&A as a % of revenue	4.17%	3.79%	3.58%	3.84%	3.63%	5.06%	9.70%	4.82%	4.82%	4.82%	4.82%

Select Balance Sheet And Other Data							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cash	3,333,000,000	3,535,000,000	3,319,000,000	3,436,000,000	3,536,000,000	2,080,000,000	1,408,000,000	1,408,000,000	1,408,000,000	1,408,000,000	1,408,000,000
Accounts Receivable	3,240,000,000	3,884,000,000	5,545,000,000	6,435,000,000	6,294,000,000	4,176,000,000	2,748,000,000	2,787,638,017	2,827,847,786	2,868,637,552	2,910,015,684
Inventories	3,388,000,000	4,030,000,000	5,891,000,000	5,603,000,000	5,281,000,000	4,678,000,000	3,325,000,000	3,403,421,507	3,483,692,618	3,565,856,957	3,649,959,175
Prepaid Expenses											
Accounts Payable	628,000,000	901,000,000	1,200,000,000	1,275,000,000	1,189,000,000	623,000,000	414,000,000	449,284,589	487,576,429	529,131,825	574,228,923
Accrued Expenses	2,105,000,000	2,376,000,000	2,571,000,000	2,763,000,000	3,518,000,000	2,284,000,000	1,568,000,000	1,644,913,382	1,725,599,512	1,810,243,449	1,899,039,333
Accrued Expenses (Raw data)	2,105.00	2,376.00	2,571.00	2,763.00	3,518.00	2,284.00	1,568.00				
Debt							3,214,000,000				
Accrued Expenses (Reverse data)	1,568	2,284	3,518	2,763	2,571	2,376	2,105				
Gross PP&E (increases annual be CA	1,840,000,000	2,445,000,000	2,945,000,000	3,408,000,000	3,362,000,000	3,124,000,000	3,150,000,000	3,472,640,199	3,828,326,969	4,220,445,120	4,652,726,152
Accounts Receivable Growth (%)		19.88%	42.77%	16.05%	-2.19%	-33.65%	-34.20%	1.44%	1.44%	1.44%	1.44%
Inventories Growth (%)		18.95%	46.18%	-4.89%	-5.75%	-11.42%	-28.92%	2.36%	2.36%	2.36%	2.36%
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)		43.47%	33.19%	6.25%	-6.75%		-33.55%	8.52%	8.52%	8.52%	8.52%
Accrued Expenses Growth (%)		12.87%	8.21%	7.47%	27.33%		-31.35%	4.91%	4.91%	4.91%	4.91%
Capital Expenditures Growth (%)		32.88%	20.45%	15.72%	-1.35%	-7.08%	0.83%	10.24%	10.24%	10.24%	10.24%

Free Cash Flow Buildup							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Period							1	2	3	4	5
Total Revenues							7,251,000,000	7,686,734,529	8,148,653,664	8,638,330,917	9,157,434,358
EBITDA							-	-	-	-	-
EBIT							(2,514,000,000)	631,051,795	668,973,607	709,174,255	751,790,681
Tax rate							40%	40%	40%	40%	40%
EBIAT							(1,508,400,000)	378,631,077	401,384,164	425,504,553	451,074,409
Depreciation & Amortization							703,000,000	370,777,920	393,059,087	416,679,197	441,718,710
Accounts receivable							1,428,000,000	(39,638,017)	(40,209,768)	(40,789,767)	(41,378,131)
Inventories							1,353,000,000	(78,421,507)	(80,271,111)	(82,164,338)	(84,102,219)
Prepaid expenses							-	-	-	-	-
Accounts payable							(209,000,000)	35,284,589	38,291,840	41,555,396	45,097,099
Accrued expenses							(716,000,000)	76,913,382	80,686,130	84,643,938	88,795,884
Capital expenditures							(26,000,000)	(322,640,199)	(355,686,770)	(392,118,151)	(432,281,033)
Unlevered free cash flows							1,024,600,000	420,907,244	437,253,572	453,310,827	468,924,719
Discount Rate (WACC)							5.90%	5.90%	5.90%	5.90%	5.90%
Present value of free cash flows							967,486,138	375,290,179	368,132,843	360,377,519	352,010,101
Sum of present values of FCFs							2,423,296,780				

Terminal Value	
Growth in perpetuity method:	
Long term growth rate	2.60%
WACC	5.90%
Free cash flow (t+1)	361,162,363
Terminal Value	10,933,294,198
Present Value of Terminal Value	8,207,351,491

WACC	
Share Price	39
Diluted Shares Outstanding	376,000,000
Cost of Debt	3.30%
Tax Rate	40.00%
After-tax Cost of Debt	1.98%
Cost of Equity	6.77%
	RF Beta RM-RF
	2.38 1.37 3.20
Total Debt (\$)	3,214,000,000
Total Equity (\$)	14,622,640,000
Total Capital	17,836,640,000
Debt Weighting	18.02%
Equity Weighting	81.98%
WACC =	5.90%

Enterprise Value to Equity Value	
Enterprise Value	10,630,648,271
Less: Net debt	1,806,000,000
Equity Value	8,824,648,271
Diluted Shares Outstanding	376,000,000
Equity Value Per Share	23.47
	Overvalued

Appendix 32. DCF Valuation of ALE

Valuation Date:	10-Apr-17										
Share Price on Valuation Date:	69										
Diluted Shares Outstanding:	49,500,000	Raw Data	50								
Select Operating Data											
							Projected Annual Forecast				
Currency: Dollar (\$)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue	907,000,000	928,200,000	961,200,000	1,018,400,000	1,136,800,000	1,486,400,000	1,339,700,000	1,438,733,140	1,545,086,995	1,659,302,726	1,781,961,500
Revenue Growth Rate (%)		2.34%	3.56%	5.95%	11.63%	30.75%	-9.87%	7.39%	7.39%	7.39%	7.39%
EBITDA											
EBITDA Margin (%)											
EBIT	158,800,000	173,000,000	180,600,000	183,700,000	216,300,000	231,300,000	245,400,000	258,723,929	277,849,288	298,388,429	320,445,862
EBIT Margin (%)	17.51%	18.64%	18.79%	18.04%	19.03%	15.56%	18.32%	17.98%	17.98%	17.98%	17.98%
Depreciation & Amortization	80,500,000	90,400,000	101,200,000	116,600,000	135,700,000	165,900,000	190,600,000	160,147,048	171,985,419	184,698,904	198,352,194
D&A as a % of revenue	8.88%	9.74%	10.53%	11.45%	11.94%	11.16%	14.23%	11.13%	11.13%	11.13%	11.13%
Select Balance Sheet And Other Data											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cash	44,900,000	101,100,000	80,800,000	97,300,000	145,800,000	97,000,000	27,500,000	27,500,000	27,500,000	27,500,000	27,500,000
Accounts Receivable	99,500,000	79,700,000	89,000,000	96,300,000	103,000,000	121,200,000	122,500,000	127,741,253	133,206,757	138,906,106	144,849,306
Inventories	60,000,000	69,100,000	69,800,000	59,300,000	80,500,000	117,100,000	104,200,000	116,588,815	130,450,593	145,960,461	163,314,368
Prepaid Expenses											
Accounts Payable	75,400,000	71,800,000	90,500,000	99,900,000	134,100,000	88,800,000	74,000,000	75,904,708	77,858,442	79,862,464	81,918,068
Accrued Expenses	-	-	-	-	-	-	-	-	-	-	-
Accrued Expenses (Raw data)	661.20	607.30	576.20	523.40	561.50	563.00	566.30	-	-	-	-
Debt							1,558,100,000				
Accrued Expenses (Reverse data)	566	563	562	529	576	607	661				
Gross PP&E (increases annual be CA	1,805,600,000	1,982,700,000	2,347,600,000	2,576,500,000	3,284,800,000	3,669,100,000	3,741,200,000	4,234,527,961	4,792,907,905	5,424,917,817	6,140,266,808
Accounts Receivable Growth (%)		-19.90%	11.67%	8.20%	6.96%	17.67%	1.07%	4.28%	4.28%	4.28%	4.28%
Inventories Growth (%)		15.17%	1.01%	-15.04%	35.75%	45.47%	-11.02%	11.89%	11.89%	11.89%	11.89%
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)		-4.77%	26.04%	10.39%	34.23%	-33.78%	-16.67%	2.57%	2.57%	2.57%	2.57%
Accrued Expenses Growth (%)											
Capital Expenditures Growth (%)		9.81%	18.40%	9.75%	27.49%	11.70%	1.97%	13.19%	13.19%	13.19%	13.19%
Free Cash Flow Buildup											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Period							1	2	3	4	5
Total Revenues							1,339,700,000	1,438,733,140	1,545,086,995	1,659,302,726	1,781,961,500
EBITDA							-	-	-	-	-
EBIT							245,400,000	258,723,929	277,849,288	298,388,429	320,445,862
Tax rate							40%	40%	40%	40%	40%
EBIAT							147,240,000	155,234,358	166,709,573	179,033,057	192,267,517
Depreciation & Amortization							190,600,000	160,147,048	171,985,419	184,698,904	198,352,194
Accounts receivable							(1,300,000)	(5,241,253)	(5,465,504)	(5,699,349)	(5,943,200)
Inventories							12,900,000	(12,388,815)	(13,861,778)	(15,509,868)	(17,353,907)
Prepaid expenses							-	-	-	-	-
Accounts payable							(14,800,000)	1,904,708	1,953,734	2,004,022	2,055,604
Accrued expenses							-	-	-	-	-
Capital expenditures							(72,100,000)	(493,327,961)	(558,379,944)	(632,009,912)	(715,348,991)
Unlevered free cash flows							262,540,000	(193,671,915)	(237,058,500)	(287,483,147)	(345,970,784)
Discount Rate (WACC)							3.71%	3.71%	3.71%	3.71%	3.71%
Present value of free cash flows							253,138,199	(180,049,142)	(212,491,786)	(248,462,706)	(288,303,856)
Sum of present values of FCFs							(676,169,291)				
Terminal Value											
Growth in perpetuity method:											
Long term growth rate		2.60%									
WACC		3.71%									
Free cash flow (t+1)		(295,799,757)									
Terminal Value		(26,550,603,905)									
Present Value of Terminal Value		(22,125,109,552)									
WACC											
Share Price	69										
Diluted Shares Outstanding	49,500,000										
Cost of Debt	3.30%										
Tax Rate	40.00%										
After-tax Cost of Debt	1.98%										
Cost of Equity	4.51%										
			RF	Beta	RM-RF						
				2.38	0.67	3.20					
Total Debt (\$)	1,558,100,000										
Total Equity (\$)	3,400,650,000										
Total Capital	4,958,750,000										
Debt Weighting	31.42%										
Equity Weighting	68.58%										
WACC =	3.71%										
Enterprise Value to Equity Value											
Enterprise Value	(22,801,278,843)										
Less: Net debt	1,530,600,000										
Equity Value	(24,331,878,843)										
Diluted Shares Outstanding	49,500,000										
Equity Value Per Share	(491.55)										
	<i>Overvalued</i>										

