Analysts' Earnings Forecast Bias

Evidence for the Dutch Market 2006-2011

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Abstract

In this paper the analysts' earnings forecast error is examined for the Dutch market in the years from 2006 until 2011 and compared to findings in the US market and the UK market. The analysts' earnings forecast error is examined in five different periods starting from 1 week before the earnings announcement until 4 years before the earnings announcement. The analysts' earnings forecasts are overly too optimistic for the years 2009 until 2011; the analysts' earnings forecast error in the Dutch market is on average between the 0.33%-point and 4.92%-point higher than in the US market and the UK market. However there was no evidence for the existence of the optimistic-pessimistic trend in the analysts' earnings forecast revisions. The findings from the regression analysis of the analysts' earnings forecast error are dispersed, while the influence of company size and earnings predictability is in line with the expectations. The contrary is true for the firm coverage and a sentiment factor, like the consumer confidence level, GDP growth or Oil prices, these factors were not significant or consistent.

Keywords: *Analysts' Earnings Forecast Bias, Optimism, EPS, Regression analysis, Dutch Market.*

Jel codes: *G02, G12, G17, G24, D03 and D82*

Contents

1. Introduction

One area in which the expectations of analysts' forecasts are highly important is in the valuation process for the common stock of a company. The earnings per share (EPS) forecasts can be used in combination with a company's Price-Earnings ratio (P/E ratio), or in combination with the dividend discount model, to determine the price of the common stock (Cragg and Malkiel (1968), Clayman and Schwartz (1994), and Breton et al. (2011)). While most investors do not have access to private company information, analysts do. Therefore, the role of analysts' forecasts is crucial for financial markets, as they provide relevant information to the investors and thereby fill in the gap of information asymmetry between firms and investors.

According to Van der Meer et al. (2011) there are three approaches to calculate the earnings growth rate: firstly, by using analysts' forecasts, secondly, with the use of GDP growth, and thirdly, with historical dividend/earnings growth data. This paper focuses on the analysts' forecasts growth rate. The reason for focusing on this approach is the following.

Financial analysts are of importance for the financial market, since their supply of relevant information is used by investors. With their entrance to public and private information, financial analysts issue earnings forecasts and recommendations, which are widely used by investors (Brown (2012), Bolton et al. (2007), Malmendier and Shanthikumar (2007a), Stickel (1995) and Gleason and Lee (2003)). The earnings growth rate is of special importance, since it is widely used in valuation practices (Koller et al. (2010)). Since an accurate earnings growth rate is crucial for investors and valuation practices, it is important that earnings forecasts are as accurate as possible. Cragg and Malkiel (1968) concluded that earnings growth in past periods is not a useful predictor for future earnings growth. Furthermore, Bradshaw et al. (2012) conclude that analysts' forecasts are superior in the short run over the random walk series. Therefore, analysts' earnings forecasts are highly important for a well-developed financial system.

It is crucial to have an accurate earnings growth forecast when making a solid valuation. According to Koller et al. (2010) some small changes in the expected growth rate can cause highly different outcomes in the valuation of a

company. Despite the fact that it is crucial to have an accurate earnings growth forecast, previous literature showed that analysts' earnings forecasts are, in general, overly too optimistic.

Previous literature on the analysts' forecast error mainly contains evidence from the US market (Ali et al. (1992), Francis and Philbrick (1993), Clayman and Schwartz (1994), Lim (2001), Chopra (1998), Claus and Thomas (2001), Bosquet et al. (2011), Brown (2012), Bradshaw et al. (2012), Brown and Larocque (2012), and Boudt et al. (2012)). The conclusions in said articles are similar in most cases, showing that the existence of analysts' forecast error is due to the analysts' forecasts being too optimistic. However, the magnitude of this forecast error differs among the before mentioned studies: from 2% to 57.1% annually. This difference can partly be explained by the varying research periods used in these studies: on average, the forecast error was higher before the mid '90s than after. This is due to the rising stock prices after the mid '90s, resulting in the fact that the actual EPS were then more in line with the forecasted EPS (Chopra 1998). Helbok and Walker (2004) found evidence for the optimistic analysts' forecast in the UK, where the forecast error was between 0.57% and 3.82% annually. Table 1-1 in the Appendix shows an overview of the previous research on the forecast error with the main results.

