Industry, Behavioural and Economic Influences on the Implementation of Valuation Methods

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Abstract

This thesis examines which valuation methods equity research analysts use in order to value midcap firms in different industries around the world. The relevance of this research is to understand the decision process of how equity research analysts determine which valuation method is the most appropriate. This paper focuses on the influences of industry, investor sentiment and the financial crisis. Binary logit models have been used in order to determine whether these factors play a role in the employment of a certain valuation metric. By conducting a descriptive analysis on the 412 equity research reports it became clear that the DCF method (181) is the most frequently applied method, shortly followed by the price-to-earnings (P/E) multiple method (168). The logit models show that the industry in which a company is active, measured by the percentage of (in)tangible assets, has a significant effect on the equity researcher's valuation behaviour. In addition, it has become clear that investor sentiment does have an effect on the chosen valuation method. However, the results are ambiguous and further research is recommended. Finally, the current global financial crisis has had a negative effect on the use of multiples as a valuation metric. Nonetheless, it is not clear that there has been a shift from multiples towards the DCF method.

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1. Introduction

As this thesis focuses on equity analyst reports it is essential to understand the motivation and relevance of these reports. An analyst's report consists of two parts, namely: the historical (past) data part and the forecasts or estimates part. The forecasting of earnings is potentially a difficult and simultaneously risky process for the analyst. The equity research reports are written by a wide range of investment banks, brokerages and financial institutions and are used by a large amount of private and institutional investors. An assumption that is commonly made is that equity analysts adhere to the efficient market hypothesis (EMH). This hypothesis implies that all available information is incorporated into the price. However, this is not evident to the client that uses these reports to make an investment decision (Givoly and Lakonishok; 1979). Theory and practice tend to contradict each other on this topic. The semi-strong form of market efficiency states that investors should not be able to make a positive return based on publicly available information, because it is already incorporated into the price and therefore no profit is available. On the other hand, Wall Street research departments and brokerage house employ a large number of equity analysts with the intention that these analysts can provide research that will generate superior returns (Barber, Lehavy, McNichols and Trueman; 2001). Thus, the possibility that equity analyst's reports can provide a profitable investment strategy solely by using publicly available information is suggested in theory (Stickel; 1995 and Womack; 1995). Also, it has been shown by Barber et al. (2001), that favourable changes in individual analyst recommendations are accompanied by positive returns at the time of their announcement. The relevance of equity analysts' reports becomes more apparent when studies indicate that positive returns are obtainable in practice.

The importance of an equity analyst report gains more weight when the restrictions of rational investor behaviour are slightly loosened. When all investors no longer share the same homogenous expectations and investor behaviour diverts from being rational, then investors and analysts both are interested in these heterogeneous expectations. If investors are now interested in the dispersion of expectations then they have to understand what causes it. This can best be described as "investor sentiment". Investor sentiment in its purest form can be classified as either: positive or negative. When an investor is looking to sell a security it would be easier to sell to an optimistic investor, who believes the price of the stock will go up. On the other hand, pessimistic investors expect the price to go down and will therefore short sell the stock creating additional supply in the market (Baik and Park; 2003). Nowadays, more and more attention is being focused on the subsection of finance literature called behavioural finance. This field of research focuses on the aspect of psychology in combination with finance and tries to explain why investor expectations

differ and how to incorporate this into investment decisions. I have decided to incorporate this behavioural aspect when looking at equity reports, because it might be able to explain a discrepancy between the fundamental value, the equity value and the equity analysts forecast and recommendation. I shall go into more depth on this topic further on in this paper, however, it is critical to understand the relevance of the equity analyst's report and especially how these analysts arrive at their recommendation.

Furthermore, equity analysts can be split up into sell-side analysts and buy-side analysts. Sell-side analysts work for brokerage firms and provide research for the firm's brokers and their clients. Their earnings forecasts and stock recommendations are also available to the public (Cheng, Liu, and Qian; 2006). These authors state that sell-side equity research has investment value and refer to further academic literature such as: Elton, Gruber, and Grossman (1986); Stickel (1995); Womack (1996); Barber, Lehavy, McNicols and Trueman (2001) and Li (2005).

Sell-side analysts face a conflict of interest, namely: the goal to report information and recommendations objectively and the incentive to offer optimistic research and recommendations. By providing slightly more positive recommendations this would result in their clients buying the stocks of companies that the brokerage firm has relationships with, which will have an overall positive result on the brokerage firm's performance and that of the equity analyst.

Research Objectives

There is a lack of information on how companies are valued by equity analysts and there is also little known about how these analysts form their outlooks on the macro economy and on individual firm's earnings estimates. While determining the value and target price of a company, the analysts have the ability to choose from of a vast array of valuation methods. This paper will discuss a number of different research objectives. First of all, I shall provide an overview of the assortment of valuation methods that analysts use and how often they employ certain methods in order to make an accurate valuation of a firm. Secondly, I shall focus on the influence of the industry, measured by the percentage of (in)tangible assets, on which valuation method is more likely to be employed by the analysts in question. Thirdly, it is not only important to understand which fundamental valuation methods are used, but also to understand whether investor sentiment has an effect on the chosen valuation method used. Finally, I shall focus on the effects of the most recent financial crisis and the consequence it has had on the implementation of (un)sophisticated valuation methods. To summarize, this thesis will try to provide information about the available valuation methods, how these methods are chosen and why they are used.

This thesis does not only aim to make a distinction between the different valuation methods and how often they are used, but also to understand why these approaches are chosen in contrast to

the others available. It will then be possible to provide evidence that for instance traditional cash flow methods are used more often compared to the comparative approach using multiples.

Structure Overview

This introduction provides the aim and relevance of this research but also explains the importance of sell-side equity analyst reports. Equity research reports have been the main source of data in this thesis. The rest of this paper will be structured as followed: chapter 2 will provide an overview of the academic literature covering this topic. In chapter 3 I shall state my hypotheses, which are predominantly based on the literature. Chapter 4 and 5 will cover the methodology and data, respectively. Chapter 6 will provide an overview of the results and chapter 7 will summarize the main findings, discuss any limitations and provide recommendations for future research.

2. Literature Review

In this part I shall discuss previous academic literature that is relevant for this topic and I shall draw on major findings to help me progress with my own research. This chapter has been subdivided into sections that are all incorporated in a sell-side equity analyst's report. By using this wide range of academic literature that has already been written I will be able to determine the hypotheses for my own research. These hypotheses are stated in the following chapter.

2.1 Valuation Methods

The valuation method employed by the equity analyst is a very important tool when writing the report and can have a strong effect on the overall recommendation made by the equity analyst in their report. In order to fully understand how and whether the valuation method can have an effect it is important to distinguish between the available valuation methods. It is also vital to remember that a valuation model is never a completely objective method of determining the exact value. This is because the analyst will include biases in the valuation process and make assumptions which will make their way into the resulting value.

2.1.1 Absolute vs. Relative Valuation Methodology

I have made the categorization that there are two major categories where one can place a valuation method. Absolute valuation models on the one hand and relative valuation models on the other. Absolute valuation models try to determine the "intrinsic" value of a project, investment or company by only looking internally at the fundamentals that determine the value. Fundamentals consist of sales, dividends, cash flow and the growth rate of a company. These are all internal factors and not external factors such as when a valuation is made by looking at comparable companies. Valuation models that fall into the absolute valuation category are: the dividend discount model (DDM), the discounted cash flow (DCF) model, residual income model (RIM) and net asset value (NAV) model.

An alternative category that a valuation method can belong to, is the relative valuation model. These models compare the company that is being analyzed to similar companies, which are either in the same industry or companies that are similar due to their nature or size. These methods usually use multiples or ratios, such as the price-to-earnings (P/E) ratio, or a multiple of the enterprise value (EV)-to-earnings before interest, debt and amortization (EBITDA), together the EV/EBITDA multiple. Once these ratios or multiples have been determined they can then be compared to the same multiple of a similar company. Generally this type of valuation is much easier and faster (therefore referred to as "quick and dirty"). In many cases a combination of absolute and relative valuations is used by analysts.

2.1.2 Sophisticated Valuation Techniques

First of all, the paper by Stanley Block in 1999, discusses the findings regarding which analytical techniques are used by financial analysts. His research covers important areas in valuation methodology such as: present value analysis, quarterly earnings announcements, belief in efficient markets, market anomalies, and the belief that international diversification lowers risk. The actual goal of the paper is to identify which approaches are most widely used. In order to determine this, the author uses a questionnaire that he sent out to the members of the AIMR. By doing so he is able to conclude that present value techniques are not as widely used in practice as they are in theory. His suggestion for this disparity between theory and practice is that the selection of an appropriate discount rate and prediction of future cash flows is simply too complicated than the theory suggests. Another important finding is that a significant amount of the analysts interviewed state that the importance of quarterly earnings is overemphasized by the financial media and that the long term strategy of a firm is more important. In comparison, analysts highly value the economic value added (EVA) approach over the more traditional CAPM dividend discount model. Additionally, the analysts that filled in the questionnaire explain that the most important variable in determining return is the skill and training of the portfolio manager. Furthermore, the author states that international diversification has a far lower effect on risk due to an increasing level of integration in the global financial markets. To summarize, Block suggests that in practice the so commonly taught present value technique is not used as often as presumed. In contrast, the author places more emphasis on the economic value added approach.

The paper written by Fernandez (2007) provides an overview of the possible approaches with which one can value a company based on cash flow discounting. The author lists the ten most commonly used methods for valuing companies by this more traditional approach. These include the free cash flow (FCF), equity cash flow, capital cash flow, adjusted present value, business's risk adjusted free cash flow and equity cash flow, risk-free rate adjusted free cash flow and equity cash flow, economic profit and economic value added (EVA). The aim of the paper is to figure out whether all of these valuation methods provide the same end value. The main finding, although possibly rather contradictory to previous literature, is that all ten methods always provide the exact same end value. This would be in line with the efficient market hypothesis. The author explains his finding by stating that the differences between cash flow based valuations occur in the computation of the tax shield. By taking this literature into consideration we can therefore make the assumption that analysts do not choose a cash flow based valuation approach over an alternative cash flow based valuation method because one might provide a different end result.

In contradiction to the paper by Fernandez, who states that all absolute valuation techniques provide the same end result, there is also evidence that two methods that both belong to the

sophisticated valuation method do indeed present different estimates of equity value. In the studies conducted by Penman and Sougiannis (1998) and Francis, Olsson, and Oswald (2000), they both report that, with non-price based terminal values, the residual income model (RIM) outperforms the DCF model. The limitation of these studies is that they do not explain exactly *why* the RIM would be superior to the DCF model. This finding is then contradicted by Lundholm and O'Keefe (2001), where they explain that the differences in valuations between the DCF model and the RIM are caused by the difficulty to consistently apply the same assumptions to the different models. They suggest that there is no evidence that the RIM is superior compared to the DCF model.

In more recent literature, Giamouridis and Montagu (2011) present results that show that "sophisticated valuation models are superior, although not universally, relative to simple valuation models in many respects". They conclude that the sophisticated models should be considered as an additional if not primary perspective on equity valuation and portfolio management. The paper goes on to describe the fact that, in general, the sophisticated models, such as the residual income model (RIM) and return on margin ratio (ROM), are more precise and accurate valuation methods than their more simple peers.

As is clear in recent literature, it is possible to state that the most commonly used absolute valuation methods are the discounted cash flow and the residual income model. However, there seems to be some discussion as to which absolute valuation technique is superior. In this research, it will become apparent which absolute or sophisticated valuation technique is used more often by sell-side equity analysts.

The sensitivity analysis has shown that the DCF method is very vulnerable to changes in the underlying assumptions. Small changes in the perpetual growth rate will lead to huge variances in the terminal value. Since the terminal value accounts for a large portion of the company's value, this is of big significance for the validity of the DCF method (Steiger and Paper; 2008).

2.1.3 Unsophisticated Valuation Techniques

In contrast to the sophisticated valuation techniques, which are based on internal and mainly cash flow based data; the unsophisticated or relative valuation techniques use multiples or ratios to compare companies in order to determine a realistic value of the company in the market. The primary concern for analysts using the sophisticated valuation techniques is that they are required to make assumptions and estimations to make forecasts for future earnings. This is a very complex process and small errors in these forecasts can have a large effect on the resulting value. Another characteristic of sophisticated valuation techniques is that they take multi-period data into consideration, which arguably can be an advantage or a disadvantage. However, in the case of unsophisticated valuation techniques, only one period is taken into consideration. First of all, this

makes the whole process far less complicated and it can be argued for that it also provides a more accurate value of a firm at the time of calculation. It gives a more realistic indication of what investors are willing to pay for in the market at this moment. In the part below I shall discuss the relevant literature regarding unsophisticated valuation techniques.

The paper by Demirakos et al. (2004) distinguishes between sophisticated and unsophisticated valuation methodologies. The traditional cash flow based methods, as explained above, all tend to provide a similar yet accurate indication of the fundamental value of a company. These cash flow based methods are considered to be the sophisticated valuation approach. However, the unsophisticated or sometimes referred to as "quick and dirty" methods are also used very often by analysts. According to Demirakos et al. these unsophisticated valuation methods tend to be perceived as more popular and used more often than the sophisticated valuation methods.

The paper by Goedhart, Koller and Wessels (2005) explains that "senior executives gravitate towards DCF analyses as the most accurate and flexible method for valuing projects, divisions and companies." However, they state that this method heavily relies on the estimation of a number of key ingredients that when turn out to be wrong can lead to big mistakes. Therefore, they propose using comparable companies and other companies multiples together with the DCF method to come to a more accurate valuation. By comparing these multiples with competitors and with other comparable listed companies the analysts can come to a conclusion which factors are really creating value in an industry. A very commonly applied model is the price-to-earnings (PE) model. This model takes an industry average price-to-earnings ratio and multiplies it by a company's earnings in order to come up with a valuation. However, this can be considered to be an oversimplified model to use when valuing complex and intricate companies with a diverse business model. By using the industry average the analyst makes an assumption that the growth rates, return on invested capital and capital structures of the individual company are similar to the industry average. However, in reality these numbers may be far off from the industry average. A solution to this limitation would be to hand pick and select other companies that are either in the same business or industry, or are in another way comparable, and use a weighted average of these multiples to come up with one multiple that will possibly provide a valuable insight on what the company is worth.

An additional valuation model that receives a lot of attention from analysts is the dividend discount model. This is a simple model that focuses solely on the number of future dividend payments and discounts them back to the present. In the paper written by Richard Barker (1999), he explains that although this model does not actually determine the share price it does work as a benchmark of relative price differences. This benchmark serves as a basis from which to conduct subjective and company specific analysis in order to establish a full and accurate valuation of a company. The author goes on to describe the preferences of analysts and fund managers when

choosing valuation techniques. He also relates back to the popularity of “unsophisticated” valuation as the method of choice compared to the traditional cash flow based methods. He explains that this is due to the fact that practical implementation of determining future cash flows and in particular figuring out an estimation of a terminal value can prove to be too complex in reality.

2.1.4 Trading Multiples

“The method of multiples has advantages over the discounted cash flow method (Baker and Ruback; 1999)”. The complex procedure of making assumptions in determining the proper discount rate and applying this to forecasted future earnings in the DCF model is conveniently circumvented when using the method of multiples. The appropriate discount rate, growth rate and required returns are already incorporated in the multiple of a comparable company. The difficulty in determining the multiple is figuring out what is a suitable comparable company or peer group. This can be best determined by the substitutability of the two companies in question according to Baker et al (1999). If a truly comparable publicly traded firm or transaction were available, if the basis of substitutability could be determined, and if the multiple could be estimated reliably, then the method of multiples would be clearly superior to discounted cash flow analysis, according to the authors.