Appendix 33. DCF Valuation of CEL

Valuation Date:	10-Apr-17										
Share Price on Valuation Date:	10										
Diluted Shares Outstanding:	100,698,306 Raw Data										
Select Operating Data											
							Projected Annual Forecast				
Currency: Dollar (\$)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue	6,662,000,000	6,506,000,000	5,938,000,000	4,927,000,000	4,570,000,000	4,180,000,000	4,027,000,000	4,027,000,000	4,027,000,000	4,027,000,000	4,027,000,000
Revenue Growth Rate (%)		-2.34%	-8.73%	-17.03%	-7.25%	-8.53%	-3.66%	0.00%	0.00%	0.00%	0.00%
EBITDA											
EBITDA Margin (%)											
EBIT	1,938,000,000	1,421,000,000	984,000,000	650,000,000	659,000,000	308,000,000	308,000,000	633,576,623	633,576,623	633,576,623	633,576,623
EBIT Margin (%)	29.09%	21.84%	16.57%	13.19%	14.42%	7.37%	7.65%	15.73%	15.73%	15.73%	15.73%
Depreciation & Amortization	724,000,000	738,000,000	765,000,000	676,000,000	610,000,000	562,000,000	534,000,000	511,243,838	511,243,838	511,243,838	511,243,838
D&A as a % of revenue	10.87%	11.34%	12.88%	13.72%	13.35%	13.44%	13.26%	12.70%	12.70%	12.70%	12.70%
Select Balance Sheet And Other Data											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cash	533,000,000	920,000,000	1,414,000,000	1,057,000,000	1,158,000,000	761,000,000	1,240,000,000	1,240,000,000	1,240,000,000	1,240,000,000	1,240,000,000
Accounts Receivable	2,139,000,000	3,289,000,000	3,142,000,000	2,648,000,000	2,306,000,000	2,143,000,000	2,182,000,000	2,238,031,874	2,295,502,598	2,354,449,121	2,414,909,339
Inventories	104,000,000	170,000,000	112,000,000	84,000,000	89,000,000	85,000,000	64,000,000	65,947,348	67,953,948	70,021,604	72,152,173
Prepaid Expenses											
Accounts Payable	1,095,000,000	1,573,000,000	1,319,000,000	980,000,000	1,143,000,000	963,000,000	954,000,000	956,789,230	959,586,614	962,392,177	965,205,943
Accrued Expenses	-	-	-	-	-	-	-	-	-	-	-
Accrued Expenses (Raw data)	661.20	607.30	576.20	523.40	561.50	563.00	566.30	-	-	-	-
Debt							4,069,000,000				
Accrued Expenses (Reverse data)	566	563	562	529	576	607	661				
Gross PP&E (increases annual be C	2,063,000,000	2,168,000,000	2,077,000,000	1,865,000,000	1,834,000,000	1,745,000,000	1,659,000,000	1,687,430,920	1,716,349,072	1,745,762,806	1,775,680,614
Accounts Receivable Growth (%)		53.76%	-4.47%	-15.72%	-12.92%	-7.07%	1.82%	2.57%	2.57%	2.57%	2.57%
Inventories Growth (%)		63.46%		-25.00%	5.95%	-4.49%	-24.71%	3.04%	3.04%	3.04%	3.04%
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)		43.65%	-16.15%	-25.70%	16.63%	-15.75%	-0.93%	0.29%	0.29%	0.29%	0.29%
Accrued Expenses Growth (%)											
Capital Expenditures Growth (%)		5.09%			-1.66%			1.71%	1.71%	1.71%	1.71%
Free Cash Flow Buildup											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Period							1	2	3	4	5
Total Revenues							4,027,000,000	4,027,000,000	4,027,000,000	4,027,000,000	4,027,000,000
EBITDA							-	-	-	-	-
EBIT							308,000,000	633,576,623	633,576,623	633,576,623	633,576,623
Tax rate							40%	40%	40%	40%	40%
EBIAT							184,800,000	380,145,974	380,145,974	380,145,974	380,145,974
Depreciation & Amortization							534,000,000	511,243,838	511,243,838	511,243,838	511,243,838
Accounts receivable							(39,000,000)	(56,031,874)	(57,470,724)	(58,946,523)	(60,460,218)
Inventories							21,000,000	(1,947,348)	(2,006,600)	(2,067,656)	(2,130,569)
Prepaid expenses							-	-	-	-	-
Accounts payable							(9,000,000)	2,789,230	2,797,384	2,805,563	2,813,766
Accrued expenses							-	-	-	-	-
Capital expenditures							86,000,000	(28,430,920)	(28,918,152)	(29,413,733)	(29,917,808)
Unlevered free cash flows							777,800,000	807,768,899	805,791,720	803,767,463	801,694,982
Discount Rate (WACC)							2.70%	2.70%	2.70%	2.70%	2.70%
Present value of free cash flows							757,379,699	765,911,464	743,977,778	722,625,539	701,839,443
Sum of present values of FCFs							3,691,733,924				
Terminal Value											
Growth in perpetuity method:											
Long term growth rate							0.00%				
WACC							2.70%				
Free cash flow (t+1)							701,839,443				
Terminal Value							26,030,906,563				
Present Value of Terminal Value							22,788,613,324				
WACC											
Share Price	10										
Diluted Shares Outstanding	100,698,306										
Cost of Debt	3.30%										
Tax Rate	40.00%										
After-tax Cost of Debt	1.98%										
Cost of Equity	5.50%										
			RF	Beta	RM-RF						
				2.38	0.97	3.20					
Total Debt (\$)	4,069,000,000										
Total Equity (\$)	1,040,213,501										
Total Capital	5,109,213,501										
Debt Weighting	79.64%										
Equity Weighting	20.36%										
WACC =	2.70%										
Enterprise Value to Equity Value											
Enterprise Value	26,480,347,248										
Less: Net debt	2,829,000,000										
Equity Value	23,651,347,248										
Diluted Shares Outstanding	100,698,306										
Equity Value Per Share	234.87										
	Undervalued										

Appendix 34. DCF Valuation of IDT

Valuation Date:	10-Apr-17										
Share Price on Valuation Date:	13										
Diluted Shares Outstanding:	22,800,000	Raw Data								23	

Select Operating Data											
	2010	2011	2012	2013	2014	2015	Projected Annual Forecast				
Currency: Dollar (\$)							2016	2017	2018	2019	2020
Revenue	1,193,578,000	1,351,416,000	1,506,283,000	1,620,617,000	1,651,541,000	1,596,777,000	1,496,261,000	1,557,536,174	1,621,320,700	1,687,717,344	1,756,833,075
Revenue Growth Rate (%)		13.22%	11.46%	7.59%	1.91%	-3.32%	-6.29%	4.10%	4.10%	4.10%	4.10%
EBITDA											
EBITDA Margin (%)											
EBIT	16,156,000	17,122,000	(1,149,000)	28,303,000	22,914,000	90,737,000	26,408,000	29,205,074	30,401,086	31,646,077	32,942,054
EBIT Margin (%)	1.35%	1.27%	-0.08%	1.75%	1.39%	5.68%	1.76%	1.88%	1.88%	1.88%	1.88%
Depreciation & Amortization	33,341,000	20,952,000	16,648,000	14,910,000	16,318,000	18,418,000	20,535,000	21,989,993	22,890,531	23,827,949	24,803,755
D&A as a % of revenue	2.79%	1.55%	1.11%	0.92%	0.99%	1.15%	1.37%	1.41%	1.41%	1.41%	1.41%

Select Balance Sheet And Other Data											
	2010	2011	2012	2013	2014	2015	Projected Annual Forecast				
Cash	233,884,000	228,096,000	161,541,000	186,588,000	219,529,000	201,396,000	208,359,000	208,359,000	208,359,000	208,359,000	208,359,000
Accounts Receivable	105,232,000	100,146,000	83,017,000	65,078,000	69,330,000	67,014,000	49,283,000	50,069,841	50,869,244	51,681,410	52,506,544
Inventories	-	-	-	-	-	-	-	-	-	-	-
Prepaid Expenses	-	-	-	-	-	-	-	-	-	-	-
Accounts Payable	52,957,000	40,802,000	39,844,000	41,160,000	42,135,000	29,140,000	30,253,000	30,793,262	31,343,172	31,902,903	32,472,629
Accrued Expenses	143,800,000	166,600,000	160,100,000	145,400,000	142,500,000	139,300,000	117,400,000	119,663,966	121,971,590	124,323,715	126,721,199
Accrued Expenses (Raw data)	143.80	166.60	160.10	145.40	142.50	139.30	117.40				
Debt	-	-	-	-	-	-	-	-	-	-	-
Accrued Expenses (Reverse data)	117	139	143	145	160	167	144				
Gross PP&E (increases annual be C	96,892,000	90,471,000	85,567,000	80,742,000	81,760,000	91,316,000	87,374,000	88,075,455	88,782,541	89,495,303	90,213,788
Accounts Receivable Growth (%)					6.53%	-3.34%		1.60%	1.60%	1.60%	1.60%
Inventories Growth (%)											
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)			-2.35%	3.30%	2.37%		3.82%	1.79%	1.79%	1.79%	1.79%
Accrued Expenses Growth (%)		15.86%	-3.90%		-1.99%	-2.25%		1.93%	1.93%	1.93%	1.93%
Capital Expenditures Growth (%)			-5.42%		1.26%	11.69%	-4.32%	0.80%	0.80%	0.80%	0.80%

Free Cash Flow Buildup											
	2010	2011	2012	2013	2014	2015	Projected Annual Forecast				
Period							2016	2017	2018	2019	2020
Total Revenues							1	2	3	4	5
EBITDA							1,496,261,000	1,557,536,174	1,621,320,700	1,687,717,344	1,756,833,075
EBIT							-	-	-	-	-
Tax rate							26,408,000	29,205,074	30,401,086	31,646,077	32,942,054
EBIAT							40%	40%	40%	40%	40%
Depreciation & Amortization							15,844,800	17,523,044	18,240,652	18,987,646	19,765,232
Accounts receivable							20,535,000	21,989,993	22,890,531	23,827,949	24,803,755
Inventories							17,731,000	(786,841)	(799,403)	(812,166)	(825,133)
Prepaid expenses							-	-	-	-	-
Accounts payable							1,113,000	540,262	549,910	559,731	569,726
Accrued expenses							(21,900,000)	2,263,966	2,307,624	2,352,125	2,397,484
Capital expenditures							3,942,000	(701,455)	(707,086)	(712,763)	(718,485)
Unlevered free cash flows							37,265,800	40,828,970	42,482,228	44,202,522	45,992,580
Discount Rate (WACC)							6.47%	6.47%	6.47%	6.47%	6.47%
Present value of free cash flows							35,002,720	36,020,614	35,203,134	34,404,277	33,623,622
Sum of present values of FCFs							174,254,367				

Terminal Value	
Growth in perpetuity method:	
Long term growth rate	2.60%
WACC	6.47%
Free cash flow (t+1)	34,497,837
Terminal Value	892,468,499
Present Value of Terminal Value	652,453,589

WACC			
Share Price	13		
Diluted Shares Outstanding	22,800,000		
Cost of Debt	3.30%		
Tax Rate	40.00%		
After-tax Cost of Debt	1.98%		
Cost of Equity	6.47%		
	RF	Beta	RM-RF
		2.38	1.28
			3.20
Total Debt (\$)	-		
Total Equity (\$)	301,188,000		
Total Capital	301,188,000		
Debt Weighting	0.00%		
Equity Weighting	100.00%		
WACC =	6.47%		

Enterprise Value to Equity Value	
Enterprise Value	826,707,956
Less: Net debt	(208,359,000)
Equity Value	1,035,066,956
Diluted Shares Outstanding	22,800,000
Equity Value Per Share	45.40
	Undervalued