Most research on the forecast error was done in the US market, while insight in the analysts' earnings forecast error can also be of great value for other markets. Since investors can make corrections, based on available research, into the analysts forecast error. As a result, investors will know a more accurate value of a company, which can lead to a greater shareholder value. Indeed investors make these corrections, investors take into account several variables, like analysts characteristics (Hirst et al. (1994)). Few research is done into the European market, does that imply that analysts for the European market are more accurate than their counterparts in the US? Few research is available for the UK market, and it seems that the 1 year ahead earnings forecast error is smaller in the UK market than in the US market (Table 1-2). Will the analysts' earnings forecast error also be lower in the Dutch market compared to the US market? Up to today, too few research into the Dutch market has been done to know. The last research into the accuracy of the analysts forecast in the Dutch market was conducted in the '80s (Schreuder and Klaassen (1984)). Does this

mean that analysts' earnings forecasts of the companies in the Dutch market are more accurate, and therefore no results of optimistic behaviour among analysts can be found? In other words, are analysts' earnings forecasts of the Dutch market different from their counterparts in the UK and the US? To answer these questions, an analysis will be made of the analysts' earnings forecast in the Dutch market from 2006-2011. This analysis will be compared to the results of earlier research on the US market and the UK market. For the same timeframe, the average analysts' earnings forecast error in the US market lies within the range of 2.14% and 3.78%. For the UK market the average lies at 1.37% for 1 year prior to the earnings announcement. The results of the analysis of Breton et al. (2011) on the French market are in absolute values. Therefore, a comparison between the results of this research with the French market will not be made, since comparing absolute values with each other does not provide relevant information. Due to data limitations the period researched in this thesis is 5 years, but this still provides the opportunity to make valid comparisons with previous research that is done into the same timeframe (table 1-2).

Table 1-2: Summarized version of table 1-1: an overview of previous literature

Author	***Market***	***Period***	***Main Results***
Helbok and Walker (2004)	UK market	1990-1998	-The average forecast error in this period is 1.37% of 1 year ahead.
Libby et al. (2008)	US market	2006-2007	-clear OP pattern.
Breton et al. (2011)	French market	1997-2007	-The absolute forecast error in the period of 1 year ahead; mean of 2.46, max. 162.57 and min. 0.
Bradshaw et al. (2012)	US market	1983-2008	-Forecast error 11 months prior earnings announcement: 2.14%, 23 months: 3.08% and 35 months: 3.59%. Median respectively: 0.30%, 1.04% and 1.73%.
Brown and Larocque (2012)	US market	1996-2008	-Average overestimation of 3,78% per year and 0.42% for Q1.
Boudt et al. (2012)	US market	1995-2010	-Average forecast error 5days before announcement 0.024.

Another gap in the existing body of research is the sentiment factor which occurs. When people extrapolate an occurring trend, this can bias the future estimates. Analysts base their forecasts on current and past information, where they put more weight on current information. Therefore, analysts will be more optimistic about the future at the moment when the business cycle is at its peak then when it is at its trough (Chopra (1998)). This is the case when analysts make use of the exponential moving average or weighted moving average, where more weight is put on more recent observations (Van der Meer et al. (2011)). Evidence can be found for the notion that analysts' forecasts entirely ignore cyclicality, while stock prices move in trends. The forecast showed an upward-sloping trend, whether the companies were at their peak or trough of the business cycle (Koller et al. (2010)).

For the reasons mentioned above, in this research I will investigate whether there is an analysts' earnings forecast error in the Dutch market over the period 2006-2011. In the '80, Schreuder and Klaassen (1984) did research regarding the forecast ability of analysts in the Dutch Market in 1979, finding evidence for an overly optimistic analysts' profit forecast error of 40.6% (scaled by the actual profit). Furthermore, I try to explain the biases analysts' forecasts are exposed to. Then I will focus my attention on the effect of the extrapolation bias on analysts' forecasts and try to find consistency in this bias, in order to make a correct adjustment. In the case you can measure a trend in the revision of analysts' earnings forecast and you can explain the average revision by the state of the business cycle, consumer and/or business confidence, then you can make a correction for the analysts' earnings forecast at the moment the forecast is made. As a result, my goal is to find a more accurate value of the earnings forecast. This will give a better valuation of the companies in question and will lead to greater shareholder value. Indeed investors take into account the optimistic forecast bias of analysts' earnings forecast, which is described in previous literature (table 1-1), and make corrections to find a more accurate value of the company (Hirst et al. (1995)). Therefore, the results of this research can be of great shareholder value. In section two I will define the existing literature, followed by the methodology and data description in section three. In section four I will show the results and finally I will end with a conclusion and discussion.