A firm's value can be reasonably assessed based on the P/E ratio of its comparable firms with similar risk and growth (Agnes, Cheng and McNamara; 2000). This is also reflected in the recommendations (and target prices) made by sell-sell equity analysts, namely that they preferably use the price-earnings ratios and expected growth (PEG) to base their advise on (Bradshaw; 2002). The fact that equity analysts seem to prefer to use the P/E (or price-to-book) ratio multiple to value a company can be explained by the accurateness and substitutability of the respective ratio and company. By clearly defining a group of truly comparable companies, an analyst avoids the difficulties of making personal assumptions about the discount rate, growth rate and rates of returns. When this group of comparable companies is a good match then these variables will already be factored into the equation. Therefore, it can be said that when analysts use multiples, such as PE, PB or PEG, this will give a more accurate calculation of a firm’s value. However, the difficulty here lies in the determination of the group of comparable companies, which is dependent on substitutability.

2.1.5 Transaction Multiples

Spremann (2002) discusses the differences between trading and transaction multiples. The multiples based on a peer group of similar floated companies serve for trading purposes (i.e., buying and selling small proportions of a stock); whereas the transaction multiples determine the actual amount that was paid for a merger or acquisition (M&A). Hence, the distinguishing feature is the amount that is actually paid to acquire control over the company. This is referred to as the "control premium". Corporate transactions usually involve a substantial change in the ownership structure, which usually goes hand in hand with a change in the controlling power of the firm. Therefore, in order to obtain this power a higher amount is paid to acquire the business, which tends to make transaction multiples higher than trading multiples. Depending on the market conditions, this premium can go up to fifty percent (Schreiner; 2007). However, when we look at transaction multiples as reference we see that there is evidence that suggests that discounted cash flow methods dominate market multiples as the preferred approach for valuing both publicly-held and closely-held companies (Mukherjee, Kiymaz and Baker; 2004). Nevertheless, transaction multiples are more relevant in the case of mergers and acquisitions (M&A) and are not so apparent in equity analyst reports. Therefore, transaction multiples shall not be included in this research.

2.2 Industry Focus

The paper by Demirakos, Strong and Walker (2004) study the different valuation methodologies enclosed in analyst reports made by UK investment banks. Their paper provides an overview of the different valuation methods used by analysts and also gives reasons or suggestions as to why these approaches are used instead. Their research focuses on three distinctive sectors, namely beverages, electronics and pharmaceuticals. The authors find that the use of valuation by comparatives in the beverage sector is used more often compared to the electronics and pharmaceuticals industries. Also, they find that the most predominantly used valuation methods are the P/E multiple and the DCF method. Furthermore, they present a contradictory finding, namely that some analysts prefer a comparative valuation model over an multi-period cash flow valuation model, such as the DCF.

Demirakos et al. shed new light on the valuation methodologies used by analysts, namely by making distinctions based on industry and sector. Their main conclusion is the fact that analysts appear to adapt and adjust their valuation methodologies by considering the specific industry that they are analyzing. In their research it seems that P/E models are the model of choice, but DCF models are also used frequently. However, the authors identify that price-to-sales multiples, growth options, or profitability analyses are also used in some cases to value a company.

There is also evidence that suggests that analysts prefer different valuation models when looking at different industries. Analysts' preferences between valuation models vary systematically according to stock market sector (Barker; 1999). Survey evidence is presented that the PE ratio dominates the dividend yield as a valuation model used by analysts for companies in the services, industrials and consumer goods stock market sectors. In sharp contrast, however, the survey evidence suggests that the dominance of the PE ratio breaks down in favour of the dividend yield in the financials and the utilities stock market sectors.

Further evidence can be found that suggests that the great majority of telecommunications analysts use the DCF as their primary valuation method. Most analysts also use multiples, but only to validate their DCF results, not as an independent valuation tool (Friedrich and Glaum; 2006).

The previous academic literature discussed above provides evidence that suggests that analysts' valuation model preferences vary according to industry. This paper will continue by discussing the difference between tangible asset based industries and intangible based industries. This distinction is made in order to measure the industry in a quantifiable way.

2.2.1 Tangible Asset Based Industries

The paper by Demirakos et al (2004) already makes a distinction between industries or sectors based on certain characteristics. These characteristics are defined as when a company has fairly uniform and stable growth, comparable costs of capital across companies and transitory earnings items that can be identified and excluded from the analysis. The results of the research show that when a firm adheres to this description then there is a higher likelihood that an unsophisticated valuation method, such as a valuation based on PE comparatives, will be used by the equity analyst. An example of such an industry is the beverages sector, which also be described as a fairly mature industry with a large amount of tangible assets on its balance sheet.

The results suggest that the widespread procedure of selecting comparable firms by industry is relatively effective, where industry is defined by the first three SIC digits (Alford; 1992). While the valuation literature recommends that comparable firms should be selected from the same industry, the literature does not indicate how industries should, be defined. The results in this section suggest that defining industries by the first three SIC digits is reasonable. Tasker [1998] examines across-industry patterns in the selection of com-parable firms by investment bankers and analysts in acquisition transactions. She finds the systematic use of industry-specific multiples, which is consistent with different multiples being more appropriate in different industries.

2.2.2 Intangible Asset Based Industries

On the other hand, it is to be expected that accounting measures of performance are less relevant for intangibles-rich firms or for firms with large portfolios of growth opportunities. Consistent with the results in the paper by Demirakos (2004), pharmaceuticals usually fall into this category, with beverages being at the other extreme. Therefore, it can be expected that a valuation will be made based on a sophisticated valuation method such as the DCF model. However, a more discriminating test shows that a multi-period valuation model rather than a single-period method of comparatives is more likely to be the analysts' dominant model in the pharmaceuticals sectors compared with beverages. This result is consistent with the hypothesis that comparative valuation models are more popular in more stable sectors where conventional accounting does a better job of capturing the value of the firm.

An industry that is often discussed, and can definitely be placed well within the intangible asset based sector, is that of the technology, IT or e-commerce. Since many of these businesses have not made a profit, the traditional measures of profitability such as return on assets, the price/earnings ratio can be meaningless. Therefore, equity analysts need to understand and potentially come up with new ways to measure the value of these companies. Many tech-stock prices have increased to the point that they do not reflect the company’s ability to generate earnings

and revenue. This is possible because the entry costs of creating e-commerce businesses are not as high as starting up an actual business with a lot of tangible assets. Calculating a value for an Internet company is every bit as sticky and complicated as calculating a value for a traditional company (Gollotto and Kim; 2003). However, it can be said that the traditional ways of valuing a company in the IT or high-tech sector will not be sufficient and new or alternative ways need to be used.

2.2.3 Real Options Valuation

An area of literature that has not been covered yet is that of the real options valuation (ROV) method. Real option valuation was launched in 1973 with the models created by Black, Scholes and Merton (Black and Scholes 1973; Merton 1973). For the first time, in 1985 Brennan and Schwartz (1985) evaluated a mining project while using the ROV valuation method. More recently, empirical evidence has shown that when valuing a company that has the option to shut down, temporarily close or expand with the ROV method in addition to the DCF method has had a significant effect on investment decisions and the valuation of companies within the natural resources and mining industry (Blais, Poulin and Samis; 2005). Also from a more hypothetical approach research has shown that ROV valuation methods are an appropriate way to evaluate mining companies because of the operational flexibility that is an indispensable part of mining companies (Dogbe, Frimpong and Szymanski, 2007). Therefore, it is important to incorporate ROV methods when evaluating companies where the best operating mode in the future is difficult to forecast today, there is a great amount of uncertainty in the industry and when it is difficult to predict future cash flows (Shafie, Topal and Nehring, 2009).

Besides analyzing what valuation models are used after significant M&A activity, inter-industry differences are worthwhile focusing on as well. Real option analysis brought forward by Kester (1984) already showed differences in growth option value between industries. This analysis was later extended by Tong & Reuer (2006) who found that, although firm characteristics dominate real growth option value, industry effects do play a significant role. They found that industries like pharmaceuticals, chemical, and measuring, analyzing and controlling instruments possess high growth options, while transportation and furniture and fixtures have a lower value of real growth options.

In the paper written by Graham and Harvey (2001), they find evidence that 27%-32% of all companies use real option valuations. This can be seen as an indication that it does not even depend on the industry that the company is active in. The literature suggests that only firms that are active in fields such as oil exploration or the development of new drugs (such as pharmaceutical companies) would use the ROV technique. However, there is now evidence that suggests that almost one third of all firms occasionally use the ROV valuation method.

2.3 Investor sentiment

There might be additional factors that play a role in the valuation of a firm according to Imam, Barker and Clubb (2008). They take their research one step further by stating that there are other forces that might influence the valuation process of a company. They state that, in practice, valuation multiples and subjective judgement of whether the market price "feels right" are heavily relied upon instead of the "more sophisticated" discounted cash flow model. On the other hand, they also assert that the DCF model has become significantly more important than is suggested in previous literature, meaning that there has been a shift back towards the roots of valuation methodology over the years. The paper also relates back to the Demirakos et al. (2004) research and provides evidence that industry factors play a role in the adoption of the DCF model when valuing higher growth firms, such as technology and media companies.

Not only do equity analysts base their valuation and earnings forecasts on what "feels right", but they can also get carried away in the process. Overreaction, the tendency to make forecasts that are too extreme given the predictive value of the information available to the analyst, is a form of investor sentiment that can influence an analyst's recommendation when valuing a firm. There is also evidence that suggests that analysts tend to underreact to negative information and overreact to positive information (Darrough and Russel; 2002). This leads us to believe that analysts disregard pessimistic information that might have a negative effect on the outcome of their valuation or recommendation. It is therefore important to understand how an analyst behaves and how they (over)use or disregard information in the process of forming a valuation.

With the knowledge that equity analysts' behaviour has an effect on the information process there might be additional situations to look out for. So if the analyst has a tendency to underreact to negative information and overreact to positive information, because of the recommendation they would like to be seen giving about a certain firm they might be influenced in other ways as well. The paper by Cowen, Groysberg and Healy (2006) provides evidence that analysts at prestigious investment banks are prone to giving more optimistic reports about firms in order to attract new clients and increase brokerage services. This can lead to conflicts of interest when the reports that these analysts are supplying are no longer objective. The main incentive for analysts is to provide a positive recommendation, caused by optimism, which will then relate in new business for the trading or brokerage department of the investment bank. The goal for the analyst is to carefully choose which information to use in order to come up with the desired positive recommendation. In order to do this, comparable trading multiples are more likely to be used than the more objective and fundamentally based DCF model.

2.3.1 Behavioural Valuation

After evaluating the evidence in the literature that analyst behaviour can affect the way the analyst incorporates or disregards information into the valuation, it might be possible to determine the influence of an analyst's behaviour on the chosen valuation method. In the paper by Asquith et al. (2004), it is stated that there is "no correlation between valuation methodology and either analyst accuracy or the market's reaction to a report". This implies that the chosen valuation methodology does not explain the analyst's recommendation. The actual valuation only describes a part of the process that the analyst goes through to come up with a target price and recommendation in the end. Asquith explains this statement by saying that only in 54% of the cases the analyst's price targets are achieved or exceeded in reality. The remaining 46% of the firms that were inaccurately valuated are due to the over optimism of the analysts. The paper goes on to restate the observed phenomenon that analysts tend to use a simple earnings multiple valuation, or in other words an unsophisticated valuation method, instead of a net present value or other discounted cash flow approach which they say is only favoured in finance textbooks and MBA curriculums. There is additional evidence (Stickel 1991, Abarbanell 1991, Dreman & Berry 1995) that analyst forecasts are optimistically biased above actual earnings. This is due to the fact that analysts tend to give more positive projections, because they hope this will lead to an increase in orders for that share that will then be processed by the brokerage department and trading floor. On the other hand, a similar argument can be made for the opposite that when an analyst makes a negative forecast with a sell recommendation this will also lead to an order and brokerage fees, but the empirical evidence only shows the case for over-optimism of analysts.

2.4 Financial Crisis

In the previous sections of this chapter I have focused on the influence of industry and investor sentiment on the chosen valuation method. I have provided an overview of the different valuation methods and indicated when analysts tend to choose sophisticated valuation techniques over unsophisticated valuation techniques. The industry, measured by ratio of (in)tangible assets, of the company may have an influence on the chosen valuation method. In addition, the overall investor sentiment can have an effect on how a company is valued and the resulting recommendation given by the analyst in their report. Now, I shall consider whether analysts' approaches change due to a financial crisis, economic crisis, banking crisis or the "bursting" of a bubble. This focus is determined by the data set, which is from 2006 up until and including 2010. This time period is characterized by a strong influence of one of the most severe financial crises the world

has seen since the Great Depression. Therefore, I shall look for indications that might suggest that the financial crisis has had an overall effect on the chosen valuation method.

There is a lack of academic literature that discusses the effects of a (financial or economic) crisis on the chosen valuation methods. However, there is evidence that suggests that the dot.com bubble, which occurred in 2001, had an effect on the way equity analysts valued companies. The research by Friedman and Glaum (2006) explains that analysts started to rely more on the discounted cash flow method after the bubble burst than before the dot.com crisis at the end of the 1990s. Before the crisis analysts largely based their valuations on multiples. According to their findings the analysts changed their focus from single period-oriented measures towards an assessment of profitability and cash flow generation. Furthermore, analysts claim to have become more diligent and more critical in their analysis according to Friedrich and Glaum (2006). They not only establish the shift to more fundamental based valuation method, but also identify that analysts have become more conservative and risk averse. This implies that when they use the DCF method their assumptions on the growth rate will most likely be lower than before the crisis. Inevitably this will lead to a lower overall valuation and target price.

Equity analysts are likely to alter their focus towards a more fundamental valuation approach when there is talk of a crisis. When the gross domestic product (GDP) is declining and becomes zero or negative for two or more consecutive quarters this defines a period of stagnation or recession. It is possible to state that when there is three quarters or more of stagnation or recession we are experiencing a crisis. In order to determine whether the collapse and bankruptcy of major financial institutions, such as Lehman Brothers and Bear Sterns, has affected the valuation methods used by equity analysts I will collect the data on quarterly GDP growth. Since the sub-prime mortgage crisis already started in the US in early 2007 I expect to already see signs of the financial crisis in 2008. In order to make it easy to determine a pre- and post-crisis I have chosen to take September 2008 as the cut-off month, because this was the month that Lehman filed for Chapter 11 (bankruptcy). The bankruptcy of Lehman caused a ripple effect that was felt throughout the entire financial services industry and triggered a number of bail-outs and nationalization of companies that were considered "too big to fail". By looking at this cut-off period within the dataset I will be able to see if there is a shift in the way analysts value companies before and after the financial crisis.

3. Hypotheses

This small extract from the vast amount of literature available on this topic provides a useful insight on the existing valuation methods and which factors might influence which valuation method is chosen by the equity analyst. However, the literature still leaves room for discussion whether the traditional or sophisticated valuation methods, such as DCF, are actually used as often in practice as academics believe they are. Also, are the sophisticated valuation methods use more often when compared to the relative or unsophisticated valuation methods (multiples analysis). Especially in the academic world, but also in the education system (bachelor, master and MBA) a lot of time is spent on explaining the traditional or sophisticated valuation methods to students. However, empirical evidence suggests that there might be a divergence from the traditional valuation methods towards the multiples based analysis. Then again, lately it seems that analysts are returning to the more sophisticated valuation methods. This might have to do with the fact that these methods are a more superior and intricate way of valuating a company compared to the quick and simple way when using a relative valuation method (Giamouridis and Montagu, 2011). Also, the paper by Imam et al (2008) states that the DCF model is used more often than is suggested in previous literature, meaning that there has been a shift back towards the roots of valuation methodology over the years.