Appendix 35. DCF Valuation of UTL

Valuation Date:	10-Apr-17										
Share Price on Valuation Date:	45										
Diluted Shares Outstanding:	14,000,000	Raw Data	14								
Select Operating Data											
							Projected Annual Forecast				
Currency: Dollar (\$)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue	358,400,000	352,800,000	353,100,000	366,900,000	425,800,000	426,800,000	383,400,000	388,863,674	394,405,209	400,025,713	405,726,314
Revenue Growth Rate (%)		-1.56%	0.09%	3.91%	16.05%	0.23%	-10.17%	1.43%	1.43%	1.43%	1.43%
EBITDA											
EBITDA Margin (%)											
EBIT	32,200,000	46,800,000	47,300,000	53,100,000	59,600,000	63,600,000	65,000,000	53,313,363	54,073,110	54,843,683	55,625,238
EBIT Margin (%)	8.98%	13.27%	13.40%	14.47%	14.00%	14.90%	16.95%	13.71%	13.71%	13.71%	13.71%
Depreciation & Amortization	28,900,000	29,300,000	36,000,000	38,500,000	42,100,000	45,700,000	46,600,000	38,778,935	39,331,558	39,892,055	40,460,541
D&A as a % of revenue	8.06%	8.30%	10.20%	10.49%	9.89%	10.71%	12.15%	9.97%	9.97%	9.97%	9.97%
Select Balance Sheet And Other Data											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cash	8,900,000	7,500,000	9,800,000	9,400,000	8,400,000	8,700,000	5,800,000	5,800,000	5,800,000	5,800,000	5,800,000
Accounts Receivable	83,600,000	98,400,000	120,500,000	119,600,000	124,200,000	99,300,000	110,700,000	117,101,046	123,872,223	131,034,931	138,611,812
Inventories	13,500,000	18,400,000	5,200,000	6,200,000	1,100,000	800,000	600,000	604,882	609,803	614,764	619,766
Prepaid Expenses											
Accounts Payable	26,500,000	26,400,000	35,800,000	41,200,000	44,200,000	36,700,000	32,400,000	33,961,092	35,597,400	37,312,548	39,110,336
Accrued Expenses	-	-	-	-	-	-	-	-	-	-	-
Accrued Expenses (Raw data)	-	-	-	-	-	-	-	-	-	-	-
Debt							426,800,000				
Accrued Expenses (Reverse data)	-	-	-	-	-	-	-	-	-	-	-
Gross PP&E (increases annual be CA	476,500,000	557,200,000	601,200,000	665,600,000	733,700,000	808,900,000	883,400,000	979,448,190	1,085,939,276	1,204,008,669	1,334,915,226
Accounts Receivable Growth (%)		17.70%	22.46%	-0.75%	3.85%	-20.05%	11.48%	5.78%	5.78%	5.78%	5.78%
Inventories Growth (%)		36.30%	19.23%		-27.27%		-25.00%	0.81%	0.81%	0.81%	0.81%
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)		-0.38%	35.61%	15.08%	7.28%	-16.97%	-11.72%	4.82%	4.82%	4.82%	4.82%
Accrued Expenses Growth (%)											
Capital Expenditures Growth (%)		16.94%	7.90%	10.71%	10.23%	10.25%	9.21%	10.87%	10.87%	10.87%	10.87%
Free Cash Flow Buildup											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Period							1	2	3	4	5
Total Revenues							383,400,000	388,863,674	394,405,209	400,025,713	405,726,314
EBITDA							-	-	-	-	-
EBIT							65,000,000	53,313,363	54,073,110	54,843,683	55,625,238
Tax rate							40%	40%	40%	40%	40%
EBIAT							39,000,000	31,988,018	32,443,866	32,906,210	33,375,143
Depreciation & Amortization							46,600,000	38,778,935	39,331,558	39,892,055	40,460,541
Accounts receivable							(11,400,000)	(6,401,046)	(6,771,176)	(7,162,709)	(7,576,880)
Inventories							200,000	(4,882)	(4,921)	(4,961)	(5,002)
Prepaid expenses							-	-	-	-	-
Accounts payable							(4,300,000)	1,561,092	1,636,308	1,715,148	1,797,787
Accrued expenses							-	-	-	-	-
Capital expenditures							(74,500,000)	(96,048,190)	(106,491,086)	(118,069,393)	(130,906,558)
Unlevered free cash flows							(4,400,000)	(30,126,073)	(39,855,452)	(50,723,649)	(62,854,969)
Discount Rate (WACC)							3.37%	3.37%	3.37%	3.37%	3.37%
Present value of free cash flows							(4,256,389)	(28,191,605)	(36,078,932)	(44,418,620)	(53,245,492)
Sum of present values of FCFs							(166,191,038)				
Terminal Value											
Growth in perpetuity method:											
Long term growth rate								1.43%			
WACC								3.37%			
Free cash flow (t+1)								(54,006,902)			
Terminal Value								(2,778,121,300)			
Present Value of Terminal Value								(2,353,392,841)			
WACC											
Share Price	45										
Diluted Shares Outstanding	14,000,000										
Cost of Debt	3.30%										
Tax Rate	40.00%										
After-tax Cost of Debt	1.98%										
Cost of Equity	4.31%										
			RF	Beta	RM-RF						
				2.38	0.60	3.20					
Total Debt (\$)	426,800,000										
Total Equity (\$)	636,300,000										
Total Capital	1,063,100,000										
Debt Weighting	40.15%										
Equity Weighting	59.85%										
WACC =	3.37%										
Enterprise Value to Equity Value											
Enterprise Value	(2,519,583,880)										
Less: Net debt	421,000,000										
Equity Value	(2,940,583,880)										
Diluted Shares Outstanding	14,000,000										
Equity Value Per Share	(210.04)										
	<i>Overvalued</i>										

Appendix 36. DCF Valuation of WGL

Valuation Date:	10-Apr-17										
Share Price on Valuation Date:	82										
Diluted Shares Outstanding:	50,600,000	Raw Data								51	

Select Operating Data											
	2010	2011	2012	2013	2014	2015	Projected Annual Forecast				
	2016	2017	2018	2019	2020						
Currency: Dollar (\$)											
Revenue	2,708,876,000	2,751,501,000	2,425,310,000	2,466,138,000	2,780,947,000	2,659,830,000	2,349,559,000	2,349,567,908	2,349,576,816	2,349,585,723	2,349,594,631
Revenue Growth Rate (%)		1.57%			1.68%	12.77%	-4.36%	-11.67%	0.00%	0.00%	0.00%
EBITDA											
EBITDA Margin (%)											
EBIT	347,625,000	392,487,000	406,370,000	315,692,000	353,448,000	419,058,000	465,953,000	352,267,148	352,268,484	352,269,819	352,271,155
EBIT Margin (%)	12.83%	14.26%	16.76%	12.80%	12.71%	15.76%	19.83%	14.99%	14.99%	14.99%	14.99%
Depreciation & Amortization	94,011,000	91,325,000	96,476,000	103,284,000	110,772,000	121,892,000	132,566,000	97,888,568	97,888,939	97,889,310	97,889,681
D&A as a % of revenue	3.47%	3.32%	3.98%	4.19%	3.98%	4.58%	5.64%	4.17%	4.17%	4.17%	4.17%

Select Balance Sheet And Other Data											
	2010	2011	2012	2013	2014	2015	Projected Annual Forecast				
	2016	2017	2018	2019	2020						
Cash	4,390,000	1,353,000	1,000	-	1,060,000	6,733,000	5,573,000	5,573,000	5,573,000	5,573,000	5,573,000
Accounts Receivable	102,800,000	115,334,000	148,052,000	111,323,000	131,664,000	358,491,000	491,020,000	560,738,066	640,355,135	731,276,730	835,107,936
Inventories	193,861,000	193,115,000	138,623,000	157,083,000	179,683,000	232,845,000	225,546,000	235,151,870	245,166,848	255,608,358	266,494,566
Prepaid Expenses											
Accounts Payable	152,040,000	158,878,000	186,560,000	170,428,000	249,442,000	346,237,000	423,259,000	508,394,738	610,654,964	733,484,156	881,019,624
Accrued Expenses	-	-	-	-	20,000,000	21,100,000	17,900,000	17,900,000	17,900,000	17,900,000	17,900,000
Accrued Expenses (Raw data)	-	-	-	-	20.00	21.10	17.90				
Debt							1,766,430,000				
Accrued Expenses (Reverse data)	18	21	20	-	-	-	-				
Gross PP&E (increases annual be C	2,329,528,000	2,448,574,000	2,574,396,000	2,724,882,000	3,022,064,000	3,672,728,000	4,127,237,000	4,546,194,912	5,007,681,453	5,516,013,727	6,075,947,066
Accounts Receivable Growth (%)		12.19%	28.37%	-24.81%	18.27%		36.97%	14.20%	14.20%	14.20%	14.20%
Inventories Growth (%)		-0.38%	-28.22%	13.32%	14.39%	29.59%	-3.13%	4.26%	4.26%	4.26%	4.26%
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)		4.50%	17.42%	-8.65%	46.36%	38.80%	22.25%	20.11%	20.11%	20.11%	20.11%
Accrued Expenses Growth (%)											
Capital Expenditures Growth (%)		5.11%	5.14%	5.85%	10.91%	21.53%	12.38%	10.15%	10.15%	10.15%	10.15%

Free Cash Flow Buildup											
	2010	2011	2012	2013	2014	2015	Projected Annual Forecast				
	2016	2017	2018	2019	2020						
Period							1	2	3	4	5
Total Revenues							2,349,559,000	2,349,567,908	2,349,576,816	2,349,585,723	2,349,594,631
EBITDA							-	-	-	-	-
EBIT							465,953,000	352,267,148	352,268,484	352,269,819	352,271,155
Tax rate							40%	40%	40%	40%	40%
EBIAT							279,571,800	211,360,289	211,361,090	211,361,892	211,362,693
Depreciation & Amortization							132,566,000	97,888,568	97,888,939	97,889,310	97,889,681
Accounts receivable							(132,529,000)	(69,718,066)	(79,617,069)	(90,921,595)	(103,831,207)
Inventories							7,299,000	(9,605,870)	(10,014,978)	(10,441,510)	(10,886,208)
Prepaid expenses							-	-	-	-	-
Accounts payable							77,022,000	85,135,738	102,260,226	122,829,192	147,535,468
Accrued expenses							(3,200,000)	-	-	-	-
Capital expenditures							(454,509,000)	(418,957,912)	(461,486,541)	(508,332,273)	(559,933,339)
Unlevered free cash flows							(93,779,200)	(103,897,253)	(139,608,333)	(177,614,985)	(217,862,911)
Discount Rate (WACC)							3.92%	3.92%	3.92%	3.92%	3.92%
Present value of free cash flows							(90,244,860)	(96,213,491)	(124,411,121)	(152,315,260)	(179,788,981)
Sum of present values of FCFs							(642,973,714)				

Terminal Value	
Growth in perpetuity method:	
Long term growth rate	0.00%
WACC	3.92%
Free cash flow (t+1)	(179,788,981)
Terminal Value	(4,590,682,612)
Present Value of Terminal Value	(3,788,410,542)

WACC			
Share Price	82		
Diluted Shares Outstanding	50,600,000		
Cost of Debt	3.30%		
Tax Rate	40.00%		
After-tax Cost of Debt	1.98%		
Cost of Equity	4.74%		
	RF	Beta	RM-RF
		2.38	0.74
			3.20
Total Debt (\$)	1,766,430,000		
Total Equity (\$)	4,147,176,000		
Total Capital	5,913,606,000		
Debt Weighting	29.87%		
Equity Weighting	70.13%		
WACC =	3.92%		

Enterprise Value to Equity Value	
Enterprise Value	(4,431,384,256)
Less: Net debt	1,760,857,000
Equity Value	(6,192,241,256)
Diluted Shares Outstanding	50,600,000
Equity Value Per Share	(122.38)
	Overvalued