2. Literature Overview

2.1 Buy-side versus sell-side analysts

There are differences between buy-side and sell-side analysts and their forecasts. A sell-side analyst is an analyst who works at a broker house, where he writes reports and gives recommendations about certain industries or stocks. A buy-side analyst, on the other hand, only produces reports for the portfolio managers of their own firm (Groysberg et al. (2008)). Most research is done into sell-side analysts. Groysberg et al. (2008) investigated the differences between buy-side and sell-side analysts in the US market during the period 1997 to 2004. Groysberg at al. (2008) found that, in this period, the mean forecast of buy-side analysts is between 8% and 16% higher than that of sell-side analysts, when expressed as a percentage of actual earnings. Furthermore, they found that the buy-side actual forecast error was between 11% and 15% higher than that of sell-side analysts. Groysberg et al. (2008) concluded that the difference between sell-side analysts and buy-side analysts can partly be explained by the difference in skills they possess. They state that the retention rate is higher at the side of buy-side analysts. This means that poor performing analysts have a higher chance of keeping their jobs as a buy-side analyst in comparison with a sell-side analyst. Ashton and Cianci (2007) studied the motivational and cognitive determinants of sell-side analysts and buy-side analysts. They found evidence for optimism in the forecasts made by sell-side analysts, which was in line with the findings of Dechow et al. (2000), Easterwood and Nutt (1999), Beneish (1991), Biddle and Ricks (1988), Crichfield et al. (1978), Stickel (1992), Das et al. (1998), Bathke et al. (1991), Dreman and Berry (1995), Dugar and Nathan (1995), Fried and Givoly (1982), Klein (1990), and O'Brien (1988). Regarding buy-side analysts, Ashton and Cianci (2007) only found one article in which buy-side analysts were optimistic (Willis (2001)). Finally, Ashton and Cianci (2007) expect that sell-side analysts have motivational determinants to be optimistic which buy-side analysts do not have. Examples of such determinants are relationship management, supporting investment banking and trading activities, and generating trading commissions. They conclude that sell-side analysts have more incentives to be optimistic and found evidence that sell-side analysts are more optimistic than buy-side analysts.

Since buy-side analysts only produce reports for the portfolio managers of their own firm and sell-side analysts write reports for investors about certain industries and stocks, the rest of this paper will solely focus on sell-side analysts, since only their information is publicly available and used by investors.

2.2 Analysts' earnings forecast biases

A lot of research is done with regard to the accuracy of analysts' earnings forecasts, and many authors find one or more biases which occur if analysts are making their forecasts. In the following subsections I will give an overview of the most important biases in analysts' forecast. The incentives for an analyst to be accurate change over the year. Where their initial forecast is mostly too optimistic, later in the year the analyst wants to recover this optimism and strives to be more accurate. Gell et al. (2010) argue that a revision is driven by the same incentive as a forecast: the change in analyst incentives to systematically bias their earnings estimates. Gell et al. (2010) give five explanations for the analysts' forecast error:

- the strategic incentives bias explanation;
- the selection bias explanation;
- the cognitive bias explanation;
- the skewed distribution bias explanation;
- the news bias explanation.

In the following subsections I will elaborate on these five explanations and add the extrapolation bias explanation.

2.2.1 Strategic incentives bias explanation

Gell et al. (2010) state that the strategic incentives bias explanation assumes analysts to be rational and to purposely bias their forecast due to strategic incentives. This can be seen as the timing of the forecast.