Based on the evidence provided by previous academic literature that I have reviewed I have formed the following hypotheses regarding the various factors that might influence the choice of valuation method by equity analysts:

1. Valuation Methodology

H1a: I expect that it is more likely that the DCF valuation method will be used more often compared to relative valuation models

H1b: I expect that, within the sophisticated valuation techniques, the DCF model is used more often than the residual income model (RIM)

H1c: I expect that, within the unsophisticated valuation techniques, the P/E multiple is used more often than the EV/EBITDA multiple

2. Industry Focus

Based on the available literature there are signs that indicate that analysts choose a certain valuation method based on the industry that a firm is in. I have divided the industry that a firm can

be placed into tangible assets or intangible asset based firms. For these two categories I expect to see the following in the data:

H2a: I expect that, for firms in an industry with a relatively high percentage of tangible assets, the likelihood that the DCF model will be used more often than multiples increases

H2b: I expect that, for firms in an industry with a relatively high percentage of intangible assets, the likelihood that multiples are used more often than the DCF model increases

In addition to the tangible and intangible asset based industries I have categorized another approach to valuating companies according to industry. This valuation technique is especially useful in the natural resources, mining or energy industry and I believe that the Real Options Valuation (ROV) provides a much more precise value of what these companies are worth when incorporating the ROV method into the valuation process in addition to a traditional cash flow based valuation method, such as the DCF model.

H2c: I expect that the probability that a company is valued by means of the Real Options Valuation (ROV) model increases when it is active in the Energy industry

3. Investor Sentiment

Furthermore, it is unclear how investor expectations are formed. These expectations play a very important role in determining target prices and especially stock recommendations. In order to test which valuation method is used by an equity analyst I will first determine the overall investor sentiment in the analyst's report and see if has an influence on the chosen valuation model.

H3a: I expect that when investor sentiment is generally positive, it is more likely that analysts will use multiples instead of the DCF model

H3b: I expect that when investor sentiment is generally negative, it is more likely that analysts will use the DCF model instead of multiples

4. Financial Crisis

Furthermore, we still are experiencing the aftermath of one of the most severe financial crises since the Great Depression in the 1930's and I want to see whether this has had a rigorous effect on investor confidence. Before the current financial crisis, it was perhaps more common to use simple and easy comparable valuation techniques, but nowadays more accurate and precise tools are required to determine the fundamental value of a company. Hence,

H4a: I expect that, since the start of the (current) financial crisis the probability has increased that the DCF valuation model will be used *more often* than before the (current) crisis began

H4b: I expect that, since the start of the (current) financial crisis the probability has decreased that the multiples analysis will be used *less often* than before the (current) crisis began

4. Methodology

After having established the previous empirical research that has already been conducted on this topic and determining the hypotheses that shall be tested, this section will discuss the methodology. There are numerous approaches to test hypotheses and due to the large amount of hypotheses and the large amount of data available I shall be conducting a number of tests. In this section I will explain the different methods that will be able to show which factors influence the chosen valuation method.

4.1 Manual Extraction Data

First of all, the data has to be manually extracted from the individual analyst reports. I shall do this by reading through each equity research report myself and identify the key information needed for the tests. Once this is done I will be able to provide an overview of the different valuation methods that are used to analyse companies in their respective industries. It is likely that each individual equity analyst has a preference to which valuation methods he/she uses in order to calculate the enterprise value of the company.

Subsequently, the different valuation methods identified per analyst report are subdivided into sophisticated (or absolute) valuation techniques and unsophisticated or (relative) valuation techniques. This subdivision is done on the basis of the characteristics and derivation of the different valuation techniques available (see table 5 for an overview). If the equity analyst specifies in his report that he has used the DCF or DDM valuation technique, for example, then these will be classified as sophisticated valuation models. This is because the DCF and DDM are both fundamental analysis tools that look at the multiple periods of cash flow. On the other hand, an unsophisticated valuation model is identified when one of the following valuation techniques is specified, namely: price-to-earnings (PE), price-to-earnings-to-growth (PEG), price-to-book (PB), enterprise value-over-earnings before interest, tax, depreciation and amortization (EV/EBITDA), or the enterprise-to-earnings before interest and tax (EV/EBIT) multiples. This is because these valuation methods only look at one point in time and use a peer group and multiple to come to the end value.

The manual extraction part of this thesis is an essential, and time consuming, part which allows the reader to fully understand the valuation process that the equity analyst has used. By systematically making a note of the specified valuation techniques used, I will be able to gain an insight into the decision process of the equity analyst and how she/he comes to the conclusion which valuation method to use. After this process has been completed I shall focus on which factors influence this decision.

4.2 Logistic Regressions

One way to study which factors might have an effect on the selection of a certain valuation method is to use logistic regressions. Logistic regressions can either take the form of a logit or a probit model, which I will explain the differences further on in this section. The choice of a specific valuation method is the dependent variable, which can only take a binary form. When using the standard statistical analysis of ordinary least square (OLS) regressions it is possible to determine which factors have an effect on the independent variable. However, in this case the dependent variable is binary and using a dummy variable, which takes a value of 1 or zero, is not possible. This is because of the most likely outcome of a statistical OLS test with a binary dependent variable will be either zero or one. A logit or probit model is able to overcome this constraint and will provide useful results by means of using a binary response variable. This is explained well in the book by Brooks (2008).

4.2.1 Logit Model

A logistic regression (or the logit model) is a form of regression analysis that is commonly used for determining the result of a binary dependent variable based on one or more predictor variables. A binary dependent variable is one that can only take two possible outcomes. For example: yes vs. no, or in this case DCF vs. not DCF, sophisticated vs. unsophisticated valuation method or even crisis vs. pre-crisis.

Logistic regression tries to model the probability of, in this case, analyst reports that use the DCF valuation using a linear function of the predictors. Specifically, the log-odds of the DCF method being used (the logit of the probability) is fit to the predictors using linear regression. The odds are described as the probability of the value being one (chosen valuation method is DCF) divided by the probability of the value being zero (i.e. the chosen method is not DCF). The odds ratio is the main measurement tool in logistic regression and is calculated in order to evaluate the odds that membership in one group will lead to a binary outcome of one (DCF) with the odds that membership in some other group will lead to the same outcome. The odds ratio (OR) is simply the probability of being the required value for one group divided by the odds of being the required value for another group. An odds ratio of one indicates that the probability that the chosen method is indeed DCF is equally probable for both groups under comparison. The higher the OR becomes, the stronger the relationship. The lowest value for the OR is zero, but it can increase to an infinitely high positive value.

4.2.2 Probit Model

Compared to the logit model, the probit model creates a cumulative distribution function instead of converting the model by building a cumulative logistic function. This alternative method of statistical analysis is very similar to the logit model. The probit model is also a type of logistic regression where the dependent variable can only take one of two values (e.g. sophisticated vs. unsophisticated valuation method). The probit model is a specification for an ordinal or binary (only two outcomes) model that employs a probit link function. This model is used often when estimating the standard maximum likelihood that an outcome will occur. However, as both models generate comparable results, because the densities are relatively homogenous, the selection of either the logit or probit model is rather arbitrary.

4.2.3 Dummy Variables

In this thesis, as already has become apparent, it will be important to incorporate binary variables. Dummy variables are binary and can only take a value of one or zero. If it is the case that a DCF valuation method, or other sophisticated valuation method, has been used by the equity analyst the dummy variable will receive the value of one, and zero otherwise. The same process will be repeated to determine whether multiples, or unsophisticated valuation methods, have been used by the equity analyst. Dummy variables are often referred to as proxy variables that represent qualitative facts in a logistic regression. Usually, the variables in a regression have a quantitative characteristic, such as earnings, sales or assets, which can be expressed in numbers (e.g. US dollars). When a dummy variable is included as a value of one, its coefficient will alter the intercept. When the dummy variable takes the value of zero it will have no effect on the dependent variable. The result the dummy variable with value 1 has on the dependent variable can be compared to the dummy variable with value 0.

When there are multiple dummy variables that must be included in the equation, the constant term has to be excluded. If a constant term is included in the regression, it is important to exclude one of the dummy variables from the regression, making this the base category against which the others are assessed. If all the dummy variables are included, their sum is equal to 1 resulting in perfect multicollinearity. When two or more predictor variables are highly correlated in a multiple regression, this is referred to as multicollinearity. When the problem occurs that all dummy variables are included, which results in perfect multicollinearity, this is referred to as the dummy variable trap (Garavaglia and Sharma; 2000).

4.2.4 Log Odds Coefficients

The odds ratio is the probability of success divided by the probability of failure and is an exponential function of x (Hosmer and Lemeshow, 2000). The odds ratio shows that the probability increases multiplicatively by exp(β) for a one-unit increase in x, so exp(β) is therefore the odds ratio. If the parameter of an independent variable is (i.e. the log odds ratio) 0 the odds ratio is 1[exp(0)], which indicates a 50/50 probability of success. For example, if one of the predictor variables has parameter of 0.862, the odds ratio is [exp(0.862)] 2.368. This odds ratio of 2.368 implies that a one-unit increase of the independent variables increases the odds of success by 137%. On the other hand, if another parameter is -1.145, the odds ratio is 0.318 [exp(-1.145)] which indicates that a one-unit increase of the predicator variable alters the probability of success of the dependent variable by a degree of 32%. Appendix table 1 provides an overview of the relation between the log odds, odds ratios and probabilities of success.

4.3 Testing Investor Sentiment

In the case of testing investor sentiment I shall conduct a simple word count. By counting certain words that are indicated to indicate whether an analyst has an overall positive or negative sentiment I shall be able to determine the overall investor sentiment. Simply by using the search function (control + F) in Adobe Acrobat Reader I will go through each individual report and detect how many signaling words there are in total.

However, when conducting the word count there are certain factors to consider. First of all, each equity analyst has his/her own way of writing. This means that certain analysts may be inclined to use certain words more often than others. Another element to think about is the amount of pages that the report has. If the amount of pages increases, then the probability that a certain word will be detected more often will also increase. In addition, it is important to bear in mind that equity analysts, in general, tend to be slightly (over)optimistic and therefore are more likely to provide a positive recommendation and therefore use more positive words to support their arguments. This is in line with the findings of Dechow, Hutton and Sloan (2000) and Dugar and Nathan (1995). In order to take all of these factors into account and in some way still be able to determine the investor sentiment in the equity report I shall use the equations mentioned below. Finally, I shall then test whether the analyst's sentiment or the overall investor sentiment has a significant effect on the chosen valuation method.

I have already mentioned that I will manually count the number of words that indicate whether there is an overall positive or negative sentiment. However, once this is done this gives an absolute number that does not provide much insight. In order to understand the influence of investor sentiment I shall calculate the increase/decrease of positive and negative investor sentiment. This is determined by calculating the net difference and the change in net difference. The equations to obtain the net difference and change in net difference are:

- $Net\ Difference = N\ Positive - N\ Negative,$ (1)

N Positive is the absolute amount of positive words accounted for. N Negative is the absolute amount of words that identify a negative investor sentiment in year t.

Change in net difference is calculated as follows:

- $\Delta Net\ Difference = \frac{Net\ Difference\ Year\ (t) - Net\ Difference\ Year\ (t-1)}{Net\ Difference\ Year\ (t-1)},$ (2)

Net Difference Year (t) refers to the net difference in the current year and Net Difference Year (t-1) refers to the net difference in the year before. This shows the relative increase/decrease in investor sentiment.

4.4 Financial Crisis

Finally, in order to determine whether the financial crisis has had an effect on the chosen valuation method I have incorporated a number of economic indicator variables into the model. Table 1, see below, provides an overview of the economic indicators that are included in the logit model. The table also shows the number of times the variable is accounted for in the dataset. The first variable, CRISIS, is accounted for (1 when detected) when there is negative economic growth. The LEHMAN variable is a cut-off within the time period of the dataset. The fall of the notorious investment bank Lehman Brothers has been seen as the start of the global financial crisis. Therefore, whenever the equity research report was written after September 2008, the month in which Lehman Brothers filed for Chapter 11 bankruptcy, it is accounted for with a value of 1. The VIX variable depicts the degree of stock market volatility. In the years before the financial crisis, the VIX level remained relatively stable around a level of approximately 15. A VIX number of 15 implies that there is an expected annualized change of 15% over the next 30 days (Brenner and Galai; 1989). Since the financial crisis started, the equity market has been characterized by much higher levels of volatility, which are then represented by higher values on the VIX index. Finally, the GDP variable shows the state of the GDP growth. The CRISIS variable only looks at negative economic growth, but the GDP variable also includes economic growth smaller than 1%. These are the economic indicators that are incorporated into the logit model to see whether they have an effect on the chosen valuation method.

Dummy	Succes Rate		
	Observ.	Yes (=1)	No (=0)
Crisis	412	81	331
Lehman	412	182	230
VIX	412	75	337
GDP	412	107	305

Table 1: This table provides an overview of the descriptive statistics of each (dummy) variable that is used in the logit regression regarding the financial crisis.

4.5 Descriptive Statistics

In this section I will descriptive statistics on the continuous variables used in the regressions later on. Table 2, see below, presents and explains the response and predictor variables that have been used.

Variable Name	Description
Dependent Variables	
Sophisticated	Dummy variable equal to one if a form of sophisticated valuation method is used in the equity report
Unsophisticated	Dummy variable equal to one if a form of unsophisticated valuation method is used in the equity report
Independent Variables	
INTANG	Percentage of total intangible assets over total net assets
TANG	Percentage of total tangible assets over total net assets
AGE	Difference between the founding year of the company and the year in which the equity report is published
TA	Total amount of net assets on balance sheet at t0 compared to equity value as percentage
SALES	Sales growth of t0 compared to t-1. Expressed in percentage. Data used from equity report
EARNINGS	Net income as a percentage of current year's (t0) sales
MCAP	In millions of US dollars equivalent according to equity report
ROA	Return on assets (ROA) as a percentage provided by equity report when available
BETA	Describes the volatility of the stock and how it is correlated to the benchmark, e.g. S&P500
PAGES	Total number of pages the equity research report consists of
REGION	Dummy variable equal to one when the company's headquarters are located in an emerging economy
LnPOSITIVE	Natural logarithm of the absolute amount of words attributed to a positive investor sentiment
LnNEGATIVE	Natural logarithm of the absolute amount of words attributed to a negative investor sentiment
LnNET DIFFERENCE	Natural logarithm that shows the in/decrease of positive/negative words from year t0 compared to year t-1
CHANGE NET DIFF	Percentage that describes whether there has been a(n) in/decrease in the amount of positive/negative words
CRISIS	Dummy variable equal to one when negative economic growth is detected in the country where the company's headquarters are located.
LEHMAN	Dummy variable equal to one if the equity report was published after September 2008, the month in which the investment bank Lehman Brothers filed for Chapter 11 bankruptcy
VIX	Measures implied volatility of the S&P500 index options. Used as an indication of stock market volatility over the next 30 day period
GDP	Measures GDP growth in the country where the company is headquartered. Aimed to show not only negative economic growth, but also positive growth smaller than 1%

Table 2: Description of the dependent and independent variables used in the regressions.