Appendix 39. DCF Valuation of KMI

Valuation Date:	10-Apr-17										
Share Price on Valuation Date:	22										
Diluted Shares Outstanding:	2,230,000,000	Raw Data	2,230								
Select Operating Data											
							Projected Annual Forecast				
Currency: Dollar (\$)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue	7,852,000,000	7,943,000,000	9,973,000,000	14,070,000,000	16,226,000,000	14,403,000,000	13,058,000,000	14,419,230,103	15,922,361,522	17,582,186,748	19,415,040,315
Revenue Growth Rate (%)		1.16%	25.56%	41.08%	15.32%	-11.24%	-9.34%	10.42%	10.42%	10.42%	10.42%
EBITDA											
EBITDA Margin (%)											
EBIT	793,000,000	1,637,000,000	1,853,000,000	3,610,000,000	3,472,000,000	2,868,000,000	3,431,000,000	2,935,994,778	3,242,057,304	3,580,025,293	3,953,224,726
EBIT Margin (%)	10.10%	20.61%	18.58%	25.66%	21.40%	19.91%	26.28%	20.36%	20.36%	20.36%	20.36%
Depreciation & Amortization	1,079,000,000	1,092,000,000	1,426,000,000	1,806,000,000	2,040,000,000	2,309,000,000	2,209,000,000	2,062,871,350	2,277,915,199	2,515,376,276	2,777,591,462
D&A as a % of revenue	13.74%	13.75%	14.30%	12.84%	12.57%	16.03%	16.92%	14.31%	14.31%	14.31%	14.31%
Select Balance Sheet And Other Data											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cash	502,400,000	411,000,000	714,000,000	598,000,000	315,000,000	229,000,000	684,000,000	684,000,000	684,000,000	684,000,000	684,000,000
Accounts Receivable	971,400,000	914,000,000	1,333,000,000	1,721,000,000	1,641,000,000	1,315,000,000	1,370,000,000	1,481,218,528	1,601,465,932	1,731,475,189	1,872,038,781
Inventories	84,200,000	172,000,000	374,000,000	430,000,000	459,000,000	407,000,000	357,000,000	414,615,297	481,528,976	559,241,679	649,496,232
Prepaid Expenses											
Accounts Payable	647,500,000	728,000,000	1,248,000,000	1,676,000,000	1,588,000,000	1,324,000,000	1,257,000,000	1,448,106,258	1,668,267,092	1,921,899,774	2,214,093,150
Accrued Expenses	215,700,000	762,000,000	1,066,000,000	1,528,000,000	1,420,000,000	1,357,000,000	1,346,000,000	1,536,914,772	1,754,908,631	2,003,822,436	2,288,041,830
Accrued Expenses (Raw data)	215.70	762.00	1,066.00	1,528.00	1,420.00	1,357.00	1,346.00				
Debt							40,050,000,000				
Accrued Expenses (Reverse data)	1,346	1,357	1,420	1,528	1,066	762	216				
Gross PP&E (increases annual by CA)	17,070,700,000	17,926,000,000	30,996,000,000	35,847,000,000	38,564,000,000	40,547,000,000	38,705,000,000	40,937,458,415	43,298,682,378	45,796,098,935	48,437,563,511
Accounts Receivable Growth (%)		-5.91%	45.84%	29.11%	-4.65%	-19.87%	4.18%	8.12%	8.12%	8.12%	8.12%
Inventories Growth (%)		82.59%		14.97%	6.74%	-11.33%	-12.29%	16.14%	16.14%	16.14%	16.14%
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)		12.43%	71.43%	34.29%	-5.25%	-16.62%	-5.06%	15.20%	15.20%	15.20%	15.20%
Accrued Expenses Growth (%)			39.90%	43.34%	-7.07%	-4.44%	-0.81%	14.18%	14.18%	14.18%	14.18%
Capital Expenditures Growth (%)		5.01%		15.65%	7.58%	5.14%	-4.54%	5.77%	5.77%	5.77%	5.77%
Free Cash Flow Buildup											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Period							1	2	3	4	5
Total Revenues							13,058,000,000	14,419,230,103	15,922,361,522	17,582,186,748	19,415,040,315
EBITDA							-	-	-	-	-
EBIT							3,431,000,000	2,935,994,778	3,242,057,304	3,580,025,293	3,953,224,726
Tax rate							40%	40%	40%	40%	40%
EBIAT							2,058,600,000	1,761,596,867	1,945,234,383	2,148,015,176	2,371,934,836
Depreciation & Amortization							2,209,000,000	2,062,871,350	2,277,915,199	2,515,376,276	2,777,591,462
Accounts receivable							(55,000,000)	(111,218,528)	(120,247,404)	(130,009,257)	(140,563,592)
Inventories							50,000,000	(57,615,297)	(66,913,679)	(77,712,703)	(90,254,553)
Prepaid expenses							-	-	-	-	-
Accounts payable							(67,000,000)	191,106,258	220,160,834	253,632,682	292,193,376
Accrued expenses							(11,000,000)	190,914,772	217,993,859	248,913,805	284,219,394
Capital expenditures							1,842,000,000	(2,232,458,415)	(2,361,223,964)	(2,497,416,557)	(2,641,464,576)
Unlevered free cash flows							6,026,600,000	1,805,197,008	2,112,919,227	2,460,799,422	2,853,656,347
Discount Rate (WACC)							3.81%	3.81%	3.81%	3.81%	3.81%
Present value of free cash flows							5,805,300,090	1,675,055,570	1,888,599,266	2,118,777,950	2,366,808,975
Sum of present values of FCFs							13,854,541,850				
Terminal Value											
Growth in perpetuity method:											
Long term growth rate		2.60%									
WACC		3.81%									
Free cash flow (t+1)		2,428,346,008									
Terminal Value		200,353,254,804									
Present Value of Terminal Value		166,172,034,740									
WACC											
Share Price		22									
Diluted Shares Outstanding		2,230,000,000									
Cost of Debt		3.30%									
Tax Rate		40.00%									
After-tax Cost of Debt		1.98%	RF	Beta	RM-RF						
Cost of Equity		5.34%		2.38	0.92	3.20					
Total Debt (\$)		40,050,000,000									
Total Equity (\$)		48,078,800,000									
Total Capital		88,128,800,000									
Debt Weighting		45.44%									
Equity Weighting		54.56%									
WACC =		3.81%									
Enterprise Value to Equity Value											
Enterprise Value		180,026,576,589									
Less: Net debt		39,366,000,000									
Equity Value		140,660,576,589									
Diluted Shares Outstanding		2,230,000,000									
Equity Value Per Share		63.08									
			Undervalued								

Appendix 45. DCF Valuation of CYH

Valuation Date:	10-Apr-17											
Share Price on Valuation Date:	8.86											
Diluted Shares Outstanding:	110,700,000	Raw Data								111		
Select Operating Data												
							Projected Annual Forecast					
Currency: Dollar (\$)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Revenue	11,092,422,000	11,906,212,000	12,833,000,000	12,819,000,000	18,639,000,000	19,437,000,000	18,438,000,000	18,959,909,379	19,496,592,019	20,048,466,096	20,615,961,621	
Revenue Growth Rate (%)		7.34%	7.78%	-0.11%		4.28%	-5.14%	2.83%	2.83%	2.83%	2.83%	
EBITDA												
EBITDA Margin (%)												
EBIT	1,091,257,000	984,011,000	1,051,000,000	858,000,000	1,146,000,000	1,247,000,000	(863,000,000)	1,106,960,920	1,138,294,757	1,170,515,535	1,203,648,361	
EBIT Margin (%)	9.84%	8.26%	8.19%	6.69%	6.15%	6.42%	-4.68%	5.84%	5.84%	5.84%	5.84%	
Depreciation & Amortization	609,839,000	657,665,000	726,000,000	783,000,000	1,187,000,000	1,174,000,000	1,100,000,000	1,114,876,696	1,146,434,599	1,178,885,785	1,212,255,540	
D&A as a % of revenue	5.50%	5.52%	5.66%	6.11%	6.37%	6.04%	5.97%	5.88%	5.88%	5.88%	5.88%	
Select Balance Sheet And Other Data												
							Projected Annual Forecast					
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Cash	299,169,000	129,865,000	387,813,000	373,000,000	509,000,000	184,000,000	238,000,000	238,000,000	238,000,000	238,000,000	238,000,000	
Accounts Receivable	1,714,542,000	1,834,167,000	2,067,379,000	2,323,000,000	3,409,000,000	3,611,000,000	3,176,000,000	3,340,741,774	3,514,028,841	3,696,304,454	3,888,034,855	
Inventories	329,114,000	346,611,000	368,172,000	371,000,000	557,000,000	580,000,000	480,000,000	519,462,150	562,168,595	608,386,056	658,403,185	
Prepaid Expenses												
Accounts Payable	526,338,000	748,997,000	825,914,000	949,000,000	1,293,000,000	1,258,000,000	995,000,000	1,127,851,342	1,278,440,854	1,449,136,918	1,642,624,138	
Accrued Expenses	897,900,000	988,300,000	1,116,700,000	1,227,000,000	1,811,000,000	1,358,000,000	1,230,000,000	1,302,524,593	1,379,325,459	1,460,654,741	1,546,779,448	
Accrued Expenses (Raw data)	897.30	988.30	1,116.70	1,227.00	1,811.00	1,358.00	1,230.00					
Debt							15,244,000,000					
Accrued Expenses (Reverse data)	1,230	1,358	1,811	1,227	1,117	988	897					
Gross PP&E (increases annual by CA)	6,324,437,000	6,855,976,000	7,151,873,000	7,051,000,000	10,169,000,000	10,112,000,000	8,149,000,000	8,367,993,312	8,592,871,772	8,823,793,535	9,060,921,007	
Accounts Receivable Growth (%)		6.98%	12.71%	12.36%		5.93%	-12.05%	5.19%	5.19%	5.19%	5.19%	
Inventories Growth (%)		5.32%	6.22%	0.77%	50.13%	4.13%	-17.24%	8.22%	8.22%	8.22%	8.22%	
Prepaid Expenses Growth (%)												
Accounts Payable Growth (%)		42.30%	10.27%	14.90%	36.25%	-2.71%	-20.91%	13.35%	13.35%	13.35%	13.35%	
Accrued Expenses Growth (%)		10.14%	12.99%	9.88%			-9.43%	5.90%	5.90%	5.90%	5.90%	
Capital Expenditures Growth (%)		8.40%	4.32%	-1.41%		-0.56%		2.69%	2.69%	2.69%	2.69%	
Free Cash Flow Buildup												
							Projected Annual Forecast					
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Period							1	2	3	4	5	
Total Revenues							18,438,000,000	18,959,909,379	19,496,592,019	20,048,466,096	20,615,961,621	
EBITDA							-	-	-	-	-	
EBIT							(863,000,000)	1,106,960,920	1,138,294,757	1,170,515,535	1,203,648,361	
Tax rate							40%	40%	40%	40%	40%	
EBIAT							(517,800,000)	664,176,552	682,976,854	702,309,321	722,189,017	
Depreciation & Amortization							1,100,000,000	1,114,876,696	1,146,434,599	1,178,885,785	1,212,255,540	
Accounts receivable							435,000,000	(164,741,774)	(173,287,067)	(182,275,612)	(191,730,401)	
Inventories							100,000,000	(39,462,150)	(42,706,445)	(46,217,462)	(50,017,129)	
Prepaid expenses							-	-	-	-	-	
Accounts payable							(263,000,000)	132,851,342	150,589,512	170,696,063	193,487,220	
Accrued expenses							(128,000,000)	72,524,593	76,800,866	81,329,282	86,124,707	
Capital expenditures							1,963,000,000	(218,993,312)	(224,878,460)	(230,921,763)	(237,127,472)	
Unlevered free cash flows							2,689,200,000	1,561,231,947	1,615,929,859	1,673,805,614	1,735,181,482	
Discount Rate (WACC)							2.25%	2.25%	2.25%	2.25%	2.25%	
Present value of free cash flows							2,630,151,983	1,493,423,270	1,511,804,844	1,531,566,961	1,552,864,692	
Sum of present values of FCfs							8,719,811,751					
Terminal Value												
Growth in perpetuity method:												
Long term growth rate								2.60%				
WACC								2.25%				
Free cash flow (t+1)								1,593,239,174				
Terminal Value								(448,852,899,062)				
Present Value of Terminal Value								(401,691,596,040)				
WACC												
Share Price								9				
Diluted Shares Outstanding								110,700,000				
Cost of Debt								3.30%				
Tax Rate								40.00%				
After-tax Cost of Debt								1.98%	RF	Beta	RM-RF	
Cost of Equity								6.36%		2.38	1.25	3.20
Total Debt (\$)								15,244,000,000				
Total Equity (\$)								980,802,000				
Total Capital								16,224,802,000				
Debt Weighting								93.95%				
Equity Weighting								6.05%				
WACC =								2.25%				
Enterprise Value to Equity Value												
Enterprise Value								(392,971,784,289)				
Less: Net debt								15,006,000,000				
Equity Value								(407,977,784,289)				
Diluted Shares Outstanding								110,700,000				
Equity Value Per Share								(3,685.44)	<i>Overvalued</i>			

Appendix 47. DCF Valuation of ABT

Valuation Date:	10-Apr-17									
Share Price on Valuation Date:	43.83									
Diluted Shares Outstanding:	1,483,000,000	Raw Data	1,483							