Libby et al. (2008) found that sell-side analysts, for whom relationship incentives are more important than accuracy, forecasts have a larger optimistic to pessimistic (OP) time trend, in which the forecast at the beginning of the

period is optimistic and that at the end of the period is pessimistic. Ke and Yu (2006) found that analysts who are forecasting in an OP pattern are less likely to be fired. Francis and Philbrick (1993) also found supporting evidence for the pleasing of the management to be among analysts' incentives, who, therefore, on average issue earnings forecasts that are too optimistic.

Beside the evidence Bosquet et al. (2011) found on the existence of the OP pattern in analysts' earnings forecasts, they examined the decision making process of an analyst in a two-stage model when supplying some earnings forecast. They state that both behavioural (overconfidence) and strategic biases co-exist in the analysts' process in issuing earnings forecast. Analysts have the incentive to please the management; the existence of this behaviour can be explained through the agency problem, since management gives the analysts access to the company information, which they need for doing their job. If the analyst does not please the management of the company with a favourable earnings forecast, the management can decide to cut the access of the analyst to their company information (Bosquet et al. (2011), Breton et al. (2011), Koller et al. (2010), and Trueman (1990)). In his research, Trueman (1990) concludes that one of the reasons for the analyst to be reluctant to revise his forecast, if he gathered new information, is that an issuance of unfavourable revision might cause the firm manager to cut off the analyst from corporate information.

Richardson et al. (2004) show that the management of many companies prefers high market expectations after an earnings announcement, which has a positive influence on the stock price. Also, they prefer beatable targets before an earnings announcement, so there can be a positive earnings surprise effect. Richardson et al. (2004) state that the OP pattern is favourable for the management, as they can sell their own stock for the best price.

Agrawal and Chen (2005) discuss several potential conflicts of interest on analysts' behaviour and performance. They did not find any results of systematic biases on accuracy in the short run. However, the long term growth forecasts are overly optimistic and increase if the company is responsible for a greater amount of revenue commissions for the brokerage firm.

2.2.2. Selection bias explanation

According to McNichols and O'Brien (1997), analysts cover only those firms about which they are optimistic and stop covering firms about which they are pessimistic. This can explain in partly the overly optimistic view of analysts in their forecasts. Clinton et al. (2011) state that fewer analysts follow firms with a weak internal control system and therefore will follow more firms which disclose a good internal control system.

Clayman and Schwartz (1994) found that actual earnings were significantly lower than estimated earnings. The possible explanation of Clayman and Schwartz is the tendency of analysts 'to fall in love' with their own stocks. That explains why the buy recommendations outnumber the hold and sell recommendations by far.

Abdel-Khalik (1990) also found evidence for the existence of the selection bias. Analysts will classify firms in a good/bad-news classification and will base their expectations for the future on this classification. Analysts expect that good-news companies will generate higher returns in the future.

2.2.3. Cognitive bias explanation

In their research, Abarbanell and Bernard (1992), Ali et al. (1992), and Abarbanell and Bushee (1997) find that analysts underestimate the persistence of earnings surprises in revising their earnings forecasts.

According to Williams (2011), it is important that people have unbiased perceptions of their similarity to others, to implement useful information. According to social psychology, people overestimate their similarity to others, which leads to an under reaction to the news from the market (Williams (2011)). Williams (2011) described the overestimation of signal error correlations, a false consensus, as the tendency that every analyst has their own private signals about an asset, and therefore has his own expected value of the asset. To get a more informative value of the asset, the analysts should aggregate their information.

Bradshaw et al. (2012) re-examined the general belief that analysts' forecast are more accurate than a random walk time-series forecast. They found

that the analysts' forecast is superior to the random walk time-series in the short run, but if the time horizon is broadened, the analysts' forecast accuracy declines. At a certain moment, the random walk time-series become superior over the analysts' forecast. In this case, short run is defined as one-year-ahead forecast and long run as two- and three-year-ahead forecast.

Cen et al. (2011) found influences of the behavioural effect of anchoring, discussed by Tversky and Kahneman (1974), on the analysts' earnings forecast. Where the anchor for the earnings forecast of a specific firm is the earnings forecast of the whole industry the firm belongs to, even when the firm is generating higher earnings due to fundamental reasons, the upward adjustment is insufficient and, therefore, there will be an anchoring bias in the forecast due to the industry norm. As a result, earning surprises are higher for firms which have a higher earnings forecast relatively to the industry median.