			Percentiles					
	Mean	Min	25th	50th	75th	Max	St. Dev.	Nr.
INTANG (%)	15,63	0,00	1,41	7,83	27,28	69,00	17,87	412
TANG (%)	84,37	22,61	31,00	72,72	92,17	98,59	34,89	412
AGE (years)	55,63	4,00	21,00	41,00	95,00	166,00	47,02	412
TA (%)	1,23	0,45	0,63	1,12	1,87	2,23	0,33	412
SALES (%)	7,21	-24,43	2,76	8,37	12,56	90,56	16,65	412
EARNINGS (%)	18,76	-55,35	-5,67	19,74	28,57	76,27	18,23	404
MCAP (millions $)	6.322,41	712,85	1.485,64	5.632,15	8.975,45	28.324,10	4.672,31	412
ROA (%)	12,21	-15,67	3,29	14,89	21,19	55,43	11,43	412
BETA (%)	1,10	0,50	0,75	1,04	1,67	2,10	0,35	412
PAGES	37,20	3,00	21,00	28,00	37,00	97,00	15,03	412

Table 3: Shows the descriptive statistics for each continuing variable. Variable definitions are provided in table 2

Table 3 provides an overview of the descriptive statistics for each continuing variable that is used in the regressions. The variable INTANG is a percentage of total intangible assets over total net assets. The table shows that the average percentage of intangible assets is 15.63%. There is even a maximum percentage of intangible assets accounted for of 69%, but this is seen as an outlier. Due to the fact that there are a number of companies that have no intangible assets at all, this drives the mean down. The amount of tangible assets over net assets as a percentage, or TANG, is basically the opposite of the variable INTANG. This is because net assets can be divided into only two categories, namely tangible or intangible. By definition, if an asset is not intangible it is defined as a tangible asset. This explains the mean of 84.37% that table 10 shows.

The variable SALES shows the sales growth of the company in the current year compared to the previous year. This is expressed as a percentage and represents how much sales have increased over the past year. Most data was available in the equity report itself, but some external data was obtained from Thompson One Banker. The table shows that the average sales growth equals 7.21%. This is relatively high considering the fact that the data set includes the most severe financial crisis since the 1930's. However, the data set also includes a large amount of companies that are active or headquartered in emerging economies. EARNINGS show net income as a percentage of current year's sales. With an average net income margin of 18.76% this seems like a relatively health profitability ratio. However, there are a large number of firm years where negative net income is reported. MCAP shows the range of market capitalisation expressed in million US dollars. As mentioned before in Chapter 5 the market capitalisation of firms in the data set ranges from roughly US$0.7 billion to US$28 billion. ROA, or return on assets, is a percentage provided by equity report when available that expresses the profitability of the firm's assets. The average ROA for the data set is 12.21%. BETA, describes the volatility of the stock and how it is correlated to the benchmark, e.g. S&P500. A beta of exactly one shows that the company's volatility is perfectly correlated to the benchmark. In this data set the average beta is 1.10 which shows that the average company is slightly more volatile compared to the benchmark. This could be caused by firms that are active or headquartered in emerging economies.

5. Data

In this section I shall discuss the data set that is used in this thesis to test the hypotheses. I shall first provide an overview of the type of data and its origins. By already looking a bit closer at the data I will be able to provide some descriptive statistics about the number of industries, firms and years per firm that I am considering. Then I shall provide some colour on the absolute number of times certain valuation methods have been counted in the data set. This will be an initial indication of which models are used more often by the equity analysts. Subsequently, I shall zoom in on the characteristics of the different industries that the companies are located in. Following this section, I shall show certain measurements of the investor sentiment in the broker reports. Finally, I shall briefly discuss the implications of the financial crisis and control variables.

5.1 Data Overview

The main source of data for this research shall be the provided by the sell-side equity analyst reports. These analyst reports are written by a variety of independent brokerages and equity analysts working at an array of different investment banks and brokerages. The majority of the equity research is written at the major global investment banks, which include: Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, Macquarie, Merrill Lynch, Morgan Stanley and UBS. The reports consist of a minimum of 15 pages of content and are written between the years of 2006 up until and including 2010. The data set focuses on international mid-cap firms. The definition of an international mid-cap firm lies between the 2 and 5 billion US dollars of market capitalisation. However, due to severe movements in the stock market during the recorded time period the market capitalization of these firms has dispersed far beyond the 2 and 5 billion mark. In 2010 the range of total firm value lies approximately between 0.7 billion and 28 billion. By simply looking at the new value range it is possible to say that there seems to be a positive skewness effect on the overall market capitalisation of the companies included in the dataset. This slightly contradicts the theory that volatile stock markets, caused by a financial crisis, are bad for overall share price performance.

The dataset is truly international, which means that the firms are spread out all over the world and are active in both developed as well as emerging economies. The companies are listed on variety of different stock exchanges. However, it is apparent that the New York Stock Exchange (NYSE), London Stock Exchange (LSE) and the NASDAQ are the most common listings of companies in this dataset.

As already mentioned, the time frame for the data set is 5 years, including the following years: 2006, 2007, 2008, 2009 and 2010. There are only a few companies where there is very limited research available. The majority of research reports are from 2007, closely followed by 2010. 2006 has the least amount research available.

Name	Firm Year Observations							
Industry	Nr. Of Firms	Firm Year Observations	2006	2007	2008	2009	2010	Average Firm Year Observations
Consumer Discretionary	12	49	9	10	11	10	9	9,8
Consumer Staples	12	44	9	9	9	8	9	8,8
Energy	13	53	12	9	10	10	12	10,6
Healthcare	12	45	6	10	8	9	12	9,0
Industrials	11	42	6	11	9	9	7	8,4
IT	12	50	10	11	10	10	9	10,0
Materials	12	44	8	11	8	8	9	8,8
Telecom	12	45	10	8	8	9	10	9,0
Utilities	12	40	8	7	8	10	7	8,0
Total	108	412	78	86	81	83	84	9,2
Average	12	45,8						

Table 4: Overview of distribution of dataset divided per industry. Provides summary of number of firms, firm year observations and average firm years observations per industry.

Table 4 provides a clear overview of the number of firms, industries and firm year observations. There seems to be a very small discrepancy in the number of reports per firm in certain industries. With a maximum of 10.6 average firm year observations in the Energy industry and a minimum of 8.0 in the Utilities sector there seem to be slightly more analyst reports over the years in the energy sector compared to utilities. However, with an average over the entire dataset of 9.2 average firm year observations the analyst reports seem to be evenly spread out over the industries.

Moreover, this dataset will be used to extract the relevant data regarding valuation methods from these reports. In order to do this, it is necessary to read through the analyst report and manually uncover the appropriate values or information. First of all, basic information such as: company name, SIC code, date (year and month) that the report is written, and the country where the company's headquarters are located is recorded.

Furthermore, a crucial element of the broker's report is the overall recommendation given by the analyst. This recommendation is usually very clearly visible, usually on the front page of the report, in the summary of the analyst's report. Usually the analyst provides a recommendation which is either: "buy", "hold" or "sell". This recommendation is provided after the analyst has finished the analysis and valuation of the company in question. This valuation process is the key factor in the analyst's research and the recommendation given by the analyst is predominantly based on the valuation. If an analyst's valuation turns out to be *higher* than the current market value of the firm, then he will usually give an advice to buy. This is because the analyst believes that the firm's shares are currently *undervalued* and he believes its price will rise in the near future. In most cases this coincides with a target price that is higher than the current share price. However, if the analyst's valuation seems to be lower than that of the market value, then he will advise to sell. The analyst

then suspects that the firm is *overvalued* and that the share price will decrease in the near future. In table 5 and 6 below it is possible to see the amount of times a buy, hold or sell recommendation is given. There seems to be evidence that a large majority of the reports provide a "buy" recommendation (58%) compared to a hold (29%) or a sell (13%) advice. This coincides with previous academic literature by Dechow, Hutton and Sloan (2000) and Dugar and Nathan (1995) who found proof that positive recommendations lead to an increased involvement of investment banks. Therefore one can say that research analysts are incentivised to provide positive biased recommendations in order to create more revenue for their employer.

Name	Recommendations						
Industry	Buy	Hold	Sell	Total	% Buy	% Hold	% Sell
Consumer Discretionary	18	25	6	49	37%	51%	12%
Consumer Staples	29	12	3	44	66%	27%	7%
Energy	33	15	5	53	62%	28%	9%
Healthcare	30	11	4	45	67%	24%	9%
Industrials	25	12	5	42	60%	29%	12%
IT	31	13	6	50	62%	26%	12%
Materials	22	16	6	44	50%	36%	14%
Telecom	21	11	13	45	47%	24%	29%
Utilities	28	6	6	40	70%	15%	15%
Total	237	121	54	412	58%	29%	13%

Table 5: Shows an overview of the amount of buy, hold and sell recommendations per industry. The columns on the right show the corresponding percentages to a buy, hold or sell recommendation.

Name	Recommendations								
Industry	Upgrade	Reiterate	Downgrade	Initiate	Total	% Upgrade	% Reiterate	% Downgrade	% Initiate
Consumer Discretionary	5	22	3	19	49	10%	45%	6%	39%
Consumer Staples	9	16	2	17	44	20%	36%	5%	39%
Energy	3	23	2	25	53	6%	43%	4%	47%
Healthcare	5	18	2	20	45	11%	40%	4%	44%
Industrials	5	16	1	20	42	12%	38%	2%	48%
IT	9	23	2	16	50	18%	46%	4%	32%
Materials	8	18	3	15	44	18%	41%	7%	34%
Telecom	6	13	4	22	45	13%	29%	9%	49%
Utilities	3	16	1	20	40	8%	40%	3%	50%
Total	53	165	20	174	412	13%	40%	5%	42%

Table 6: Provides an overview of the amount of upgrade, reiterate, downgrade and initiate recommendation. The right column shows the respective percentages.

5.2 Valuation Methods

In this section, I shall briefly discuss which valuation methods may have been used in the equity research reports. Within the sophisticated valuation methods, the DCF method is by far the most commonly used model. Additional sophisticated valuation methods are the: residual income model (RIM), dividend discount model (DDM), net asset value (NAV) and real option valuation (ROV) models. On the other hand, for unsophisticated valuation methods are more dispersed. The most commonly used relative valuation methods are the: price-to-earnings (P/E), price-to-earnings-growth (PEG), EV/EBIT, EV/EBITDA, price-to-book (P/B) and EV/Sales.

An important difference between these methods of determining valuation techniques compared to previous academic literature is that it is possible to record the use of multiple techniques in the same report. In the papers by Demirakos et al. (2004), Bertinetti et al. (2006) and Imam et al. (2008) they only are able to identify one equity valuation model at a time. However, as they also mention in their own papers it is very common for equity research analysts to use a combination of valuation techniques. Whenever it is mentioned in the equity report that more than one valuation method is used this is incorporated into the dataset. Additionally, there is no specific weight given to the individual valuation techniques if more than one is mentioned. Also, compared to Demirakos et al. (2004) and Imam et al. (2008) the dataset consisting of 412 individual equity reports, 108 companies spread out over a time period of five years is significantly larger than the 98 and 104 equity reports that are used as in the other academic papers.

Once the main methods of valuation have been deduced, I will be able to establish whether a predominantly sophisticated (cash flow based) or unsophisticated (multiples analysis) valuation technique has been used. Table 7, see below, provides an overview of the valuation methods that I have looked for in the reports and a brief description of how they are derived.

Valuation Method	Name	Description
Sophisticated Methods		
Discounted Cash Flow	DCF	Net Present Value (NPV) of a firms future cash flows discounted by the WACC
Residual Income Model	RIM	Approach to equity valuation that accounts for the cost of equity capital
Real Options Valuation	ROV	Applies option valuation techniques to capital budgeting decisions
Net Asset Value	NAV	Net Present Value (NPV) of a firms future production from its own assets summated less net debt
Dividend Discount Model	DDM	Net Present Value (NPV) of a firms future dividend payments discounted over time
Unsophisticated Methods		
Price-to-Earnings	P/E	Market Value of Equity divided by current net income
Price-to-Earnings Growth	PEG	P/E ratio divided by the perpetual growth rate
Price-to-Book	P/B	Market Value of Equity divided by Book Value of Equity
Enterprise Value over Earnings Before Interest and Taxes	EV/EBIT	Enterprise Value divided by the Earnings Before Interest and Taxes
Enterprise Value over Earnings Before Interest, Taxes, Depreciation and Amortization	EV/EBITDA	Enterprise Value divided by the Earnings Before Interest, Taxes, Depreciation and Amortization
Price-to-Sales	P/Sales	Market Value of Equity divided by total Sales
Enterprise Value-to-Sales	EV/Sales	Enterprise Value divided by total Sales

Table 7: This table provides an overview of the equity valuation methods that are used in the equity reports. A clear distinction is made between sophisticated (cash flow based) and unsophisticated (multiples analysis) valuation methods. The table states the name, abbreviation and a short description of the method.

5.3 Industry Characteristics

The data set is sub-divided into 9 different industry sectors based on their corresponding Standard Industrial Classification (SIC) codes. The first two digits of this SIC code show the general industry that the firm is active in. Especially for the hypotheses concerning the effect that the industry has on the chosen valuation method the industry classification plays an important role. I shall investigate whether there are any differences in valuation methods between the nine industries and more specifically I shall focus on the distinction between industries characterized by a large percentage of tangible assets or intangible assets. According to these codes the nine industries are: Consumer Discretionary (25), Consumer Staples (30), Energy (10), Healthcare (35), Industrials (20), Information Technology (45), Materials (15), Telecom (50) and Utilities (55). Each industry contains (on average) twelve firms, except for Materials and Healthcare that respectively have 13 and 11 firms each. For each firm there is a maximum of 5 available reports and a minimum of 1 report. To summarize, there are exactly 412 analyst reports, spread out over nine industries including 108 different firms that together make up the majority of this dataset.

This thesis shall also take a closer look at the defining characteristics of some of the industries. I shall zoom in on the percentage of tangible and intangible assets that a company has. The Appendix tables 1 through 9 provide an overview of the average and median sales and net income over the time period available. Also, the tables show the averages for the amount of Net Assets and Intangible Assets, in US dollars, for the company. The column on the right shows the intangible assets as a percentage of the net assets.

Table 8 provides a summarized overview of the data from the tables in the Appendix. The data is now categorized per industry, which gives an indication of which industries are characterized by a relatively high level of intangible assets. From this table it is clear that companies in the healthcare industry have a higher ratio of intangible assets compared to utilities companies.

Nr.	Sector	Net Assets	Intangible Assets	% Intangible Assets
1	Consumer Discr.	4.763,36	996,60	22%
2	Consumer Staples	4.864,65	1.142,74	16%
3	Energy	6.705,38	433,44	4%
4	Healthcare	2.960,93	1.328,94	38%
5	Industrials	11.619,77	787,92	13%
6	IT	2.567,39	402,63	18%
7	Materials	6.844,29	548,25	9%
8	Telecom	5.598,77	1.143,88	18%
9	Utilities	9.166,16	230,22	3%
	AVERAGE	**6.121,19**	**779,40**	**15,63%**

Table 8: This table provides an overview of the average net assets and intangible assets, in US dollars, per industry. The column on the right shows the intangible assets as a percentage of net assets.

5.4 Investor Sentiment

In order to determine investor sentiment I shall be conducting a word count. A word count will provide an insight into the analyst's sentiment. Words such as good, growth, profit, superior and strong will be able to measure the level of the analyst's overall positive sentiment. On the other hand, by counting words such as reduction, loss, poor, weak and risk it is possible to measure the level of an apparent negative investor sentiment. Depending on the amount of times such words are used, it might be possible to indicate a certain positive or negative investor sentiment.

5.4.1 Measuring Investor Sentiment

According to the Harvard IV psychological dictionary I chose certain words which would be able to provide an accurate indication of the investor sentiment I am trying to determine. The psychological dictionary contains four categories including increase, decrease, positive and negative sentiment. Occasionally, grow sentiment can be categorized as a as a separate sentiment. However, I decided to include this into the positive sentiment category as growth mainly has a positive connotation. Following the method employed in the paper by Li (2006) I count the frequency of the chosen words in order to determine the investor sentiment in the equity analyst reports.