Select Operating Data							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Currency: Dollar (\$)											
Revenue	35,166,721,000	21,407,000,000	19,050,000,000	19,657,000,000	20,247,000,000	20,405,000,000	20,853,000,000	21,330,728,146	21,819,400,721	22,319,268,454	22,830,587,820
Revenue Growth Rate (%)				3.19%	3.00%	0.78%	2.20%	2.29%	2.29%	2.29%	2.29%
EBITDA											
EBITDA Margin (%)											
EBIT	6,265,969,000	5,197,000,000	5,826,000,000	2,774,000,000	3,231,000,000	5,163,000,000	2,181,000,000	4,220,716,240	4,317,409,999	4,416,318,946	4,517,493,830
EBIT Margin (%)	17.82%	24.28%	30.58%	14.11%	15.96%	25.30%	10.46%	19.79%	19.79%	19.79%	19.79%
Depreciation & Amortization	2,624,305,000	3,044,000,000	2,782,000,000	1,719,000,000	1,548,000,000	1,472,000,000	1,353,000,000	2,022,717,871	2,069,056,971	2,116,457,669	2,164,944,284
D&A as a % of revenue	7.46%	14.22%	14.60%	8.74%	7.65%	7.21%	6.49%	9.48%	9.48%	9.48%	9.48%

Select Balance Sheet And Other Data							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cash	5,451,450,000	8,097,359,000	15,174,000,000	8,098,000,000	4,460,000,000	5,001,000,000	18,775,000,000	18,775,000,000	18,775,000,000	18,775,000,000	18,775,000,000
Accounts Receivable	7,184,034,000	7,683,920,000	7,613,000,000	3,986,000,000	3,586,000,000	3,418,000,000	3,248,000,000	3,262,620,753	3,277,307,322	3,292,060,001	3,306,879,089
Inventories	3,188,734,000	3,284,249,000	3,793,000,000	2,693,000,000	2,643,000,000	2,599,000,000	2,434,000,000	2,475,942,628	2,518,608,011	2,562,008,602	2,606,157,071
Prepaid Expenses											
Accounts Payable	2,216,508,000	2,475,411,000	2,018,000,000	1,367,000,000	1,426,000,000	1,464,000,000	1,569,000,000	1,592,081,355	1,615,502,256	1,639,267,700	1,663,382,753
Accrued Expenses	6,014,800,000	7,855,000,000	8,216,000,000	4,406,000,000	3,654,000,000	3,789,000,000	3,333,000,000	3,390,225,085	3,447,981,472	3,506,372,171	3,565,470,221
Accrued Expenses (Raw data)	6,014.80	7,855.00	8,216.00	4,406.00	3,654.00	3,789.00	3,333.00				
Debt							22,006,000,000				
Accrued Expenses (Reverse data)	3,333	3,789	3,654	4,406	8,216	7,855	6,015				
Gross PP&E (increases annual be CA	7,970,956,000	7,873,955,000	8,063,000,000	5,905,000,000	5,935,000,000	5,730,000,000	5,705,000,000	5,772,192,009	5,843,489,316	5,918,155,647	5,995,726,168
Accounts Receivable Growth (%)		6.96%	-0.92%			-4.68%		0.45%	0.45%	0.45%	0.45%
Inventories Growth (%)		3.00%	15.49%		-1.86%	-1.66%	-6.35%	1.72%	1.72%	1.72%	1.72%
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)		11.68%	-18.48%		4.32%	2.66%	7.17%	1.47%	1.47%	1.47%	1.47%
Accrued Expenses Growth (%)		30.59%	4.60%		-17.07%	3.69%	-12.03%	1.72%	1.70%	1.69%	1.69%
Capital Expenditures Growth (%)		-1.22%	2.40%		0.51%	-3.45%	-0.44%	1.18%	1.24%	1.28%	1.31%

Free Cash Flow Buildup							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Period							1	2	3	4	5
Total Revenues							20,853,000,000	21,330,728,146	21,819,400,721	22,319,268,454	22,830,587,820
EBITDA							-	-	-	-	-
EBIT							2,181,000,000	4,220,716,240	4,317,409,999	4,416,318,946	4,517,493,830
Tax rate							40%	40%	40%	40%	40%
EBIAT							1,308,600,000	2,532,429,744	2,590,445,999	2,649,791,367	2,710,496,298
Depreciation & Amortization							1,353,000,000	2,022,717,871	2,069,056,971	2,116,457,669	2,164,944,284
Accounts receivable							170,000,000	(14,620,753)	(14,686,568)	(14,752,679)	(14,819,088)
Inventories							165,000,000	(41,942,628)	(42,665,383)	(43,400,591)	(44,148,469)
Prepaid expenses							-	-	-	-	-
Accounts payable							105,000,000	23,081,355	23,420,902	23,765,443	24,115,054
Accrued expenses							(456,000,000)	57,225,085	57,756,387	58,390,699	59,098,049
Capital expenditures							25,000,000	(67,192,009)	(71,297,307)	(74,666,331)	(77,570,521)
Unlevered free cash flows							2,670,600,000	4,511,698,663	4,612,031,001	4,715,585,577	4,822,115,608
Discount Rate (WACC)							3.97%	3.97%	3.97%	3.97%	3.97%
Present value of free cash flows							2,568,504,288	4,173,332,487	4,103,047,729	4,034,794,611	3,968,212,035
Sum of present values of FCFs							18,847,891,151				

Terminal Value	
Growth in perpetuity method:	
Long term growth rate	2.29%
WACC	3.97%
Free cash flow (t+1)	4,059,121,093
Terminal Value	241,043,778,940
Present Value of Terminal Value	198,359,579,580

WACC	
Share Price	44
Diluted Shares Outstanding	1,483,000,000
Cost of Debt	3.30%
Tax Rate	40.00%
After-tax Cost of Debt	1.98%
Cost of Equity	4.65%
	RF Beta RM-RF
	2.38 0.71 3.20
Total Debt (\$)	22,006,000,000
Total Equity (\$)	64,999,890,000
Total Capital	87,005,890,000
Debt Weighting	25.29%
Equity Weighting	74.71%
WACC =	3.97%

Enterprise Value to Equity Value	
Enterprise Value	217,207,470,730
Less: Net debt	3,231,000,000
Equity Value	213,976,470,730
Diluted Shares Outstanding	1,483,000,000
Equity Value Per Share	144.29
	Undervalued

Appendix 58. DCF Valuation of CBS

Valuation Date:	11-Apr-17											
Share Price on Valuation Date:	68.22											
Diluted Shares Outstanding:	448,000,000	Raw Data								448		

Select Operating Data							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Currency: Dollar (\$)											
Revenue	13,466,000,000	13,637,000,000	12,820,000,000	14,005,000,000	13,806,000,000	13,886,000,000	13,166,000,000	13,284,143,605	13,403,347,358	13,523,620,773	13,644,973,447
Revenue Growth Rate (%)		1.27%		9.24%	-1.42%	0.58%	-5.19%	0.90%	0.90%	0.90%	0.90%
EBITDA											
EBITDA Margin (%)											
EBIT	1,729,000,000	2,491,000,000	2,787,000,000	3,132,000,000	4,084,000,000	2,392,000,000	2,300,000,000	2,647,068,672	2,670,821,842	2,694,788,158	2,718,969,533
EBIT Margin (%)	12.84%	18.27%	21.74%	22.36%	29.58%	17.23%	17.47%	19.93%	19.93%	19.93%	19.93%
Depreciation & Amortization	500,000,000	495,000,000	306,000,000	290,000,000	281,000,000	264,000,000	225,000,000	331,078,053	334,048,944	337,046,494	340,070,943
D&A as a % of revenue	3.71%	3.63%	2.39%	2.07%	2.04%	1.90%	1.71%	2.49%	2.49%	2.49%	2.49%

Select Balance Sheet And Other Data							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cash	480,000,000	660,000,000	708,000,000	368,000,000	428,000,000	323,000,000	598,000,000	598,000,000	598,000,000	598,000,000	598,000,000
Accounts Receivable	3,248,000,000	3,086,000,000	3,137,000,000	3,234,000,000	3,459,000,000	3,628,000,000	3,314,000,000	3,330,267,838	3,346,615,532	3,363,043,473	3,379,552,057
Inventories	2,116,000,000	2,231,000,000	2,441,000,000	2,469,000,000	2,739,000,000	3,228,000,000	3,866,000,000	4,281,904,702	4,742,552,477	5,252,756,791	5,817,848,940
Prepaid Expenses											
Accounts Payable	439,000,000	324,000,000	386,000,000	286,000,000	302,000,000	192,000,000	148,000,000	148,894,680	149,794,769	150,700,299	151,611,303
Accrued Expenses	613,000,000	581,000,000	636,000,000	595,000,000	605,000,000	561,000,000	632,000,000	644,745,939	657,748,934	671,014,168	684,546,931
Accrued Expenses (Raw data)	613.00	581.00	636.00	595.00	605.00	561.00	632.00				
Debt							9,375,000,000				
Accrued Expenses (Reverse data)	632	561	605	595	636	581	613				
Gross PP&E (increases annual be C	2,694,000,000	2,372,000,000	2,271,000,000	1,461,000,000	1,433,000,000	1,405,000,000	1,241,000,000	1,241,000,000	1,241,000,000	1,241,000,000	1,241,000,000
Accounts Receivable Growth (%)		-4.99%	1.65%	3.09%	6.96%	4.89%	-8.65%	0.49%	0.49%	0.49%	0.49%
Inventories Growth (%)		5.43%	9.41%	1.15%	10.94%	17.85%	19.76%	10.76%	10.76%	10.76%	10.76%
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)			19.14%		5.59%		-22.92%	0.60%	0.60%	0.60%	0.60%
Accrued Expenses Growth (%)			9.47%	-6.45%	1.68%	-7.27%	12.66%	2.02%	2.02%	2.02%	2.02%
Capital Expenditures Growth (%)		-11.95%	-4.26%	-35.67%	-1.92%	-1.95%	-11.67%	0.00%	0.00%	0.00%	0.00%

Free Cash Flow Buildup							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Period							1	2	3	4	5
Total Revenues							13,166,000,000	13,284,143,605	13,403,347,358	13,523,620,773	13,644,973,447
EBITDA							-	-	-	-	-
EBIT							2,300,000,000	2,647,068,672	2,670,821,842	2,694,788,158	2,718,969,533
Tax rate							40%	40%	40%	40%	40%
EBIAT							1,380,000,000	1,588,241,203	1,602,493,105	1,616,872,895	1,631,381,720
Depreciation & Amortization							225,000,000	331,078,053	334,048,944	337,046,494	340,070,943
Accounts receivable							314,000,000	(16,267,838)	(16,347,694)	(16,427,942)	(16,508,584)
Inventories							(638,000,000)	(415,904,702)	(460,647,775)	(510,204,313)	(565,092,149)
Prepaid expenses							-	-	-	-	-
Accounts payable							(44,000,000)	894,680	900,089	905,530	911,004
Accrued expenses							71,000,000	12,745,939	13,002,995	13,265,234	13,532,762
Capital expenditures							164,000,000	-	-	-	-
Unlevered free cash flows							1,472,000,000	1,500,787,336	1,473,449,663	1,441,457,898	1,404,295,697
Discount Rate (WACC)							5.65%	5.65%	5.65%	5.65%	5.65%
Present value of free cash flows							1,393,220,324	1,344,445,304	1,249,313,053	1,156,777,751	1,066,641,609
Sum of present values of FCFs	6,210,398,041										

Terminal Value	
Growth in perpetuity method:	
Long term growth rate	0.90%
WACC	5.65%
Free cash flow (t+1)	1,076,212,996
Terminal Value	22,622,996,811
Present Value of Terminal Value	17,183,439,192

WACC			
Share Price	68		
Diluted Shares Outstanding	448,000,000		
Cost of Debt	3.30%		
Tax Rate	40.00%		
After-tax Cost of Debt	1.98%		
Cost of Equity	6.78%		
	RF	Beta	RM-RF
		2.37	1.38
Total Debt (\$)	9,375,000,000		
Total Equity (\$)	30,562,560,000		
Total Capital	39,937,560,000		
Debt Weighting	23.47%		
Equity Weighting	76.53%		
WACC =	5.65%		

Enterprise Value to Equity Value	
Enterprise Value	23,393,837,233
Less: Net debt	8,777,000,000
Equity Value	14,616,837,233
Diluted Shares Outstanding	448,000,000
Equity Value Per Share	32.63
	Overvalued