Skewed distribution bias explanation

In research conducted by Gu and Wu (2003), evidence for the appearance of a systematic bias due to the skewed earnings some businesses can face was found. Gu and Wu (2003) ensured that the analyst characteristics were truthful, unselective and rational. They stated that analysts want to minimize the mean absolute forecast error (MAFE), while to have the most optimal forecast, analysts should use median earnings instead of mean earnings. Because most firms have skewed earnings, the forecast bias can be explained through the mean-median difference. The results of Gu and Wu are in line with the earlier mentioned research about the optimistic forecast bias.

2.2.5. News bias selection

Helbok and Walker (2004) found evidence, in a UK sample, that analysts' revisions are mainly driven by unexpected news. Furthermore, they found that bad news is reflected in a revision more quickly than good news. This explains the theory of analysts' forecasts to initially make an overly optimistic forecast and then downgrade it through the period to set a more pessimistic/realistic forecast.

Louis et al. (2009) explained the initial optimistic forecast as a lack of conservatism in the analysts' initial forecast. Since accounting principles are conservative, the analysts' forecast should also be conservative. Analysts do not fully take in all the information in their forecast and analysts revise their forecast downwards throughout the year when new information becomes available, to adjust for their initial, too optimistic forecast.

Yoo et al. (2011) conducted a research to explain the role of cash flow forecasts in addition to earnings forecasts. Using the signalling and support theory from psychology, they found support for their hypothesis that analysts issue a cash flow forecast revision in the opposite direction of the earnings forecast revision if the earnings forecast revision is downgraded, so the analyst can still give a positive signal to the market. Furthermore, Yoo et al. (2011) found that analysts (1) want to please several stakeholders, like management, but also investors, (2) have strong incentives to delay or moderate bad news, and (3) have the tendency to search for good news in the stocks they follow, to keep investors interested.

2.2.6. Extrapolation bias explanation

According to the dictionary, extrapolation is *"to infer or estimate by extending or projecting known information"*. Angelini et al. (2012) state that a momentum component is: *"naturally justified in terms of agents' belief that expected returns are higher in bullish markets than in bearish ones (p.4-5)".*

Armstrong (1984) collected all research conducted from 1960 until 1984 to summarize the extrapolation techniques which help analysts to increase the accuracy of their forecasts. Much research was done on the effects of using exponential smoothing, moving average, adaptive versus constant parameters etc. These techniques all have in common that the analysts place more weight on current information and less weight on information from the past.

According to Chopra (1998) analysts' forecast will always be inaccurate as long as the business cycle exists. Since analysts' optimism prevents them from reducing their forecasts enough if the business cycle is moving downwards. Nonetheless, Chopra (1998) recognizes that the analysts' earnings forecasts are more accurate in a bullish market than in a bearish market, since analysts are

overly optimistic. Chopra found that the range of the forecasted EPS lies between 10%-30% a year, while the actual growth rates varies from -10% to 40%.

Barber et al. (2003) did research on the value of stock recommendations done by analysts. They found evidence that in the period of 1996 to 1999 the highly recommended stocks outperformed the not recommended stocks. However, in 2000 and 2001 the opposite is true. Barber et al. concluded that this might be due to the inability of analysts to adapt to changing market conditions, which is in line with the findings of Chopra (1998).

While analysts have difficulties with recognizing the cyclicality of the business cycle, Bagella et al. (2007) found that there was a significant overreaction to analysts' upward and downward revision of firms' 1-year ahead forecasted earnings, to rates of GDP growth and consumer confidence index level. This in spite of the fact that the theory from a standard two-stage dividend discount model suggests that the observed changes in GDP growth and consumer confidence index level should not have any significant impact on prices and implied equity risk premium. Therefore, it can be highly valuable for an investor to know by what amount an analysts' earnings forecast can be adjusted, so that the investor will not face large price shocks after a revision.