Table 9, see below, provides an overview of the total amount of positive and negative words found in the equity reports. The table is split up into three main columns, namely total word count, positive and a negative word count. The ratio positive-to-negative column depicts how the total amount of positive words is related to the total amount of negative words accounted for. The ratio shows which industries are characterized by a higher level of positive investor sentiment. In this case it would be possible to say that there is a higher level of positive investor sentiment in the industrials industry compared to the telecom industry. Words are counted manually using the search function (Control + F) in Adobe Acrobat PDF Reader.

Name	Total Word Count			Positive Word Count					Negative Word Count				
Industry	Positive Sentiment	Negative Sentiment	Ratio Positive/Negative	Good	Growth	Profit	Superior	Strong	Reduction	Loss	Poor	Weak	Risk
Consumer Discretionary	2066	1326	1.56	83	1094	471	48	370	351	131	50	237	557
Consumer Staples	3629	1428	2.54	146	1694	1267	40	482	304	207	63	235	619
Energy	1909	1291	1.48	51	1067	341	15	435	267	121	26	126	751
Healthcare	3192	2063	1.55	94	1855	678	107	458	577	262	48	104	1072
Industrials	3635	1342	2.71	102	1929	1121	15	468	259	162	54	225	642
IT	2570	1307	1.97	71	1389	761	6	343	301	177	41	180	608
Materials	2169	1224	1.77	94	1050	636	30	359	290	162	44	190	538
Telecom	2244	1594	1.41	71	1266	550	38	319	324	172	34	132	932
Utilities	2283	1005	2.27	86	1181	593	26	397	203	125	31	146	500
Total	**23697**	**12580**	**1.88**	**798**	**12525**	**6418**	**325**	**3631**	**2876**	**1519**	**391**	**1575**	**6219**

Table 9: This table shows the amount of positive and negative words per industry

Table 10, see below, shows the total count of the words used to indicate a positive or negative investor sentiment per year. By showing the amount of positive/negative words per year it is now easier to see whether an increase or decrease has occurred over the years.

Name	Total Word Count			Positive Word Count					Negative Word Count				
Year	Positive Sentiment	Negative Sentiment	Ratio Positive/Negative	Good	Growth	Profit	Superior	Strong	Reduction	Loss	Poor	Weak	Risk
2006	4259	2244	1.90	118	2475	1022	53	591	554	271	75	217	1127
2007	4528	2320	1.95	178	2369	1222	61	698	581	261	59	270	1149
2008	5020	2636	1.90	166	2565	1371	73	845	574	317	85	379	1281
2009	4948	2630	1.88	146	2589	1407	66	740	535	319	77	424	1275
2010	4942	2750	1.80	190	2527	1396	72	757	632	351	95	285	1387
Total	**23697**	**12580**	**1.88**	**798**	**12525**	**6418**	**325**	**3631**	**2876**	**1519**	**391**	**1575**	**6219**

Table 10: This table provides the amount of positive and negative words per year

5.5 Financial Crisis

Considering the fact that the time frame of the data set consists of the years 2006 up until and including 2010, this data set is therefore highly suitable for looking at the effect that the most recent financial crisis has had on valuation methods used by equity analysts. It is widely perceived that the financial crisis started to have a worldwide effect in 2008. Consequently, the years 2006 and 2007 shall be considered and classified: pre-crisis. The years 2009 and 2010 are then by definition classified as the crisis years. The year 2008 is more difficult to classify however. To resolve this situation I have determined that the overall cut-off period is September 2008. This is the month that Lehman Brothers filed for Chapter 11 bankruptcy and this event set a world-wide financial crisis in motion that would cripple the global economy. This also had an effect on the behaviour of equity analysts. They could no longer continue to write generally positive reports with buy recommendations and use “easy” and “quick and dirty” multiples analysis to determine the value of a company. I shall investigate whether there has been a shift in chosen valuation methods since the fall of Lehman in September 2008.

5.6 Company Indicators & Control Variables

In addition to the data available from the equity analysts’ reports I shall access the Thomson One Banker’s online database to collect more firm specific data. I shall require firm specific data regarding the size of the company, such as the market capitalization, sales, net assets, intangible assets and total assets. Also, measurements of profitability such as: net income and the return on assets (ROA) will be necessary to function as control variables. Moreover, variables such as the age, market beta and total number of pages will be used as control variables.

6. Results

This part will provide an overview of the main findings of the descriptive and empirical tests conducted on the data set of 412 individual equity research reports and through external data sources such as Thompson One Banker. The first segment of the results will present the descriptive statistics of continuous variables that I will be using. I will also present an overview of the response and predictor variables with a description. Additionally, I shall provide descriptive statistics on the valuation techniques that are used in the equity research reports. Section 6.2 and 6.3 will reflect the outcomes of the binary logit models used to prove or contradict the stated hypotheses.

6.1 Descriptive Analysis

Table 11 displays the descriptive statistics on the diverse valuation techniques employed by the sell side equity analysts in the 412 equity research reports that form the basis for this research. In total a number of 482 valuation techniques are counted, which implies that on average 1.17 valuation techniques are used in each report. This does mean that in some of the reports there is no mention of the exact valuation technique and in others it is clearly stated that one or more valuation techniques are used to determine the target price and/or value of the company. As seen in table 11 the discounted cash flow (DCF) method is the predominant sophisticated valuation technique with 181 analysts mentioning their use of this method. The residual income model, or RIM, is only observed twice in the entire data set. As for the real options valuation (ROV) technique, this is not mentioned at all in any of the equity reports. In total the sophisticated valuation techniques are accounted for a number of 183 times.

Name	Sophisticated			Unsophisticated				
Industry	DCF	RIM	ROV	PE	PEG	PB	EV/EBITDA	EV/EBIT
Consumer Discretionary	12	0	0	29	1	2	12	2
Consumer Staples	14	0	0	25	0	2	14	5
Energy	18	1	0	5	0	0	14	2
Healthcare	18	0	0	34	1	16	0	0
Industrials	22	0	0	16	0	2	13	3
IT	12	1	0	28	0	4	1	2
Materials	21	0	0	15	0	0	13	1
Telecom	41	0	0	3	0	0	6	0
Utilities	23	0	0	13	0	2	13	0
Total	181	2	0	168	2	28	86	15
	99%	1%	0%	56%	1%	9%	29%	5%

Table 11: This table shows provides an overview of the different valuation methods that are employed by the equity analysts. There are two categories, namely sophisticated and unsophisticated methods, and then the individual valuation methods. The percentages below show how much the individual valuation method is part of the total.

Looking at the unsophisticated valuation techniques, also referred to as multiples analysis, there is much more diversity. First of all, there were a large number of different multiples that were referred to by equity analysts when valuing a company and analysts tend to use more than one multiple when they choose to employ these relative valuation measurements. An overview of the most commonly used unsophisticated valuation techniques are displayed in table 11. The most frequently used multiple based measurement metric is the price-to-earnings, or P/E, multiple. This metric is recorded 168 times within the dataset. The second most frequently used multiple is the EV/EBITDA that is accounted for 86 times in the sample of equity research reports. These two multiples are the most predominant unsophisticated valuation methods used by equity analysts. Other multiples that are also referred to, however not as often, are the price-to-book (PB), EV/EBIT and PEG multiples with 28, 15 and 2 recordings respectively. Summarizing, the sophisticated valuation techniques are accounted for a number of 299 times.

As an individual valuation metric the DCF method is the most dominant, recorded 181 times. This result is in line with the findings of Giamouridis and Montagu (2011) and Lundholm and O'Keefe (2001) and this evidence provides proof that the DCF valuation method is used more often than multiples analysis. Also, this outcome coincides with the results presented by Imam et al. (2008) that suggest that the DCF model has become more important over time and they suggest that a shift towards valuation based on fundamentals has occurred. However, I will discuss whether an actual shift has occurred further on in this part. Even though the combined absolute number of multiples analysis used is larger than the amount of times the DCF method is referred to (181), it is common to use more than one relative valuation method and therefore it cannot be stated that the unsophisticated method is employed more often.

Along this line, the use of multiples is still significantly strong and the DCF method is closely followed by the P/E multiple metric (168 times) and the EV/EBITDA multiple (recorded 86 times). Together all the unsophisticated or relative valuation techniques combined account for 62% of the total recorded valuation methods. This is in line with the results presented by Demirakos et al. (2004) who state that unsophisticated valuation methods are becoming increasingly more popular and are frequently used in combination with other relative valuation techniques. The reason stated by Barker (1999), that establishing future cash flows and a terminal value may prove to be too difficult, could be a reason that a large amount of unsophisticated valuation methods are chosen by equity research analysts in determining the target price and value of the company in question. Even though empirical studies show signs that multiples analysis is being used on a regular basis, the more fundamental analysis based traditional valuation methods, such as DCF, are still predominant.

Category	Valuation Method	Nr.	% of (Un)Sophisticated	% of Total
Sophisticated	DCF	181	84%	35%
	NAV	25	12%	5%
	DDM	4	2%	1%
	EVA	3	1%	1%
	RIM	2	1%	0%
	Total Sophisticated	215	100%	na
Unsophisticated	P/E	168	55%	32%
	EV/EBITDA	102	33%	20%
	EV/EBIT	15	5%	3%
	P/B	12	4%	2%
	EV/Sales	9	3%	2%
	Total Unsophisticated	306	100%	na
Total	Total Overall	521	na	100%

Table 12: this table shows the categorization of sophisticated and unsophisticated valuation methods, the individual valuation techniques and the associated percentages.

The results in table 12 point towards a focus on fundamental analysis valuation models used by equity research analysts in their reports. These analysts are often aware of the drawbacks of this method. As is mentioned by Steiger and Paper (2008), the assumptions that analysts have to make in order to determine the future cash flows and terminal value have a large effect on the outcome of the valuation. The slightest error can have a significant impact on the company's value and its target price. However, it seems that equity research analysts still strongly believe in the validity of the DCF method despite its possible shortcomings. The use of relative valuation techniques coincides with the findings in academic literature. When given the choice out of the vast range of relative valuation multiples analysts tend to choose the price-to-earnings (P/E) method most often. Moreover, the majority of the relative valuation models use income statement figures in order to calculate the multiple, which can be seen as an advantage as it is not necessary to make estimations or assumptions.

6.2 Industry Focus Results

After making the distinction between the sophisticated and unsophisticated valuation techniques and looking at the results it was clear that the DCF method was predominantly used by the equity research analysts. In this section I am interested whether a specific industry has an effect on the chosen valuation technique.

Looking back at table 11, it is possible to see that there are indeed certain industries that seem to use certain valuation techniques slightly more often than other industries. Out of the nine different industries it is possible to characterize a number of "intangible asset heavy" industries by measuring the percentage of intangible assets of its net assets. Table 6 in the section 5.3 shows the industries that are characterized by a relatively higher percentage of intangible assets. Especially the healthcare industry has a significantly higher percentage of intangible assets compared to the other industries. On the other hand, the energy and utilities industries seem to be characterized by a smaller percentage of intangible assets. For further in depth data and statistics on the ratio of (in)tangible assets of specific companies I refer to the Appendix tables 3-11.

From the results in table 11 it is clear to see that four industries tend to use the discounted cash flow method slightly more often than the other industries. These four industries are: Telecom, Industrials, Materials and Utilities. Sell side equity research analysts have mentioned using the DCF valuation technique 41, 22, 21 and 23 times respectively when determining the target price and/or enterprise value of the company. Both the utilities and materials industries have a much lower than average ratio of intangible assets versus tangible assets. The fact that the DCF method is employed more often in the materials and utilities industry is in line with the findings of Demirakos (2004), Alford (1992) and Tasker (1998). These papers state that valuation methods are determined by the industry (SIC code) and certain industry characteristics.

The results seem to be the most prominent for the telecommunications sector. Within this sector equity analysts have referred to using the discounted cash flow method most often. Additionally, within this sector equity analysts have only referred to utilizing the price-to-earnings (P/E) multiple 3 times and the EV/EBITDA multiple 6 times. This provides initial evidence that suggests that a specific industry might have an effect on the choice of valuation method implemented by the research analyst. On the other hand, in the Utilities industry the DCF method is accounted for 23 times as a chosen valuation method. Also, it becomes apparent that the P/E (13 times) and EV/EBITDA (13 times) multiples are used in combination with the sophisticated valuation method. This shows that even though the sophisticated, cash flow based valuation method is used more often it is also used in combination with relative valuation techniques in order to arrive at a more comprehensive understanding of the value of the business. This is in line with the findings of

Alford (1992) who states that a combination of valuation methods should be used in order to cross-check and validate the outcome of the cash flow based model.

Sell-side equity research analysts that cover industries, characterized by relatively high ratios of intangible assets, such as the Healthcare industry, seem to use sophisticated valuation methods less extensively than their colleagues covering the more tangible asset based industries. The Healthcare industry, which among others consists of pharmaceutical companies, is characterized as being relatively intangible-rich. These pharmaceutical companies have large R&D departments that are mainly based on developing patents and licenses. Patents and licenses are a good example of an intangible asset that a company can use in order to secure cash flows for several years to come. In this industry the DCF method is used less compared to the relative valuation tool, price-to-earnings, only 18 times compared to 34 times respectively. This is in line with the findings of Gollotto and Kim (2003) who state that calculating the value for a healthcare based company is: "every bit sticky and complicated as calculating a value for a traditional company". Gollotto and Kim also state that using a traditional valuation method, such as the DCF model, are not sufficient and will need additional valuation tools to determine an accurate target price. This is reflected in the results that show that the DCF method is used frequently, but often in combination with other relative multiples based techniques.

Other industries such as Consumer Discretionary, Consumer Staples and IT also use a fairly large amount of unsophisticated valuation methods compared to the DCF method. All of the relative multiple analysis based valuation methods in these industries add up to 46, 46 and 35 times that these methods are used. The first two industries, Consumer Discretionary and Consumer Staples, are slightly different. The characteristics of the companies in these industries tend to differ a lot. Clothing, automotive and office supply companies are all part of the Discretionary industry. The Staples industry mainly consists of companies in the Food&Beverages business. However, these companies can be in very different positions in the value or supply chain. Therefore, the results from these industries are not as easy to classify as the other two industries. Beverage companies are typically considered to have mature and stable cash flows. Demirakos (2004) states that single period valuation methods are more likely to be used in this industry. This is consistent with the hypothesis that there are a lot of comparable companies, which makes it easier and more accurate to use relative valuation techniques. This is due to the fact that conventional accounting does a better job of capturing the value of the firm in this industry.

The implications of these findings are that it is more likely that sell side equity research analysts will employ the DCF method to value companies in the utilities industry. On the other hand, it is also more likely that analysts will utilize multiples based analysis when valuing companies in the healthcare and consumer (discretionary and staples) industries. Therefore, the probability that single

period valuation methods will be used by analysts when determining the value of a company in the utilities industry are significantly lower compared to that in the healthcare industry. This corresponds to results found in previous academic research. Imam, Barker and Clubb (2008) show the increased dependence on multiples in the consumer (discretionary and staples) industry. However, the results that show that multiples are utilized more often in the healthcare sector contradict the findings of Imam et al. Their paper explains that industries or companies that have stable and predictable cash flows are more likely to be analyzed by using multiples. This is because the balance sheet items of such companies provide better inputs for the multiple based tools. Firms in the healthcare sector sometimes do not have positive EBITDA or earnings figures for a couple of years. This makes using a form of multiples analysis worthless. Following the same line of research, Glaum and Friedrich (2006) provide evidence that the DCF method is applied more often in the utilities industry. Their paper refers to the characteristics of the utilities industry, which make it more likely to use the DCF method. The utilities industry is often characterized by a large amount of tangible fixed assets compared to intangible based assets. Additionally, companies in this industry tend to have fixed customer based cash flows that are more reliable to extrapolate into future free cash flows.