Appendix 60. DCF Valuation of PSO

Valuation Date:	11-Apr-17										
Share Price on Valuation Date:	7.86										
Diluted Shares Outstanding:	814,410,000	Raw Data	814								
Select Operating Data											
							Projected Annual Forecast				
Currency: Dollar (\$)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue	4,610,000,000	4,728,000,000	4,959,000,000	4,728,000,000	4,540,000,000	4,468,000,000	4,552,000,000	4,586,260,729	4,620,779,323	4,655,557,721	4,690,597,880
Revenue Growth Rate (%)		2.56%	4.89%		-3.98%	-1.59%	1.88%	0.75%	0.75%	0.75%	0.75%
EBITDA											
EBITDA Margin (%)											
EBIT	1,516,000,000	1,203,000,000	564,000,000	736,000,000	667,000,000	842,000,000	(2,462,000,000)	424,032,081	427,223,568	430,439,076	433,678,785
EBIT Margin (%)	32.89%	25.44%	11.37%	15.57%	14.69%	18.85%	-54.09%	9.25%	9.25%	9.25%	9.25%
Depreciation & Amortization	-	-	-	-	-	-	-	-	-	-	-
D&A as a % of revenue	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Select Balance Sheet And Other Data											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cash	1,736,000,000	1,369,000,000	1,062,000,000	729,000,000	530,000,000	1,703,000,000	1,459,000,000	1,459,000,000	1,459,000,000	1,459,000,000	1,459,000,000
Accounts Receivable	1,466,000,000	1,537,000,000	1,183,000,000	1,243,000,000	1,392,000,000	1,399,000,000	1,461,000,000	1,470,264,736	1,479,588,224	1,488,970,835	1,498,412,945
Inventories	429,000,000	407,000,000	261,000,000	224,000,000	224,000,000	211,000,000	235,000,000	235,260,046	235,520,379	235,781,001	236,041,911
Prepaid Expenses											
Accounts Payable	(1,605,000,000)	(1,741,000,000)	(1,556,000,000)	(1,505,000,000)	(1,601,000,000)	1,390,000,000	1,629,000,000	1,688,109,211	1,749,363,235	1,812,839,896	1,878,619,845
Accrued Expenses	-	-	-	-	-	-	-	-	-	-	-
Accrued Expenses (Raw data)	-	-	-	-	-	-	-	-	-	-	-
Debt							2,468,000,000				
Accrued Expenses (Reverse data)											
Gross PP&E (increases annual be C	366,000,000	383,000,000	327,000,000	342,000,000	334,000,000	320,000,000	343,000,000	349,783,625	374,268,479	407,952,642	452,827,433
Accounts Receivable Growth (%)		4.84%	-23.03%	5.07%	11.99%	0.50%	4.43%	0.63%	0.63%	0.63%	0.63%
Inventories Growth (%)		-5.13%			0.00%	-5.80%	11.37%	0.11%	0.11%	0.11%	0.11%
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)		8.47%	-10.63%	-3.28%	6.38%		17.19%	3.63%	3.63%	3.63%	3.63%
Accrued Expenses Growth (%)											
Capital Expenditures Growth (%)		4.64%		4.59%	-2.34%	-4.19%	7.19%	1.98%	7.00%	9.00%	11.00%
Free Cash Flow Buildup											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Period							1	2	3	4	5
Total Revenues							4,552,000,000	4,586,260,729	4,620,779,323	4,655,557,721	4,690,597,880
EBITDA							-	-	-	-	-
EBIT							(2,462,000,000)	424,032,081	427,223,568	430,439,076	433,678,785
Tax rate							40%	40%	40%	40%	40%
EBIAT							(1,477,200,000)	254,419,249	256,334,141	258,263,445	260,207,271
Depreciation & Amortization							-	-	-	-	-
Accounts receivable							(62,000,000)	(9,264,736)	(9,323,487)	(9,382,611)	(9,442,110)
Inventories							(24,000,000)	(260,046)	(260,333)	(260,622)	(260,910)
Prepaid expenses							-	-	-	-	-
Accounts payable							239,000,000	59,109,211	61,254,023	63,476,661	65,779,949
Accrued expenses							-	-	-	-	-
Capital expenditures							(23,000,000)	(6,783,625)	(24,484,854)	(33,684,163)	(44,874,791)
Unlevered free cash flows							(1,347,200,000)	297,220,053	283,519,490	278,412,711	271,409,409
Discount Rate (WACC)							4.47%	4.47%	4.47%	4.47%	4.47%
Present value of free cash flows							(1,289,524,510)	272,316,001	248,642,578	233,711,007	218,078,341
Sum of present values of FCFs							(316,776,583)				
Terminal Value											
Growth in perpetuity method:											
Long term growth rate							0.75%				
WACC							4.47%				
Free cash flow (t+1)							219,719,713				
Terminal Value							5,906,500,102				
Present Value of Terminal Value							4,745,891,998				
WACC											
Share Price							8				
Diluted Shares Outstanding							814,410,000				
Cost of Debt							3.30%				
Tax Rate							40.00%				
After-tax Cost of Debt							1.98%	RF	Beta	RM-RF	
Cost of Equity							5.43%		2.37	0.96	3.20
Total Debt (\$)							2,468,000,000				
Total Equity (\$)							6,401,262,600				
Total Capital							8,869,262,600				
Debt Weighting							27.83%				
Equity Weighting							72.17%				
WACC =							4.47%				
Enterprise Value to Equity Value											
Enterprise Value							4,429,115,415				
Less: Net debt							1,009,000,000				
Equity Value							3,420,115,415				
Diluted Shares Outstanding							814,410,000				
Equity Value Per Share							4.20				
								Overvalued			

Appendix 63. DCF Valuation of GNC

Valuation Date:	11-Apr-17										
Share Price on Valuation Date:	7.15										
Diluted Shares Outstanding:	69,400,000	Raw Data	69								
Select Operating Data											
							Projected Annual Forecast				
Currency: Dollar (\$)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue	1,822,168,000	2,072,179,000	2,428,172,000	2,626,761,000	2,613,154,000	2,639,212,000	2,540,016,000	2,691,567,468	2,852,161,338	3,022,337,132	3,202,666,558
Revenue Growth Rate (%)		13.72%	17.18%	8.18%	-0.52%	1.00%	-3.76%	5.97%	5.97%	5.97%	5.97%
EBITDA											
EBITDA Margin (%)											
EBIT	212,406,000	282,507,000	427,840,000	460,498,000	439,512,000	393,107,000	(172,947,000)	328,164,160	347,744,257	368,492,612	390,478,929
EBIT Margin (%)	11.66%	13.63%	17.62%	17.53%	16.82%	14.89%	-6.81%	12.19%	12.19%	12.19%	12.19%
Depreciation & Amortization	46,993,000	46,790,000	49,257,000	51,814,000	56,337,000	57,237,000	60,038,000	59,700,423	63,262,482	67,037,073	71,036,877
D&A as a % of revenue	2.58%	2.26%	2.03%	1.97%	2.16%	2.17%	2.36%	2.22%	2.22%	2.22%	2.22%
Select Balance Sheet And Other Data											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cash	193,902,000	128,438,000	158,541,000	226,217,000	133,834,000	56,462,000	34,464,000	34,464,000	34,464,000	34,464,000	34,464,000
Accounts Receivable	102,874,000	114,190,000	129,641,000	144,833,000	136,361,000	142,486,000	129,178,000	134,679,202	140,414,680	146,394,409	152,628,793
Inventories	381,949,000	423,610,000	491,599,000	547,916,000	569,132,000	555,885,000	583,212,000	626,830,187	673,710,561	724,097,099	778,252,025
Prepaid Expenses											
Accounts Payable	98,662,000	124,416,000	125,165,000	135,164,000	129,064,000	152,099,000	179,933,000	199,824,159	221,914,237	246,446,319	273,690,365
Accrued Expenses	-	28,100,000	33,500,000	23,000,000	25,000,000	31,100,000	34,700,000	36,958,624	39,364,262	41,926,483	44,655,478
Accrued Expenses (Raw data)	-	28.10	33.50	23.00	25.00	31.10	34.70				
Debt							1,540,453,000				
Accrued Expenses (Reverse data)	35	31	25	23	34	28					
Gross PP&E (increases annual be C	193,428,000	198,171,000	199,487,000	206,754,000	232,397,000	230,535,000	232,292,000	239,695,370	247,334,693	255,217,489	263,351,516
Accounts Receivable Growth (%)		11.00%	13.53%	11.72%	-5.85%	4.49%	-9.34%	4.26%	4.26%	4.26%	4.26%
Inventories Growth (%)		10.91%	16.05%	11.46%	3.87%	-2.33%	4.92%	7.48%	7.48%	7.48%	7.48%
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)		26.10%	0.60%	7.99%	-4.51%	17.85%	18.30%	11.05%	11.05%	11.05%	11.05%
Accrued Expenses Growth (%)			19.22%	-31.34%	8.70%	24.40%	11.58%	6.51%	6.51%	6.51%	6.51%
Capital Expenditures Growth (%)		2.45%	0.66%	3.64%	12.40%	-0.80%	0.76%	3.19%	3.19%	3.19%	3.19%
Free Cash Flow Buildup											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Period							1	2	3	4	5
Total Revenues							2,540,016,000	2,691,567,468	2,852,161,338	3,022,337,132	3,202,666,558
EBITDA							-	-	-	-	-
EBIT							(172,947,000)	328,164,160	347,744,257	368,492,612	390,478,929
Tax rate							40%	40%	40%	40%	40%
EBIAT							(103,768,200)	196,898,496	208,646,554	221,095,567	234,287,357
Depreciation & Amortization							60,038,000	59,700,423	63,262,482	67,037,073	71,036,877
Accounts receivable							13,308,000	(5,501,202)	(5,735,477)	(5,979,730)	(6,234,384)
Inventories							(27,327,000)	(43,618,187)	(46,880,374)	(50,386,538)	(54,154,926)
Prepaid expenses							-	-	-	-	-
Accounts payable							27,834,000	19,891,159	22,090,078	24,532,083	27,244,045
Accrued expenses							3,600,000	2,258,624	2,405,638	2,562,221	2,728,996
Capital expenditures							(1,757,000)	(7,403,370)	(7,639,323)	(7,882,795)	(8,134,028)
Unlevered free cash flows							(28,072,200)	222,225,942	236,149,578	250,977,881	266,773,938
Discount Rate (WACC)							2.84%	2.84%	2.84%	2.84%	2.84%
Present value of free cash flows							(27,298,011)	210,137,651	217,145,509	224,415,932	231,961,653
Sum of present values of FCFs							856,362,734				
Terminal Value											
Growth in perpetuity method:											
Long term growth rate							2.60%				
WACC							2.84%				
Free cash flow (t+1)							237,992,656				
Terminal Value							100,817,526,835				
Present Value of Terminal Value							87,661,487,518				
WACC											
Share Price	7										
Diluted Shares Outstanding	69,400,000										
Cost of Debt	3.30%										
Tax Rate	40.00%										
After-tax Cost of Debt	1.98%										
Cost of Equity	5.49%										
		RF	Beta	RM-RF							
			2.37	0.98	3.20						
Total Debt (\$)	1,540,453,000										
Total Equity (\$)	496,210,000										
Total Capital	2,036,663,000										
Debt Weighting	75.64%										
Equity Weighting	24.36%										
WACC =	2.84%										
Enterprise Value to Equity Value											
Enterprise Value	88,517,850,252										
Less: Net debt	1,505,989,000										
Equity Value	87,011,861,252										
Diluted Shares Outstanding	69,400,000										
Equity Value Per Share	1,253.77										
		Undervalued									

Appendix 66. DCF Valuation of UFI

Valuation Date:	11-Apr-17									
Share Price on Valuation Date:	27.21									
Diluted Shares Outstanding:	18,400,000	Raw Data	18							