Lemmon and Portniaguina (2006) find evidence for the premium on small stocks versus large stocks which change if the consumer confidence is changing. Furthermore, they found that the consumer confidence index is a strong predictor for the GDP level and is therefore closely related to the business cycle. They also found that the difference between the premium of a small stock and a large stock is smaller in good times, i.e. where the consumer confidence index is high. Vice versa, when the consumer confidence is low there will be a larger small stock premium.

Next to consumer confidence and GDP growth as a proxy for the business cycle, oil prices can also be considered a good proxy. Park and Ratti (2008) found evidence for the negative influence of an increase in the oil price on the stock price for the US and several European countries, including the Netherlands. However, they state that this negative effect is only notable in the short term (within the same or next month). Nandha and Faff (2008) concluded that oil

price has an adverse effect on the equity market for all industries, with the exception of mining, oil and gas. Since rising oil prices have an adverse effect on corporate profit, if oil is used as an input, it is clear that the equity market should react in the same way. Kilian and Park (2009) developed a model where they measured the effect of an increase in the oil price on stock market fluctuations. In contrast to other literature, they differentiate between the demand and supply driven oil price increase. Jointly, these effects explain 20% of the long-run variation of the US stocks.

2.3 Hypotheses

The subparagraphs above mention several reasons for the existence of a difference between the forecasted earnings per share and the actual earnings per share. In previous literature (table 1-1), researchers found evidence for the existence of overly optimistic analysts' earnings forecast, which results in forecast errors. Furthermore, this optimism decreases as the earnings announcement day is coming closer. While previous research focused mainly on the US market, there is some research available focussing on the UK market and France market (Helbok and Walker (2004), and Breton et al. (2011)). The main conclusions of the latest research is that analysts are overly optimistic by 1.37% in the UK market and between the 2.14% and 3.78% in the US market, for 1 year prior to the earnings announcement, see table (table 1-2). In the Dutch market, the latest study dated from the '80s (Schreuder and Klaassen (1984)). In this research, Schreuder and Klaassen found evidence for a too optimistic analysts' profit forecast of 40.6% (scaled by the actual profit). Therefore, this research will contribute to the existing literature, because a comparison can be made with other markets (US market and the UK market) and evidence may be found for the fact that analysts are still too optimistic in the Dutch market. Therefore, my first hypothesis is:

H1: There are no overly optimistic analysts' earnings forecasts in the Dutch market in the period from 2006 to 2011.

Secondly, in previous research evidence was found for the downward sloping analysts' earnings forecast error (Libby et al. (2008), Ke and Yu (2006), Bosquet et al. (2011), Richardson et al. (2004), Helbok and Walker (2004), and Louis et al. (2009)). Therefore, my second hypothesis is:

H2: There is no optimistic-pessimistic pattern in the analysts' earnings forecast in the Dutch Market.

Thirdly, since analysts put more weight on the more recent observations, and analysts are more optimistic about the future when the business cycle is in a positive sentiment. As the consumer confidence index is a strong predictor for the GDP level and is therefore closely related to the business cycle, the consumer confidence index is used as the explanatory variable, (Lemmon and Portniaguina (2006)). Since analysts are biased due to the extrapolation bias, I come to the following hypothesis:

H3: The analysts' earnings forecast error cannot be explained by the level of the consumer confidence.

3. Methodology and data description

3.1 Methodology

3.1.1. Analysts' earnings forecast error

For the first hypothesis, the analysts' earnings forecast error is defined as the forecasted EPS consensus minus the actual EPS, scaled by the share price of t-1 (Boudt et al. (2012) and Brown and Larocque (2012)). When the analysts' earnings forecast error is positive, analysts are too optimistic. See table 2 for the expected sign of the dependent and independent variables.