In this binary logit model eight dummies are included in the model. If all sector dummies and the intercept would be included into the model the sum of the nine dummies would be equal to one, which is equal to the variable which again is represented by the intercept parameter. “This problem causes perfect multicollinearity and in that case no independent variables can be estimated (Brooks, 2008)”. Therefore, in the model below the dummy variable that has been left out is the Industrials sector dummy. This variable then becomes the reference category to which the other dummies are compared to. The industrials dummy has been omitted because the results seem to be closest to the mean and for that reason functions well as a base case.

Independent Variables	Dependent Variables			
	Sophisticated		Unsophisticated	
INTANG	0.263	(0.381)	0.795	(1.707)c
TANG	1.161	(1.604)a	-1.820	(-0.961)a
AGE	0.009	(0.205)c	0.676	(-1.416)
TA	0.310	(0.455)	0.034	(-1.092)
SALES	1.811	(0.673)b	0.003	(-1.178)
EARNINGS	1.670	(-1.542)	-1.148	(-1.743)b
MCAP	0.730	(-1.301)	-3.074	(-0.330)
ROA	0.435	(0.923)	0.001	(0.342)
BETA	0.010	(0.009)	0.015	(-2.012)
PAGES	0.036	(2.859)b	-0.003	(-0.364)
REGION	-0.382	(-1.546)	0.038	(1.707)c
Intercept	-0.568	(-0.863)	6.050	(4.099)a
R squared	0.0043		0.0027	
Observations	412		412	

Table 13: this table shows the results of two binary logit regressions with the sophisticated and unsophisticated valuation methods as a response variable. The company indicators are the independent variables. Numbers in brackets are z-statistics based on robust Huber/White standard errors. a: significant at the 1% level; b: significant at the 5% level; c: significant at the 10% level.

Table 13 provides an overview of the results of the binary logit tests on the sophisticated and unsophisticated valuation models. Firms that have a relatively high percentage of tangible assets, TANG, are more likely to be valued according to a sophisticated valuation method. Also, companies with relatively high sales growth, SALES, and when a high number of pages are written in the report, PAGES, both seem to increase the likelihood of the DCF method being employed. The odds ratio of 3.193 (exp [1.161]) implies that a one percentage point increase in tangible assets increases the likelihood of using the DCF method by approximately 219%. This noteworthy relationship between the amount of tangible assets and the chosen valuation method are in line with the expectations that companies with a lot of fixed assets are easier to value using a sophisticated valuation model. The effect of sales growth, SALES, entails that a one-unit increase in sales growth increases the probability of the DCF method being used by 512%. This is due to the odds ratio of 6.117 (exp [1.811]) that can be seen in table 13. Even though the firm's age, AGE, and the number of pages written about the company, PAGES, are significant at the 10% and 5% levels respectively, their impact on the employment of sophisticated valuation methods is very small. This is due to the fact that their log odds ratios are, 1.009 (exp [0.009]) and 1.037 (exp [0.036]) respectively.

The other test shows the effects the same set of variables has on the employment of unsophisticated valuation methods. Especially the ratio of tangible fixed assets seems to have an important effect again. In this case a one percentage point increase in tangible fixed assets has a negative effect on the likelihood that an unsophisticated valuation method will be used by the equity analyst. The odds ratio of 0.162 (exp [-1.820]) shows this negative reaction and suggests that the probability that multiples will be used decreases by 16% when a company has a relatively high amount of tangible assets. The ratio of intangible assets also seems to have an effect on the employment of multiples analysis, although only significant at the 10% level. When the percentage of intangible assets increase by one percent the likelihood of an unsophisticated valuation method being employed increases by 121%. This can be seen by the corresponding odds ratio of 2.214 (exp [0.795]). Also, when the net income as a percentage of sales in certain year has gone up, EARNINGS, this is most likely to decrease the likelihood of multiples being used to value the company. When earnings, as percentage of sales, go up by one percentage point the probability that unsophisticated valuation methods will be employed decrease by 32%. This is because the log odds ratio connected to this variable is 0.317 (exp [-1.148]). Finally, the dummy variable that is equal to one when the company's headquarters are located in an emerging country, REGION, is significant at the 10% level. The odds ratio of 1.039 (exp [0.038]) suggests that it only has a very small influence of 4%. Even

though this variable has a small effect it can be explained that companies that are mainly active in emerging economies are more difficult to value using a sophisticated valuation method. Therefore, putting together a peer group of similar companies (possibly located or active in developed countries) and using multiples analysis is more useful.

Independent Variables	Dependent Variables			
	Sophisticated		Unsophisticated	
INTANG	0.342	(0.490)	0.515	(2.853)c
TANG	0.862	(2.604)a	-1.365	(-1.582)a
AGE	0.004	(0.172)c	0.002	(-1.416)
TA	0.310	(0.455)	0.034	(-1.092)
SALES	1.642	(1.374)b	-1.418	(-1.738)
EARNINGS	1.670	(-1.542)	-1.553	(-1.743)c
MCAP	0.210	(0.568)	0.005	(0.501)
ROA	0.434	(0.611)	-0.088	(-0.455)
BETA	1.989	(1.707)	0.759	(-0.724)
PAGES	0.032	(1.453)b	-0.001	(-0.273)
REGION	-0.568	(-0.863)	0.205	(0.501)
CONSUMER_DISCRET	-1.145	(-1.659)b	0.300	(0.614)
CONSUMER_STAPLES	0.620	(-1.244)	0.026	(0.681)
ENERGY	1.156	(-2.154)	-0.225	(-0.244)
HEALTHCARE	1.435	(0.864)	0.752	(0.354)b
IT	-0.570	(-0.791)c	0.634	(0.834)c
MATERIALS	0.058	(0.013)	-0.991	(-1.155)
TELECOM	1.346	(3.735)a	-1.627	(-2.326)a
UTILITIES	0.674	(0.647)	-0.177	(-0.351)
Intercept	2.431	(0.681)	3.442	(2.742)a
R squared	0.0043		0.0027	
Observations	412		412	

Table 14: this table shows the results of two binary logit regressions with the sophisticated and unsophisticated valuation methods as a response variable. The company indicator as well as industry dummies are the independent variables. Numbers in brackets are z-statistics based on Huber/White standard errors. a: significant at the 1% level; b: significant at the 5% level; c: significant at the 10% level.

Table 14 shows that analysts covering companies active in the telecom sector are more likely to employ the DCF method compared to the base case of the industrials industry. The odds ratio of 3.842 (exp [1.346]) suggests that when a company is categorized in the telecom sector the probability of using the DCF method increases by 284%. On the other hand, the consumer discretionary (textile, automotive and travel among others) and IT sectors seem to have a negative influence on the utilization of the DCF method. The consumer discretionary industry negatively influences the employment of the DCF method by 32% according to the log odds of 0.318 (exp [-1.145]). In the case of a categorization in the IT sector the likelihood that the DCF will be employed decreases to 57%, as is shown by the corresponding log odds of 0.566 (exp [-0.570]). These findings are in line with the expectations that industry has an effect on the chosen valuation model. However, the telecom sector is not characterized by a relatively high percentage of tangible assets as is

expected. Looking back at table 8, the telecom industry average of intangible assets as percentage of net assets is 18%. This is even higher than the average of the nine industries, which makes the telecom industry actually relatively intangible asset heavy. The negative influence of the consumer discretionary and IT sector are in line with expectations as these industries are characterized by relatively high levels of intangible assets, namely 22% and 18% respectively.

Firms classified in the healthcare and IT sector are more likely to be valued according to an unsophisticated valuation method compared to firm in the industrials industry. When a firm is located in the healthcare industry this will increase the probability of a multiple analysis being used by the equity analyst of 112%. This is due to the log odds ratio related to the healthcare industry dummy variable of 2.121 (exp [0.752]). The IT sector has a positive influence of the likelihood of multiples being used to analyze companies located in this sector. The log odds ratio of 1.885 (exp [0.634]) shows that when a company is active in the IT sector the likelihood that this company will be valued by means of an unsophisticated valuation method increases by 89%. In contrast to these positive influences the telecom sector has a negative influence on the employment of unsophisticated valuation methods. The negative coefficient shows that the possibility of using multiples to value a company in the telecom sector is only 20% compared to the likelihood that the company is not in the IT sector (odds ratio of 0.197 (exp [-1.627])). The results that show that companies active in the healthcare and IT industry increase the likelihood of multiples being used provide supportive evidence for the hypotheses. This is also because the ratios of intangible assets over net assets are 38% and 18% for the healthcare and IT industry respectively.

Previous academic literature has provided evidence for the advantages of using real options valuations with regards to certain industries and project based finance. Especially the energy and/or natural resources industry (and occasionally pharmaceutical companies) tend to adopt the use of real options when valuing companies that have the options to expand, contract or put certain projects on hold based on input variables such as oil or commodity prices. According to Blais et al. (2005) and Shafie (2009) the implementation of a real options model in combination with the DCF method would lead to a more accurate picture of the actual value and target price of a company. The further research done by Tong and Reuer (2006) found proof for the influence of industry or sector on the implementation of the real growth option value model. The authors identified industries such as pharmaceuticals, chemicals and mining companies where they state that the effects do have a significant role. Even though there seems to be evidence in precedent academic literature I have been unable to identify the use of real options valuation (ROV) in any of the equity research reports. As my hypothesis stated, I expected that the probability of the ROV model being employed would be higher in the energy industry. However, even within this industry there is no mention of this method. Alternative methods that seem to be used are the Net Asset Value (NAV) model and the Sum of the

Parts Analysis (SotP). These methods value the individual assets (e.g. oil fields or mines) and then add up the individual parts to arrive at the total value. Mostly, the target price/value of the company trades at a discount to this value. Although these methods are slightly similar they do not include the options to contract, expand or put projects on hold. Therefore, I can only state that the hypothesis that the ROV method is used more often in the energy sector is rejected.

6.3 Investor Sentiment Results

In addition to looking at the influence of a specific industry on the chosen valuation method, I have decided to add investor sentiment variables to the logit models as well. In the methodology and data section it is described how to determine the investor sentiment variable. First of all, I manually counted the number of "positive" and "negative" words associated with investor sentiment. Once this task was completed I needed to process it accordingly. I did this by calculating the increase/decrease in positive/negative investor sentiment as a percentage per page. Using percentages in this way then incorporates the fact that equity analysts are inclined to use a certain word in their report more often, just because it is a part of their readily available vocabulary. In addition, when a report has more pages the likelihood that a word will be used more often increases. Furthermore, when only looking at the absolute number of "positive" or "negative" words, this does not say anything about the overall investor sentiment. Therefore, in order to determine whether the equity analyst is perceived to have an overall positive or negative investor sentiment I have looked at the net difference and especially change in net difference. This shows how the equity analyst's sentiment has changed from one year to the next. I have incorporated these four elements that I have just described as predictor variables into the logit model. Table 15, see below, provides an overview of the results that are used in as investor sentiment indicator variables.

Name	Investor Sentiment			
Year	Increase/Decrease Positive Sentiment	Increase/Decrease Negative Sentiment	Net Difference	Change Net Difference
2006	-	-	2015	-
2007	6,3%	3,4%	2208	9,6%
2008	10,9%	13,6%	2384	8,0%
2009	-1,4%	-0,2%	2318	-2,8%
2010	-0,1%	4,6%	2192	-5,4%

Table 15: This table shows the variables which measure investor sentiment. Column 2 and 3 look at the increase or decrease in the amount of positive/negative words. The net difference is the difference between the number of positive words in that year and the amount of negative words. Finally, the change in net difference is determined by looking at the percentage change compared to the year before.

The fourth column in table 15, the change in net difference, is expressed in percentages. The first row does not provide an output because there is no data available for the previous year (2005). Looking at how the change in net difference develops over the years there seems to be a trend. The

change in net difference in 2007 (referring to the percentage change of the net difference between the year 2007 and 2006) is 9,6%, but it then starts to decline to 8,0% in 2008. This trend continues after 2008 as the change in net difference becomes negative. This implies that the difference between the amount of positive and negative words is becoming smaller from 2009 onwards. In other words, negative investor sentiment is increasing since 2009. This is line with the predictions that the global financial crisis has had an overall negative effect on investor sentiment.

Table 16 provides an overview of the results of the influence of investor sentiment on the chosen valuation method. The main findings provide evidence that the number of *negative* words has a positive effect on a sophisticated valuation method being chosen by the equity analyst. This implies that when there is a one percent increase in the number of *negative* words being used in the equity report the likelihood that the DCF method is employed increases. When a one percent increase in the number of *negative* is detected, the likelihood that the equity analyst will employ a cash flow based valuation technique goes up by 57%. This can be seen in the related odds ratio of 1.570 (exp [0.451]). This result, however, seems to contradict the findings presented by Darrough and Russel (2002) who imply that equity analysts tend to disregard pessimistic information that might decrease the overall value of the company they are analyzing. Darrough and Russel state that equity analysts tend to overreact to positive information. The results presented in column 2 of table 16 suggest the opposite that equity analysts do react to "negative" information, which as a result has an effect on the choice of valuation method. There might be an argument for the reason why equity analysts decide to use multiple based analyses when investor sentiment is "negative". A possible explanation for the use of multiple based analyses could be that this method can lead to an overall higher enterprise value (assumption that multiples include growth expectations and possible synergies).

Additionally, the results also show that the number of *positive* words increase the likelihood that an unsophisticated valuation method will be used by the equity analyst. When the number of positive words increases by one percentage point the probability of multiples analysis being used increases by 218%. This can be seen by looking at the corresponding odds ratio of 3.177 (exp [1.156]). These results are in line with the expectations that when investor sentiment is positive (or becomes more optimistic) the equity analyst will be more inclined to use multiples analysis.

Furthermore, the results also show that the percentage of tangible assets (TANG) still has a positive effect on the probability on choosing a sophisticated valuation technique. The positive effect of sales (SALES) on the employment of a sophisticated valuation method also remains robust, but the level of significance (previously significant at the 5% level) has now decreased to the 10% level. The effect of AGE and PAGES remain significant (PAGES even at the 1% level now), but still only have a very small effect. In addition, the variable showing the percentage of intangible assets (INTANG)

continues to have a positive effect on the employment of an unsophisticated valuation technique. On other hand, the percentage of tangible assets, TANG, remains robust by still showing a negative effect on the employment of unsophisticated valuation methods. The percentage of net earnings of sales, EARNINGS, remains to be significant at the 10% level.

Independent Variables	Dependent Variables			
	Sophisticated		Unsophisticated	
INTANG	1.118	(0.427)	0.501	(0.674)c
TANG	0.548	(0.754)a	-0.137	(-0.369)a
AGE	0.002	(0.342)c	0.006	(0.046)
TA	0.004	(-0.009)	-0.059	(-0.227)
SALES	1.016	(1.623)c	-6.826	(-2.956)
EARNINGS	0.592	(0.614)	-0.810	(-0.967)c
MCAP	0.220	(0.744)	0.260	(0.554)
ROA	0.844	(0.913)	-1.080	(-1.583)
BETA	-0.694	(0.735)	1.642	(-0.093)
PAGES	0.036	(1.859)a	-0.003	(-0.364)
REGION	-0.470	(-0.863)	0.149	(0.611)
LnPOSITIVE	-0.362	(-0.735)	1.156	(2.154)b
LnNEGATIVE	0.451	(0.647)	-0.731	(-1.309)
LnNET_DIFFERENCE	0.004	(0.116)	-0.028	(-0.061)
CHANGE_NET_DIFF	-0.665	(-1.199)a	0.001	(0.501)
Intercept	1.053	(-2.572)	3.218	(-1.442)
R squared	0.091		0.143	
Observations	412		412	

Table 16: this table shows the results of two binary logit regressions with the sophisticated and unsophisticated valuation methods as a response variable. The company indicators and investor sentiment are the independent variables. Numbers in brackets are z-statistics based on robust Huber/White standard errors. a: significant at the 1% level; b: significant at the 5% level; c: significant at the 10% level.