Select Operating Data											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Currency: Dollar (\$)											
Revenue	622,618,000	712,812,000	705,086,000	713,962,000	687,902,000	687,121,000	643,637,000	648,538,516	653,477,359	658,453,812	663,468,163
Revenue Growth Rate (%)		14.49%	-1.08%	1.26%	-3.65%	-0.11%	-6.33%	0.76%	0.76%	0.76%	0.76%
EBITDA											
EBITDA Margin (%)											
EBIT	40,260,000	51,612,000	25,585,000	34,468,000	53,313,000	59,522,000	53,016,000	43,371,249	43,701,536	44,034,338	44,369,675
EBIT Margin (%)	6.47%	7.24%	3.63%	4.83%	7.75%	8.66%	8.24%	6.69%	6.69%	6.69%	6.69%
Depreciation & Amortization	27,416,000	25,977,000	27,135,000	24,584,000	17,896,000	18,043,000	17,528,000	21,577,914	21,742,237	21,907,811	22,074,647
D&A as a % of revenue	4.40%	3.64%	3.85%	3.44%	2.60%	2.63%	2.72%	3.33%	3.33%	3.33%	3.33%

Select Balance Sheet And Other Data											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cash	42,691,000	27,490,000	10,886,000	8,755,000	15,907,000	10,013,000	16,646,000	16,646,000	16,646,000	16,646,000	16,646,000
Accounts Receivable	91,276,000	99,815,000	99,236,000	98,392,000	93,925,000	83,863,000	83,422,000	83,898,959	84,378,644	84,861,073	85,346,259
Inventories	111,007,000	134,883,000	112,750,000	110,667,000	113,370,000	111,615,000	103,532,000	104,447,357	105,370,807	106,302,421	107,242,272
Prepaid Expenses											
Accounts Payable	40,662,000	42,842,000	48,541,000	45,544,000	51,364,000	45,023,000	41,593,000	41,960,736	42,331,723	42,705,990	43,083,567
Accrued Expenses	-	537,400,000	358,400,000	398,000,000	-	476,400,000	526,900,000	583,935,458	647,144,845	717,196,472	794,830,992
Accrued Expenses (Raw data)	-	537.40	358.40	398.00	-	476.40	526.90				
Debt							121,591,000				
Accrued Expenses (Reverse data)	527	476	-	398	358	537	-				
Gross PP&E (increases annual be C	151,499,000	151,027,000	127,090,000	115,164,000	123,802,000	136,222,000	185,101,000	193,698,845	202,696,055	212,111,181	221,963,635
Accounts Receivable Growth (%)		9.36%	-0.58%	-0.85%	-4.54%		-0.53%	0.57%	0.57%	0.57%	0.57%
Inventories Growth (%)		21.51%		-1.85%	2.44%	-1.55%	-7.24%	0.88%	0.88%	0.88%	0.88%
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)		5.36%	13.30%	-6.17%	12.78%	-12.35%	-7.62%	0.88%	0.88%	0.88%	0.88%
Accrued Expenses Growth (%)				11.05%			10.60%	10.82%	10.82%	10.82%	10.82%
Capital Expenditures Growth (%)		-0.31%	-15.85%	-9.38%	7.50%	10.03%	35.88%	4.64%	4.64%	4.64%	4.64%

Free Cash Flow Buildup											
							Projected Annual Forecast				
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Period							1	2	3	4	5
Total Revenues							643,637,000	648,538,516	653,477,359	658,453,812	663,468,163
EBITDA							-	-	-	-	-
EBIT							53,016,000	43,371,249	43,701,536	44,034,338	44,369,675
Tax rate							40%	40%	40%	40%	40%
EBIAT							31,809,600	26,022,750	26,220,922	26,420,603	26,621,805
Depreciation & Amortization							17,528,000	21,577,914	21,742,237	21,907,811	22,074,647
Accounts receivable							441,000	(476,959)	(479,686)	(482,428)	(485,187)
Inventories							8,083,000	(915,357)	(923,450)	(931,614)	(939,851)
Prepaid expenses							-	-	-	-	-
Accounts payable							(3,430,000)	367,736	370,987	374,267	377,576
Accrued expenses							50,500,000	57,035,458	63,209,387	70,051,627	77,634,521
Capital expenditures							(48,879,000)	(8,597,845)	(8,997,210)	(9,415,126)	(9,852,454)
Unlevered free cash flows							56,052,600	95,013,696	101,143,187	107,925,140	115,431,058
Discount Rate (WACC)							5.80%	5.80%	5.80%	5.80%	5.80%
Present value of free cash flows							52,977,810	84,875,566	85,394,783	86,122,289	87,059,035
Sum of present values of FCFs							396,429,483				

Terminal Value	
Growth in perpetuity method:	
Long term growth rate	0.76%
WACC	5.80%
Free cash flow (t+1)	87,720,684
Terminal Value	1,739,136,579
Present Value of Terminal Value	1,311,670,848

WACC	
Share Price	27
Diluted Shares Outstanding	18,400,000
Cost of Debt	3.30%
Tax Rate	40.00%
After-tax Cost of Debt	1.98%
Cost of Equity	6.73%
	RF
	Beta
	RM-RF
	2.37
	1.36
	3.20
Total Debt (\$)	121,591,000
Total Equity (\$)	500,664,000
Total Capital	622,255,000
Debt Weighting	19.54%
Equity Weighting	80.46%
WACC =	5.80%

Enterprise Value to Equity Value	
Enterprise Value	1,708,100,331
Less: Net debt	104,945,000
Equity Value	1,603,155,331
Diluted Shares Outstanding	18,400,000
Equity Value Per Share	87.13
	Undervalued

Appendix 67. DCF Valuation of CL

Valuation Date:	11-Apr-17										
Share Price on Valuation Date:	73.73										
Diluted Shares Outstanding:	898,400,000	Raw Data	898								
Select Operating Data											
						Projected Annual Forecast					
Currency: Dollar (\$)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenue	15,564,000,000	16,734,000,000	17,085,000,000	17,420,000,000	17,277,000,000	16,034,000,000	15,195,000,000	15,362,817,587	15,532,488,596	15,704,033,496	15,877,472,983
Revenue Growth Rate (%)		7.52%	2.10%	1.96%	-0.82%		-5.23%	1.10%	1.10%	1.10%	1.10%
EBITDA											
EBITDA Margin (%)											
EBIT	3,379,000,000	3,718,000,000	3,730,000,000	3,387,000,000	3,398,000,000	2,625,000,000	3,692,000,000	3,194,159,649	3,229,436,790	3,265,103,542	3,301,164,206
EBIT Margin (%)	21.71%	22.22%	21.83%	19.44%	19.67%	16.37%	24.30%	20.79%	20.79%	20.79%	20.79%
Depreciation & Amortization	376,000,000	421,000,000	425,000,000	439,000,000	442,000,000	449,000,000	443,000,000	399,726,644	404,141,331	408,604,774	413,117,513
D&A as a % of revenue	2.42%	2.52%	2.49%	2.52%	2.56%	2.80%	2.92%	2.60%	2.60%	2.60%	2.60%
Select Balance Sheet And Other Data											
						Projected Annual Forecast					
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cash	490,000,000	878,000,000	884,000,000	962,000,000	1,089,000,000	970,000,000	1,315,000,000	1,315,000,000	1,315,000,000	1,315,000,000	1,315,000,000
Accounts Receivable	1,610,000,000	1,675,000,000	1,668,000,000	1,636,000,000	1,552,000,000	1,427,000,000	1,411,000,000	1,413,044,744	1,415,092,451	1,417,143,125	1,419,196,771
Inventories	1,222,000,000	1,327,000,000	1,365,000,000	1,425,000,000	1,382,000,000	1,180,000,000	1,171,000,000	1,199,271,271	1,228,225,090	1,257,877,937	1,288,246,688
Prepaid Expenses											
Accounts Payable	1,165,000,000	1,244,000,000	1,290,000,000	1,343,000,000	1,231,000,000	1,110,000,000	1,124,000,000	1,140,880,491	1,158,014,497	1,175,405,825	1,193,058,340
Accrued Expenses	2,063,000,000	1,993,000,000	2,233,000,000	2,450,000,000	2,249,000,000	2,167,000,000	2,036,000,000	2,051,736,836	2,067,595,307	2,083,576,353	2,099,680,921
Accrued Expenses (Raw data)	2,063.00	1,993.00	2,233.00	2,450.00	2,249.00	2,167.00	2,036.00				
Debt							6,533,000,000				
Accrued Expenses (Reverse data)	2,036	2,167	2,249	2,450	2,233	1,993	2,063				
Gross PP&E (increases annual be C	3,693,000,000	3,668,000,000	3,842,000,000	4,083,000,000	4,080,000,000	3,796,000,000	3,840,000,000	3,868,572,179	3,897,356,953	3,926,355,906	3,955,570,631
Accounts Receivable Growth (%)		4.04%	-0.42%	-1.92%			-1.12%	0.14%	0.14%	0.14%	0.14%
Inventories Growth (%)		8.59%	2.86%	4.40%	-3.02%		-0.76%	2.41%	2.41%	2.41%	2.41%
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)		6.78%	3.70%	4.11%	-8.34%		1.26%	1.50%	1.50%	1.50%	1.50%
Accrued Expenses Growth (%)			12.04%	9.72%	-8.20%	-3.65%	-6.05%	0.77%	0.77%	0.77%	0.77%
Capital Expenditures Growth (%)		-0.68%	4.74%	6.27%	-0.07%	-6.96%	1.16%	0.74%	0.74%	0.74%	0.74%
Free Cash Flow Buildup											
						Projected Annual Forecast					
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Period							1	2	3	4	5
Total Revenues							15,195,000,000	15,362,817,587	15,532,488,596	15,704,033,496	15,877,472,983
EBITDA							-	-	-	-	-
EBIT							3,692,000,000	3,194,159,649	3,229,436,790	3,265,103,542	3,301,164,206
Tax rate							40%	40%	40%	40%	40%
EBIAT							2,215,200,000	1,916,495,789	1,937,662,074	1,959,062,125	1,980,698,524
Depreciation & Amortization							443,000,000	399,726,644	404,141,331	408,604,774	413,117,513
Accounts receivable							16,000,000	(2,044,744)	(2,047,707)	(2,050,674)	(2,055,646)
Inventories							9,000,000	(28,271,271)	(28,953,820)	(29,652,847)	(30,368,751)
Prepaid expenses							-	-	-	-	-
Accounts payable							14,000,000	16,880,491	17,134,006	17,391,328	17,652,515
Accrued expenses							(131,000,000)	15,736,836	15,858,471	15,981,046	16,104,568
Capital expenditures							(44,000,000)	(28,572,179)	(28,784,775)	(28,998,953)	(29,214,725)
Unlevered free cash flows							2,522,200,000	2,289,951,568	2,315,009,581	2,340,336,799	2,365,935,998
Discount Rate (WACC)							4.01%	4.01%	4.01%	4.01%	4.01%
Present value of free cash flows							2,424,874,950	2,116,634,881	2,057,227,258	1,999,482,764	1,943,354,907
Sum of present values of FCFs							10,541,574,761				
Terminal Value											
Growth in perpetuity method:											
Long term growth rate							1.10%				
WACC							4.01%				
Free cash flow (t+1)							1,964,817,831				
Terminal Value							67,338,435,360				
Present Value of Terminal Value							55,475,359,379				
WACC											
Share Price							74				
Diluted Shares Outstanding							898,400,000				
Cost of Debt							3.30%				
Tax Rate							40.00%				
After-tax Cost of Debt							1.98%	RF	Beta	RM-RF	
Cost of Equity							4.21%		2.37	0.58	3.20
Total Debt (\$)							6,533,000,000				
Total Equity (\$)							66,239,032,000				
Total Capital							72,772,032,000				
Debt Weighting							8.98%				
Equity Weighting							91.02%				
WACC =							4.01%				
Enterprise Value to Equity Value											
Enterprise Value							66,016,934,140				
Less: Net debt							5,218,000,000				
Equity Value							60,798,934,140				
Diluted Shares Outstanding							898,400,000				
Equity Value Per Share							67.67	Overvalued			

Appendix 78. DCF Valuation of DLX

Valuation Date:	12-Apr-17									
Share Price on Valuation Date:	69.36									
Diluted Shares Outstanding:	49,800,000	Raw Data	50							