6.4 Financial Crisis Results

To make sure that not only the effects of industry and investor sentiment influence the chosen valuation method, I have also looked at whether the current global financial crisis has had an impact on how equity research analysts value companies. In order to do this I have incorporated economic indicator variables into the logit models to find out if these factors influence the chosen valuation technique. These economic indicators are correlated to the rise and fall of the business cycle. Also, as already explained in Chapter 5, the data set of equity research reports includes the years 2006 up until and including 2010. Even though there is a lack of academic research on the effects of the current financial and ensuing economic crisis on employed valuation methods there is previous literature explaining the effects of the dot.com crisis that occurred in 2000-2001. The paper by Friedman and Glaum (2006) states that analysts started to rely more on fundamentals based analysis, such as the DCF method, after the burst of the tech bubble. The authors actually establish a shift taking place from one form of valuation to an alternative method due to a macroeconomic shock.

Year	Sophisticated	Unsophisticated	
Year	DCF	PE	EV/EBITDA
2006	34	28	16
2007	40	38	22
2008	38	33	17
2009	37	31	17
2010	32	38	14
Total	181	168	86
Average	36,2	33,6	17,2

Table 17: this table provides an overview of the amount of times the DCF, P/E and EV/EBITDA method were used by equity analysts in the period between 2006 and 2010.

Table 17 shows that the use of different valuation techniques over the five year period. The employment of the sophisticated and unsophisticated valuation methods remain relatively the same over the five years. However, there does seem to be a declining trend in the amount of times the sophisticated valuation technique is used. The time period after 2007 has been characterized by volatile equity markets, caused by a financial crisis which was then in turn followed by a sovereign debt crisis. In 2010, the use of the DCF method in equity analysts' reports is at an all time low. This is counter intuitive and is not in line with the expectations. The fact that the use of the DCF method reaches an all time low in 2010 might be caused by the relatively small sample of data. Also, for some of the companies that are analysed there are no reports for some years. The missing years are most frequently 2006 and 2010. Also, when looking at the two most prominent unsophisticated valuation

techniques there does not seem to be a overall trend over the five year period. For the price-to-earnings multiple, the employment of this multiple increases up until 2008, then decreases in the years 2008 and 2009, which is in line with the hypothesis. However, in 2010 the use of the P/E multiple is at an all time high again. For the EV/EBITDA multiple there is even less of a trend to be seen. These descriptive statistics do not provide enough insightful information. Therefore, I have incorporated economic indicator variables in order to test their influence on the chosen valuation method.

The results in table 18, see below, show that none of the four economic indicator variables have a significant effect on the employment of the DCF method. This result rejects the hypothesis that the DCF valuation method is more likely to be used due to the effects of the financial crisis compared to pre-crisis period. This implies that the financial crisis that has affected global stock markets since 2008 has not had a significant effect on the probability of the DCF method being employed more often. However, the independent variables TANG and SALES remain to have a significant effect on the employment of the sophisticated valuation method. As do the predictor variables AGE and PAGES.

On the other hand, there is evidence that shows that negative economic growth, CRISIS, has a negative effect on the employment of an unsophisticated valuation method. When the dummy variable is equal to one, that suggests that negative economic growth was detected in the country where the company's headquarters are located. Here the dummy variable representing this phenomenon significantly influences the employment of the unsophisticated valuation method. The odds ratio of 0.793 (exp [-0.232]) means that the likelihood of using multiples is only 79% compared to when there is *not* a period of negative economic growth accounted for. This in a way provides evidence that the financial crisis might have had an effect on the equity analysts' choice of valuation method. The main finding of this logit model implies that when there is a period of negative economic growth the equity analyst is less likely to choose a multiple based analysis in order to value a company. However, there is no evidence that suggests that the analyst then resorts to the DCF method because of this period of negative growth. Either way, there is reason to suggest that the economic climate does indeed have a significant effect, even though only at the 10% level, on the choice of valuation technique. The percentage of intangible and tangible assets, INTANG and TANG, remain to have a significant influence on the employment of an unsophisticated valuation method. Net income as a percentage of sales in a certain year, EARNINGS, also remains robust to the inclusion of the financial crisis indicator variables.

Independent Variables	Dependent Variables			
	Sophisticated		Unsophisticated	
INTANG	1.556	(0.532)	0.020	(0.705)c
TANG	1.811	(0.673)a	-0.731	(-0.931)a
AGE	0.005	(0.427)c	0.149	(0.584)
TA	0.005	(1.542)	0.584	(0.994)
SALES	0.663	(1.301)c	0.003	(0.001)
EARNINGS	1.432	(1.662)	-0.575	(-0.885)c
MCAP	-0.559	(-0.923)	0.338	(0.764)
ROA	0.358	(0.614)	0.434	(0.684)
BETA	-2.141	(-1.244)	-0.764	(-1.894)
PAGES	0.036	(2.859)a	-0.003	(-0.364)
CRISIS	-0.663	(-0.013)	-0.232	(-0.562)c
LEHMAN	0.020	(0.735)	-0.363	(-0.622)
VIX	0.399	(0.762)	-0.731	(-0.563)
GDP	0.210	(0.834)	-0.582	(-0.822)
Intercept	-1.342	(-0.855)	4.189	(-0.973)
R squared	0.0032		0.0055	
Observations	412		412	

Table 18: this table shows the results of two binary logit regressions with the sophisticated and unsophisticated valuation methods as a response variable. The financial crisis variables, specified in table 2, are added to the list of independent variables. Numbers in brackets are z-statistics based on robust Huber/White standard errors. a: significant at the 1% level; b: significant at the 5% level; c: significant at the 10% level.

To conclude, the hypothesis that the DCF method is used more often since the beginning of the financial crisis is rejected. However, there is some evidence that suggests that an unsophisticated valuation method is less likely to be used by an equity analyst when there is a period of negative economic growth.

7. Conclusion

In this chapter I shall summarize the main findings and relate back to the hypotheses that were made. By presenting the main results it shall become clear which hypotheses were rejected and which were proven to be correct. In addition, I shall also reflect on the limitations of this research and make suggestions for possible further academic research in this field.

7.1 Main Findings

First of all, one of the main findings is that the DCF method has proven to be the most predominant individual valuation method used by equity analysts in this data set. By simply counting the absolute number of times an equity analyst states which method (s)he has used it has become clear that the DCF is employed the most. The total amount of times the DCF method is referred to in this data set is 181 times. Closely behind the DCF method are the price-to-earnings (P/E) and the EV/EBITDA multiples, referred to 168 and 86 times respectively. These two methods are both considered to be an unsophisticated valuation method and the DCF method is a sophisticated valuation method.

There is very limited evidence that supports the idea that additional sophisticated valuation methods, such as the dividend discount model (DDM), residual income model (RIM) or more advanced models such as the real options valuation (ROV) are used in equity research reports. However, looking more closely at the unsophisticated valuation methods there seems to be more diversity. In addition to the predominant P/E and EV/EBITDA methods, the price-to-earnings-to-growth (PEG), EV/EBIT and price-to-book (PB) methods are referred to 2, 15 and 28 times respectively. Even though these methods are counted as individual valuation techniques they are all closely related to both the P/E and EV/EBITDA methods.

Summarizing, the DCF method is indeed employed more often than multiples in general as was expected. Within the sophisticated valuation methods the DCF is by far the most principal valuation technique. Within the unsophisticated valuation methods the P/E method is used more often (168 times) versus the EV/EBITDA (86 times). This is also in line with the expectations.

Secondly, I have closely looked at the effect of a specific industry has on the chosen valuation method. I have taken the percentage of (in)tangible assets as a measurement of the industry and looked at the effect this balance sheet item has on the valuation metric employed by the equity analyst. By looking at industry averages I expected that it would be more likely that the DCF method would be used in sectors that were characterized by a high percentage of tangible assets. On the other hand, I suspected that sectors that were characterized by a relatively high percentage of intangible assets would therefore more likely be valued according to unsophisticated

valuation metrics. The results of the logit model show that the percentage of tangible fixed assets indeed does have a positive significant effect on the probability of the DCF method being used by an equity analyst. Additionally, the sales growth, age and pages variables all have a significantly positive effect on the sophisticated valuation method being used more often. The telecommunications industry seems to increase the probability of the employment of the DCF method in the equity research reports. On the other hand, the consumer discretionary (e.g. Abercrombie & Fitch) and IT sectors decrease the likelihood that the DCF method will be used by equity analysts.

In addition to these results, the percentage of intangible assets has a significant positive effect on the chance that an unsophisticated valuation method is used. The healthcare and IT industry dummy variables both have a significant positive effect on the probability of an unsophisticated method being used. These findings both prove the hypothesis that the industry and percentage of (in)tangible assets do indeed have an effect on the chosen valuation method. On the other hand, the telecom industry has a negative effect on the employment of the multiples. The net income as percentage of sales also decreases the likelihood of an unsophisticated valuation method being employed. Moreover, the percentage of tangible assets has a negative effect on the likelihood of multiples being employed.

There was no data available confirming the use of the real options valuation (ROV) method I was unable to test whether it is used in combination with the DCF model in the energy industry.

Thirdly, I wanted to incorporate whether the investor sentiment of the equity analyst plays a role in determining which valuation method is into this thesis. As the equity research reports are written by equity analysts there is room for human irrationality to affect the process of determining the value of the company in question. After counting the “positive” and “negative” words in the equity reports and then determining how the investor sentiment should be incorporated into the model the following results became clear. When the absolute amount of words attributed to *negative* investor sentiment increases with one percentage point, which measures the overall *negative* investor sentiment, this increases the probability of the DCF being chosen. On the other hand, when the absolute amount of words attributed to *positive* investor sentiment increases with one percentage point, which measures the overall *positive* investor sentiment; this increases the probability of multiples being chosen. Also, by including the variables measuring investor sentiment the majority of the previous company indicator variables, such as sales growth, age, pages, earnings and (in)tangible assets have remained significant.

Finally, I have also looked at the influence that the current global financial crisis has had on the valuation methods used by equity analysts in their reports. By studying previous academic research on the previous crisis, now referred to as the dot.com crisis, it became clear that after 2001 there was a shift from the multiple based analysis towards the more fundamental based analysis,

such as the DCF model. Therefore, I wanted to find out if a similar shift has taken place again due to the effects caused by the current financial crisis. I expected to see that in the years characterized by the current financial crisis (vs. pre-crisis) analysts would be more likely to employ the DCF valuation model instead of the multiples based analysis. After determining which economic variables to use in order to measure the effects of the financial crisis the only variable that had a significant effect was the crisis variable. The effect of this variable implies that when there is negative economic growth this decreases the probability of the employment of an unsophisticated valuation method. This does not directly provide evidence in favour of my hypothesis that the DCF method is now employed more often due to the effects of the financial crisis. However, the fact that negative economic growth does have a negative influence on the probability that multiples are employed by the equity analysts in their reports partially supports my hypothesis.

7.2 Limitations

I must mention a number of limitations that I have come across during writing this research. The first limitation refers back to the investor sentiment tests. I find the field of behavioural finance very interesting and I do believe that equity analysts are influenced by their own irrationality. However, in order to determine whether an equity analyst is irrational and incorporates his/her own investor sentiment when writing the report and choosing the valuation method is not clear in this research. I believe that more attention should be focussed solely on the influence of investor sentiment. Also, the data set does not provide the ideal resources in order to determine the investor sentiment. For further research I suggest interviewing the equity analysts themselves and asking them what drives them when deciding which valuation method to use and how their sentiment plays a role in this process. However, I already suspect that it will be difficult to interview a large group of equity analysts.

The second limitation regards researching the effects of the financial crisis on the chosen valuation method. The data set does not always include a large number of reports for certain years. Especially the years 2006 and 2010 had a smaller amount of reports available compared to other years. This slightly smaller sample size makes the research and possible results less reliable. In order to determine the effect of the financial crisis more accurately the data set should include an equal and sufficient amount of reports per year.

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9. Appendices

Appendix Table 1

Log Odds	Odds	Probabilities
-6,9067	0,001	0,001
-4,5951	0,010	0,01
-1,7346	0,177	0,15
-1,3863	0,250	0,2
-1,0986	0,333	0,25
-0,8473	0,429	0,3
-0,6910	0,539	0,35
-0,4055	0,667	0,4
-0,2007	0,818	0,45
0,0000	1,000	0,5
0,2007	1,222	0,55
0,4005	1,500	0,6
0,6910	1,857	0,65
0,8473	2,333	0,7
1,0986	3,000	0,75
1,3863	4,000	0,8
1,7346	5,667	0,85
4,5951	9,000	0,9
6,9067	999,0	0,999
9,2102	9999,0	0,9999

Appendix Table 2

	INTANG	TANG	AGE	TA	SALES	EARNINGS	MCAP	ROA	BETA	LnPOSITIVE	LnNEGATIVE	LnNET DIFF.	Δ NET DIFF	CRISIS	LEHMAN	VIX	GDP
INTANG	1,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TANG	0,436	1,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AGE	-0,032	-0,069	1,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TA	-0,057	0,007	0,134	1,000	-	-	-	-	-	-	-	-	-	-	-	-	-
SALES	-0,147	0,103	0,006	0,044	1,000	-	-	-	-	-	-	-	-	-	-	-	-
EARNINGS	0,136	-0,004	0,012	-0,145	0,099	1,000	-	-	-	-	-	-	-	-	-	-	-
MCAP	-0,068	-0,256	-0,054	0,341	-0,032	0,012	1,000	-	-	-	-	-	-	-	-	-	-
ROA	0,089	0,132	-0,156	0,145	-0,057	-0,054	-0,083	1,000	-	-	-	-	-	-	-	-	-
BETA	0,147	0,054	-0,112	0,005	-0,147	-0,156	0,054	-0,009	1,000	-	-	-	-	-	-	-	-
PAGES	0,014	0,067	-0,023	0,056	0,158	-0,043	-0,021	-0,132	-0,015	1,000	-	-	-	-	-	-	-
LnPOSITIVE	-0,143	-0,176	0,067	0,004	0,011	-0,256	-0,041	0,098	0,136	1,000	-	-	-	-	-	-	-
LnNEGATIVE	0,054	0,004	0,087	0,073	0,155	0,132	-0,068	-0,104	-0,068	-0,156	1,000	-	-	-	-	-	-
LnNET DIFFERENCE	0,163	0,073	-0,009	-0,069	-0,068	0,054	-0,034	0,073	0,089	-0,112	-0,068	1,000	-	-	-	-	-
CHANGE NET DIFF	-0,041	-0,120	0,098	0,007	0,089	0,007	-0,032	-0,069	0,147	0,067	0,089	0,007	1,000	-	-	-	-
CRISIS	-0,068	-0,045	-0,104	0,103	-0,045	0,103	-0,057	0,007	0,086	-0,147	-0,045	0,103	0,089	1,000	-	-	-
LEHMAN	-0,034	0,042	-0,102	-0,078	0,042	-0,078	-0,147	0,073	0,098	0,011	0,004	-0,004	-0,045	-0,068	1,000	-	-
VIX	-0,139	-0,075	0,074	-0,134	-0,075	-0,120	0,120	-0,120	-0,104	0,155	0,073	-0,135	0,042	0,033	0,122	1,000	-
GDP	0,068	-0,055	-0,132	-0,077	-0,098	-0,045	0,077	-0,045	-0,102	-0,057	-0,120	0,043	0,122	-0,032	-0,142	-0,036	1,000