Select Operating Data											
	2010	2011	2012	2013	2014	2015	Projected Annual Forecast				
	2016	2017	2018	2019	2020						
Currency: Dollar (\$)											
Revenue	1,402,237,000	1,417,596,000	1,514,917,000	1,584,824,000	1,674,082,000	1,772,817,000	1,849,062,000	1,936,602,136	2,028,286,685	2,124,311,855	2,224,883,144
Revenue Growth Rate (%)		1.10%	6.87%	4.61%	5.63%	5.90%	4.30%	4.73%	4.73%	4.73%	4.73%
EBITDA											
EBITDA Margin (%)											
EBIT	279,343,000	263,881,000	297,600,000	319,360,000	333,710,000	348,246,000	362,688,000	380,470,281	398,482,884	417,348,258	437,106,775
EBIT Margin (%)	19.92%	18.61%	19.64%	20.15%	19.93%	19.64%	19.61%	19.65%	19.65%	19.65%	19.65%
Depreciation & Amortization	73,915,000	73,343,000	65,652,000	64,473,000	65,842,000	76,700,000	91,583,000	88,694,285	92,893,338	97,291,187	101,897,243
D&A as a % of revenue	5.27%	5.17%	4.33%	4.07%	3.93%	4.33%	4.95%	4.58%	4.58%	4.58%	4.58%

Select Balance Sheet And Other Data											
	2010	2011	2012	2013	2014	2015	Projected Annual Forecast				
	2016	2017	2018	2019	2020						
Cash	17,383,000	28,687,000	45,435,000	121,089,000	61,541,000	62,427,000	76,574,000	76,574,000	76,574,000	76,574,000	76,574,000
Accounts Receivable	66,471,000	69,023,000	70,387,000	88,049,000	113,656,000	123,654,000	152,649,000	176,115,223	203,188,832	234,424,375	270,461,656
Inventories	21,660,000	22,043,000	23,291,000	28,966,000	39,411,000	41,956,000	40,182,000	44,875,552	50,117,346	55,971,419	62,509,291
Prepaid Expenses											
Accounts Payable	60,478,000	64,694,000	65,107,000	71,492,000	87,216,000	87,575,000	106,793,000	117,786,763	129,912,275	143,286,043	158,036,568
Accrued Expenses	144,000,000	150,100,000	155,000,000	163,000,000	219,100,000	228,400,000	-	-	-	-	-
Accrued Expenses (Raw data)	144.00	150.10	155.00	163.00	219.10	228.40	-	-	-	-	-
Debt							758,648,000				
Accrued Expenses (Reverse data)		228	219	163	155	150	144				
Gross PP&E (increases annual be CA	120,221,000	113,411,000	104,189,000	101,343,000	87,623,000	85,732,000	86,896,000	88,075,804	89,271,626	90,483,684	91,712,199
Accounts Receivable Growth (%)		3.84%	1.98%	25.09%	29.08%	8.80%	23.45%	15.37%	15.37%	15.37%	15.37%
Inventories Growth (%)		1.77%	5.66%	24.37%	36.06%	6.46%	-4.23%	11.68%	11.68%	11.68%	11.68%
Prepaid Expenses Growth (%)											
Accounts Payable Growth (%)		6.97%	0.64%	9.81%	21.99%	0.41%	21.94%	10.29%	10.29%	10.29%	10.29%
Accrued Expenses Growth (%)			3.26%	5.16%	34.42%	4.24%		11.77%	11.77%	11.77%	11.77%
Capital Expenditures Growth (%)							1.36%	1.36%	1.36%	1.36%	1.36%

Free Cash Flow Buildup											
	2010	2011	2012	2013	2014	2015	Projected Annual Forecast				
	2016	2017	2018	2019	2020						
Period							1	2	3	4	5
Total Revenues							1,849,062,000	1,936,602,136	2,028,286,685	2,124,311,855	2,224,883,144
EBITDA							-	-	-	-	-
EBIT							362,688,000	380,470,281	398,482,884	417,348,258	437,106,775
Tax rate							40%	40%	40%	40%	40%
EBIAT							217,612,800	228,282,169	239,089,731	250,408,955	262,264,065
Depreciation & Amortization							91,583,000	88,694,285	92,893,338	97,291,187	101,897,243
Accounts receivable							(28,995,000)	(23,466,223)	(27,073,608)	(31,235,544)	(36,037,280)
Inventories							1,774,000	(4,693,552)	(5,241,794)	(5,854,073)	(6,537,872)
Prepaid expenses							-	-	-	-	-
Accounts payable							19,218,000	10,993,763	12,125,512	13,373,768	14,750,525
Accrued expenses							(228,400,000)	-	-	-	-
Capital expenditures							(1,164,000)	(1,179,804)	(1,195,822)	(1,212,058)	(1,228,515)
Unlevered free cash flows							71,628,800	298,630,637	310,597,356	322,772,234	335,108,167
Discount Rate (WACC)							6.01%	6.01%	6.01%	6.01%	6.01%
Present value of free cash flows							67,569,159	265,739,450	260,723,550	255,587,441	250,316,333
Sum of present values of FCFs	1,099,935,932										

Terminal Value	
Growth in perpetuity method:	
Long term growth rate	2.60%
WACC	6.01%
Free cash flow (t+1)	256,824,558
Terminal Value	7,535,649,192
Present Value of Terminal Value	5,628,917,053

WACC	
Share Price	69
Diluted Shares Outstanding	49,800,000
Cost of Debt	3.30%
Tax Rate	40.00%
After-tax Cost of Debt	RF
Cost of Equity	Beta RM-RF
	6.89%
	2.32
	1.43
	3.20
Total Debt (\$)	758,648,000
Total Equity (\$)	3,454,128,000
Total Capital	4,212,776,000
Debt Weighting	18.01%
Equity Weighting	81.99%
WACC =	6.01%

Enterprise Value to Equity Value	
Enterprise Value	6,728,852,986
Less: Net debt	682,074,000
Equity Value	6,046,778,986
Diluted Shares Outstanding	49,800,000
Equity Value Per Share	121.42
	Undervalued

Appendix 98. DCF Valuation of FMC

Valuation Date:	12-Apr-17											
Share Price on Valuation Date:	74.87											
Diluted Shares Outstanding:	134,500,000	Raw Data								135		
Select Operating Data												
							Projected Annual Forecast					
Currency: Dollar (\$)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Revenue	3,116,300,000	3,036,300,000	3,409,900,000	3,130,700,000	3,258,700,000	3,276,500,000	3,282,400,000	3,317,216,537	3,352,402,374	3,387,961,429	3,423,897,659	
Revenue Growth Rate (%)		-2.57%	12.30%	-8.19%	4.09%	0.55%	0.18%	1.06%	1.06%	1.06%	1.06%	
EBITDA												
EBITDA Margin (%)												
EBIT	344,000,000	533,900,000	591,500,000	462,000,000	415,100,000	617,800,000	386,300,000	493,264,357	498,496,430	503,784,000	509,127,655	
EBIT Margin (%)	11.04%	17.58%	17.35%	14.76%	12.74%	18.86%	11.77%	14.87%	14.87%	14.87%	14.87%	
Depreciation & Amortization	133,600,000	99,600,000	115,900,000	88,000,000	93,500,000	115,700,000	137,100,000	115,413,141	116,637,332	117,874,508	119,124,808	
D&A as a % of revenue	4.29%	3.28%	3.40%	2.81%	2.87%	3.53%	4.18%	3.48%	3.48%	3.48%	3.48%	
Select Balance Sheet And Other Data												
							Projected Annual Forecast					
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Cash	161,500,000	158,900,000	77,100,000	123,200,000	109,500,000	78,600,000	64,200,000	64,200,000	64,200,000	64,200,000	64,200,000	
Accounts Receivable	852,900,000	931,300,000	1,073,700,000	1,484,300,000	1,602,500,000	1,851,400,000	1,828,000,000	1,998,786,547	2,185,529,356	2,389,719,188	2,612,986,086	
Inventories	347,800,000	470,300,000	642,400,000	688,400,000	607,600,000	800,200,000	703,500,000	805,334,378	921,909,680	1,055,359,714	1,208,127,162	
Prepaid Expenses												
Accounts Payable	389,300,000	382,100,000	404,200,000	475,200,000	378,300,000	403,600,000	355,400,000	366,947,096	378,869,362	391,178,987	403,888,558	
Accrued Expenses	223,000,000	186,200,000	254,100,000	307,000,000	407,200,000	337,600,000	374,900,000	437,792,787	511,236,395	597,000,817	697,152,979	
Accrued Expenses (Raw data)	223.00	186.20	254.10	307.00	407.20	337.60	374.90					
Debt							1,997,600,000					
Accrued Expenses (Reverse data)	375	338	407	307	254	186	223					
Gross PP&E (increases annual be CA	918,500,000	986,800,000	956,200,000	1,248,300,000	930,000,000	1,016,400,000	1,002,100,000	1,030,940,146	1,060,610,303	1,091,134,359	1,122,536,888	
Accounts Receivable Growth (%)		9.19%	15.29%		7.96%	15.53%	-1.26%	9.34%	9.34%	9.34%	9.34%	
Inventories Growth (%)		35.22%	36.59%	7.16%	-11.74%	31.70%	-12.08%	14.48%	14.48%	14.48%	14.48%	
Prepaid Expenses Growth (%)												
Accounts Payable Growth (%)		-1.85%	5.78%	17.57%		6.69%	-11.94%	3.25%	3.25%	3.25%	3.25%	
Accrued Expenses Growth (%)			36.47%	20.82%	32.64%	-17.09%	11.05%	16.78%	16.78%	16.78%	16.78%	
Capital Expenditures Growth (%)		7.44%	-3.10%	30.55%	-25.50%	9.29%	-1.41%	2.88%	2.88%	2.88%	2.88%	
Free Cash Flow Buildup												
							Projected Annual Forecast					
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Period							1	2	3	4	5	
Total Revenues							3,282,400,000	3,317,216,537	3,352,402,374	3,387,961,429	3,423,897,659	
EBITDA							-	-	-	-	-	
EBIT							386,300,000	493,264,357	498,496,430	503,784,000	509,127,655	
Tax rate							40%	40%	40%	40%	40%	
EBIAT							231,780,000	295,958,614	299,097,858	302,270,400	305,476,593	
Depreciation & Amortization							137,100,000	115,413,141	116,637,332	117,874,508	119,124,808	
Accounts receivable							23,400,000	(170,786,547)	(186,742,808)	(204,189,832)	(223,266,898)	
Inventories							96,700,000	(101,834,378)	(116,575,302)	(133,450,034)	(152,767,448)	
Prepaid expenses							-	-	-	-	-	
Accounts payable							(48,200,000)	11,547,096	11,922,266	12,309,625	12,709,570	
Accrued expenses							37,300,000	62,892,787	73,443,608	85,764,422	100,152,162	
Capital expenditures							14,300,000	(28,840,146)	(29,670,157)	(30,524,056)	(31,402,529)	
Unlevered free cash flows							492,380,000	184,350,567	168,112,796	150,055,035	130,026,258	
Discount Rate (WACC)							5.46%	5.46%	5.46%	5.46%	5.46%	
Present value of free cash flows							466,896,927	165,762,275	143,338,417	121,320,172	99,685,988	
Sum of present values of FCFs							997,003,779					
Terminal Value												
Growth in perpetuity method:												
Long term growth rate								1.06%				
WACC								5.46%				
Free cash flow (t+1)								100,743,361				
Terminal Value								2,291,047,550				
Present Value of Terminal Value								1,756,455,528				
WACC												
Share Price								75				
Diluted Shares Outstanding								134,500,000				
Cost of Debt								3.30%				
Tax Rate								40.00%				
After-tax Cost of Debt								1.98%	RF	Beta	RM-RF	
Cost of Equity								6.15%		2.32	1.20	3.20
Total Debt (\$)								1,997,600,000				
Total Equity (\$)								10,070,015,000				
Total Capital								12,067,615,000				
Debt Weighting								16.55%				
Equity Weighting								83.45%				
WACC =								5.46%				
Enterprise Value to Equity Value												
Enterprise Value								2,753,459,307				
Less: Net debt								1,933,400,000				
Equity Value								820,059,307				
Diluted Shares Outstanding								134,500,000				
Equity Value Per Share								6.10		Overvalued		