Appendix Table 3

Company	Sector	Average Sales	Median Sales	Average Net Income	Median Net Income	Net Assets	Intangible Assets	% Intangible Assets
Abercrombie & Fitch Company	Consumer Discretionary	2.716,36	2.784,71	330,67	333,99	2.567,60	54,50	2%
Barratt Developments Plc.	Consumer Discretionary	4.651,53	4.503,89	489,08	508,63	12.298,93	1.853,27	15%
Career Education Corp.	Consumer Discretionary	1.049,35	969,81	80,92	67,47	1.387,01	484,78	35%
Ford Otomotiv Sanayi AS	Consumer Discretionary	4.294,66	4.483,26	319,68	335,87	2.591,53	80,09	3%
Hero Motocorp Limited	Consumer Discretionary	2.549,28	2.428,13	281,27	241,25	1.896,69	12,70	1%
JD Group Limited	Consumer Discretionary	1.434,14	1.540,86	144,13	150,16	1.366,05	89,37	7%
Meredith Corp.	Consumer Discretionary	1.486,03	1.586,53	93,76	134,11	1.669,30	1.028,51	62%
Officemax Incorporated	Consumer Discretionary	9.087,46	7.833,66	21,20	-	7.543,00	1.375,27	18%
Rent A Center Inc	Consumer Discretionary	2.444,11	2.339,11	130,49	135,74	2.626,94	1.269,09	48%
Sky Perfect Jsat Holdings	Consumer Discretionary	1.078,90	1.086,18	16,78	34,85	3.181,12	185,91	6%
Tempur Pedic International Inc	Consumer Discretionary	929,49	927,82	99,39	99,33	643,38	258,11	40%
TUI AG	Consumer Discretionary	26.395,53	26.014,53	-443,16	-168,62	19.388,77	5.267,62	27%
Industry Average		**4.843,07**	**4.708,21**	**130,35**	**156,06**	**4.763,36**	**996,60**	**22%**

Appendix Table 4

Company	Sector	Average Sales	Median Sales	Average Net Income	Median Net Income	Net Assets	Intangible Assets	% Intangible Assets
Aryzta AG	Consumer Staples	2.747,96	2.550,27	160,02	157,79	3.810,32	1.303,14	34%
Carlsberg AS	Consumer Staples	6.149,44	6.016,80	180,15	161,95	10.194,15	3.737,74	37%
Circle K Sunkus Company	Consumer Staples	1.490,11	1.551,35	88,55	89,87	1.761,68	53,60	3%
Dairy Farm International	Consumer Staples	4.650,86	4.763,18	210,64	210,59	2.288,80	292,56	13%
Fomento Economico Mexicano	Consumer Staples	7.089,50	6.727,38	389,76	362,00	11.728,90	4.582,21	39%
Ioi Corporation Berhad	Consumer Staples	1.639,27	1.598,02	242,62	229,63	3.939,72	147,91	4%
Lawson Inc	Consumer Staples	2.456,71	2.388,94	189,13	190,16	3.686,96	175,66	5%
Nisshin Seifun Group Inc	Consumer Staples	3.903,18	3.891,38	113,87	111,99	3.807,67	46,32	1%
Souza Cruz SA	Consumer Staples	1.977,67	1.986,44	400,84	386,02	1.473,41	35,81	2%
Swedish Match AB	Consumer Staples	1.854,05	1.886,75	274,47	275,08	2.491,34	683,72	27%
Tyson Foods Inc	Consumer Staples	25.892,60	26.014,00	233,00	337,00	10.227,00	2.611,00	26%
Yakult Honsha Company Limited	Consumer Staples	2.247,74	2.295,83	129,18	125,39	2.965,84	43,20	1%
Industry Average		**5.174,92**	**5.139,20**	**217,68**	**219,79**	**4.864,65**	**1.142,74**	**16%**

Appendix Table 5

Company	Sector	Average Sales	Median Sales	Average Net Income	Median Net Income	Net Assets	Intangible Assets	% Intangible Assets
Arc Resources Limited	Energy	583,89	592,55	233,41	221,42	2.989,58	135,43	5%
Caltex Australia Limited	Energy	11.024,15	11.517,23	393,67	436,14	4.679,99	69,79	1%
Consol Energy Inc	Energy	2.653,15	2.580,25	220,81	115,21	5.155,34	-	0%
Energen Corp.	Energy	995,83	937,38	151,14	127,45	2.836,89	-	0%
EQT Corp.	Energy	1.165,92	1.191,61	217,53	216,03	3.196,98	-	0%
Hellenic Petroleum SA	Energy	8.843,20	7.847,83	329,48	343,10	7.351,78	189,94	3%
Mangalore Refinery & Petrochemicals	Energy	4.109,08	4.238,71	84,96	105,81	2.088,89	-	0%
Noble Energy Inc	Energy	2.041,03	2.095,91	533,14	645,72	10.830,90	760,50	7%
Origin Energy Limited	Energy	6.263,81	6.501,54	1.435,61	495,81	18.367,93	2.361,66	13%
Penn West Petroleum Limited	Energy	1.832,10	1.484,57	491,98	494,12	12.484,42	1.636,29	13%
PTT Exploration & Production	Energy	2.418,20	2.469,35	761,22	775,85	6.850,50	12,03	0%
SBM Offshore NV	Energy	2.007,87	2.042,57	164,24	215,03	3.631,35	35,62	1%
Industry Average		**3.661,52**	**3.624,96**	**418,10**	**349,31**	**6.705,38**	**433,44**	**4%**

Appendix Table 6

Company	Sector	Average Sales	Median Sales	Average Net Income	Median Net Income	Net Assets	Intangible Assets	% Intangible Assets
Amylin Pharmaceuticals Inc	Healthcare	68,45	59,96	-149,15	-139,98	568,05	3,69	1%
Cipla Limited	Healthcare	783,62	791,04	142,11	151,97	1.351,49	-	0%
The Cooper Companies Inc	Healthcare	5.610,97	5.356,07	358,91	337,12	5.665,11	2.008,67	35%
Coventry Health Care Inc	Healthcare	983,60	997,90	82,30	79,30	1.331,30	472,80	36%
Edwards Lifesciences Corp.	Healthcare	928,85	1.013,78	62,57	61,56	1.414,50	716,07	51%
GN Store Nord A/S	Healthcare	1.047,31	1.054,13	207,73	211,27	1.721,06	1.039,16	60%
Hillenbrand Inc	Healthcare	1.337,66	1.268,53	232,69	226,08	1.928,36	1.208,37	63%
Hill-Rom Holdings Inc	Healthcare	1.441,10	1.409,80	234,18	226,08	1.940,54	1.232,18	63%
Lincare Holdings Inc	Healthcare	4.391,59	4.119,89	196,45	199,24	7.398,47	4.544,60	61%
Mettler Toledo International Inco	Healthcare	5.681,56	6.220,01	185,45	183,57	7.459,72	4.586,68	61%
Omnicare Inc	Healthcare	1.859,99	1.863,91	160,04	177,08	4.156,19	56,44	1%
Shionogi & Company Limited	Healthcare	302,05	262,04	106,44	90,71	995,29	25,28	3%
Sun Pharmaceutical Industries Limited	Healthcare	833,91	858,96	62,55	68,32	2.561,97	1.382,29	54%
Industry Average		**1.943,90**	**1.944,31**	**144,79**	**144,02**	**2.960,93**	**1.328,94**	**38%**

Appendix Table 7

Company	Sector	Average Sales	Median Sales	Average Net Income	Median Net Income	Net Assets	Intangible Assets	% Intangible Assets
Alfa Sab De CV	Industrials	5.588,33	5.275,78	377,85	390,24	6.874,81	87,65	1%
Bidvest Group Limited	Industrials	11.234,34	10.830,87	337,84	334,94	5.296,79	644,16	12%
Copart Inc	Industrials	546,40	528,57	117,45	112,66	953,93	199,07	21%
First Group PLC	Industrials	7.169,17	7.274,25	196,10	186,46	8.408,46	3.263,31	39%
Hankyu Hanshin Holdings Inc	Industrials	6.377,61	6.922,30	170,93	208,06	24.960,78	663,05	3%
Intertek Group PLC	Industrials	968,25	959,18	92,85	98,03	822,20	177,51	22%
Keio Corp.	Industrials	4.047,82	4.253,82	163,50	168,38	7.684,15	67,81	1%
Marubeni Corp.	Industrials	37.365,74	28.409,24	516,13	371,51	40.823,34	1.037,04	3%
Orascom Construction Industries	Industrials	1.886,62	1.980,66	236,54	191,47	17.209,24	11,75	0%
Schindler Holding AG	Industrials	8.102,35	7.233,04	265,96	270,85	6.191,03	834,72	13%
SPX Corp.	Industrials	4.581,16	4.372,00	115,86	173,00	5.306,40	2.249,60	42%
Tobu Railway Company Limited	Industrials	5.907,38	6.093,80	214,87	179,66	14.906,09	219,42	1%
Industry Average		**7.814,60**	**7.011,13**	**233,82**	**223,77**	**11.619,77**	**787,92**	**13%**

Appendix Table 8

Company	Sector	Average Sales	Median Sales	Average Net Income	Median Net Income	Net Assets	Intangible Assets	% Intangible Assets
Alps Electric Company Ltd	IT	6.088,98	6.014,18	-62,17	44,39	3.755,23	142,78	4%
BMC Software Inc	IT	1.718,70	1.731,60	255,14	238,10	4.057,60	1.669,90	41%
Compal Electronics Inc	IT	7.131,16	7.251,29	258,65	256,34	6.130,92	31,26	1%
Diebold Inc	IT	2.155,62	2.109,67	128,13	132,30	2.353,19	419,98	18%
HCL Technologies Limited	IT	1.422,15	1.490,08	224,94	244,37	2.496,37	809,42	32%
Itochu Techno-Solutions Corp.	IT	2.481,11	2.493,11	113,51	101,65	2.185,89	62,94	3%
Logitech International SA	IT	2.044,34	2.078,27	186,06	176,00	1.412,12	278,63	20%
Net One Systems Company Limited	IT	944,95	910,10	44,52	40,54	700,71	14,63	2%
Qlogic Corp.	IT	572,31	586,70	97,44	105,42	713,82	137,14	19%
Semiconductor Manufacturing Internationa	IT	1.327,65	1.373,32	-110,79	-44,97	4.218,68	199,76	5%
Tieto OYJ	IT	2.110,51	2.073,23	133,10	113,80	1.778,23	699,13	39%
Zebra Technologies Corp.	IT	705,91	702,27	100,74	110,11	1.005,87	365,93	36%
Industry Average		**2.391,95**	**2.401,15**	**114,11**	**126,50**	**2.567,39**	**402,63**	**18%**

Appendix Table 9

Company	Sector	Average Sales	Median Sales	Average Net Income	Median Net Income	Net Assets	Intangible Assets	% Intangible Assets
Airgas Inc	Materials	3.362,51	3.205,05	172,39	154,42	4.399,54	1.279,44	29%
Buzzi Unicem	Materials	3.685,93	3.767,14	391,68	324,45	7.959,50	818,84	10%
Goldcorp Inc	Materials	651,88	281,78	183,70	106,00	17.970,42	1.687,12	9%
Industrias Penoles Sab De CV	Materials	2.432,42	1.997,41	194,73	159,15	3.288,46	-	0%
Kinross Gold Corp.	Materials	644,35	719,48	-31,45	-37,92	2.024,61	293,47	14%
MECHEL OAO	Materials	3.099,53	3.749,29	522,75	375,60	4.611,57	332,74	7%
Newmont Mining Corp. Of Canada	Materials	4.428,60	4.411,00	29,20	443,00	15.598,00	186,00	1%
Pretoria Portland Cement Company	Materials	664,23	625,01	162,88	156,32	547,54	2,29	0%
Sequana	Materials	5.164,50	5.246,83	16,93	7,91	4.868,38	1.091,83	22%
Taiyo Nippon Sanso Corp.	Materials	4.035,31	3.883,86	157,69	167,39	5.384,73	313,35	6%
Usinas Sider Minas Gerais SA	Materials	4.175,83	4.604,62	870,72	1.136,62	8.634,47	25,67	0%
Industry Average		**2.940,46**	**2.953,77**	**242,84**	**272,09**	**6.844,29**	**548,25**	**9%**

Appendix Table 10

Company	Sector	Average Sales	Median Sales	Average Net Income	Median Net Income	Net Assets	Intangible Assets	% Intangible Assets
American Tower Corp.	Telecom	1.028,11	944,79	-110,79	-134,13	7.650,60	3.798,81	50%
Centurylink Inc	Telecom	2.474,27	2.447,73	363,87	344,71	8.184,55	4.409,73	54%
Elisa OYJ	Telecom	1.931,18	1.940,18	172,91	207,84	3.134,37	1.339,04	43%
Globe Telecom Inc	Telecom	1.254,40	1.223,20	237,46	235,86	2.507,26	70,04	3%
Magyar Telekom Teleco Plc.	Telecom	3.317,97	3.327,92	315,91	347,90	6.560,09	1.950,33	30%
Mahanagar Telephone Nigam	Telecom	1.148,62	1.188,24	107,05	105,57	4.625,51	6,09	0%
NII Holdings Inc	Telecom	1.926,41	1.745,84	220,59	186,64	4.895,33	410,45	8%
PCCW LIMITED	Telecom	3.017,94	2.945,56	-3,11	192,76	6.558,73	596,87	9%
Philippine Long Distance Tele	Telecom	2.767,94	2.726,81	675,20	707,22	5.109,42	219,77	4%
Telecom Argentina SA	Telecom	2.355,86	2.425,44	164,58	248,25	2.794,19	222,11	8%
Telefonica Chile SA	Telecom	1.296,46	1.307,88	139,88	11,66	3.409,13	91,58	3%
Telemar Norte Leste SA	Telecom	5.790,08	5.878,78	458,92	345,31	11.756,05	611,77	5%
Industry Average		**2.359,10**	**2.341,86**	**228,54**	**233,30**	**5.598,77**	**1.143,88**	**18%**

Appendix Table 11

Company	Sector	Average Sales	Median Sales	Average Net Income	Median Net Income	Net Assets	Intangible Assets	% Intangible Assets
AGL Resources Inc	Utilities	1.804,72	1.832,00	159,34	153,00	6.147,00	420,00	7%
China Resources Power Holdings	Utilities	896,57	764,47	265,99	304,07	8.171,50	315,28	4%
CMS Energy Corp.	Utilities	6.109,40	6.288,00	-70,40	-90,00	14.097,00	-	0%
Electric Power Development	Utilities	5.745,13	5.556,98	298,22	297,84	19.710,02	-	0%
Gail (India) Limited	Utilities	3.636,26	3.761,24	548,22	564,17	6.280,02	16,52	0%
International Power Plc.	Utilities	2.454,28	1.525,21	252,41	181,92	18.164,31	812,22	4%
MDU Resources Group Inc	Utilities	2.920,34	2.719,26	224,06	206,38	4.903,47	251,83	5%
Mosenergo	Utilities	2.789,22	2.669,18	60,65	59,19	7.540,13	-	0%
Nstar	Utilities	3.286,21	3.261,78	223,04	221,52	8.144,79	598,06	7%
Petronas Gas Berhad	Utilities	760,96	770,90	270,32	263,65	3.061,85	-	0%
Reliance Infrastructure	Utilities	1.577,87	1.575,29	203,51	191,99	6.806,67	10,22	0%
Transalta Corp.	Utilities	2.390,93	2.403,10	167,39	170,19	6.967,20	338,52	5%
Industry Average		**2.864,32**	**2.760,62**	**216,89**	**210,33**	**9.166,16**	**230,22**	**3%**