EPS Forecast Consensus

To generate an analysts' EPS forecast consensus, the unweighted average is taken from the different analysts per company per forecast period. All sell-side analysts work at different brokers, such as BNP Paribas, Theodoor Gilissen, Lehman Brothers, Natixis, Rabobank Equity Research, Credit Suisse Europe, Sanford C. Bernstein & Co., etc. Since not all analysts follow the company throughout the entire research period the consensus EPS forecast is made, to average all the analysts' earnings per share forecast at a specific time. The consensus EPS forecast is made for five periods, namely 4 years, 3 years, 2 years, 1 year and 1 week before the earnings announcement. As a consequence, the consensus EPS forecast consists of analysts forecast revisions which are publicized at different periods. For example, for the period of 4 years from the earnings announcement, if analyst X made his last revision exactly 4 years prior to the earnings announcement, this revision is used for the consensus EPS forecast, but if analyst Y made a first revision 4,5 years prior to the earnings announcement and a second revision 3 years and 11 months prior to the earnings announcement, the first revision is taken for the consensus EPS forecast. Since exactly 4 years prior to the earnings announcement, the last revision is taken into account. As a result, this can cause some small biases. For the robustness check, not the average is taken from all the analysts EPS forecasts, but the median to generate the consensus EPS forecast. Secondly the EBITDA is taken instead of the EPS.

3.1.2. Control Variables

In the existing forecast error literature several variables, that have a significant influence on the forecast error, are found. Those variables can be divided in firms' characteristics or analysts' characteristics. In this research I will only focus on firms' characteristics, because analysts' characteristics are beyond the scope of this research. In the following subsections company size, companies' earnings predictability, coverage and trading volume will be discussed. These variables will be the control variables in the model I will use in this research, in table 2 an overview of the expected signs is presented.

Company Size

Companies with more information uncertainty should have a greater forecast error. In contrast, companies with high information disclosure should have a lower forecast error. Therefore, the forecast error will be negatively influenced by the size of a company, since large firms publicize more information (Breton et al. (2011), Gell et al. (2010), Jackson (2005), Lim (2001), and Das et al. (1998)).

Earnings per Share Predictability

The larger the EPS predictability, the easier it should be to make a forecast and therefore the forecast error should be lower, where the EPS predictability is measured by the EPS variance over the three years before. Therefore, EPS predictability has an expected positive sign, since the firm's EPS is harder to predict when the variance is high, following that the analysts' forecast error will be larger (Breton et al. (2011), Gell et al. (2010), Jackson (2005), Lim (2001), and Das et al. (1998)). In the robustness check, where EBITDA is used instead of EPS, the EBITDA predictability is measured as the EBITDA variance over the last three years.

Coverage

The number of analysts following the company should have a negative influence on the analysts' earnings forecast error, since stronger coverage by analysts should make prediction less difficult (Breton et al. (2011), Gell et al. (2010), Jackson (2005), Lim (2001), and Das et al. (1998)). However, the

results about the sign of the number of analysts on the forecast error are mixed, since the effect of the number of analysts shows no consistency in previous research (Breton et al. (2011), Gell et al. (2010), Jackson (2005), and Das et al. (1998).

Trading Volume

Gell et al. (2010) state that the trading volume is a proxy for analysts' incentives to generate extra business, therefore, greater trading volume is associated with greater analysts incentives to induce optimist forecasts. This is in line with Hayes (1998) and Cowen et al. (2006). However, in this research I use the 25 most traded companies in the Dutch Market, the AEX. Consequently, I assume there are no differences in trading volume among the companies in the sample I will use.

3.1.3. Independent Variables

To test my third hypothesis, I will use consumer confidence as a proxy for the business cycle. As the consumer confidence index is a strong predictor for the GDP level and is therefore closely related to the business cycle, the consumer confidence index is used as the explanatory variable (Lemmon and Portniaguina (2006)). Consumer confidence is measured by taking the value of the last month of the year prior to the year during which the forecast of the consumer confidence index is made. This is done, because this level of consumer confidence is the most recent level the analyst could assimilate into his analysis. In the robustness checks, consumer confidence is replaced by the GDP growth of the last quarter prior to when the forecast is made, and the oil price when the forecast is made. The GDP growth is based on the difference in GDP in the last quarter with the GDP of the last quarter of the previous year.

Table 2: Expected sign of the dependent and independent variables.
In the columns the period before the actual earnings announcement is given.

	-1 week	-1Year	-2Year	-3Year	-4Year
Forecast error	+/-	+	+	+	+
Coverage	-	-	-	-	-
Size	-	-	-	-	-
Earnings predictability	+	+	+	+	+
Consumer Confidence	+	+	+	+	+
GDP Growth	+	+	+	+	+
Oil Prices	-	-	-	-	-

3.1.4. Research Model

This results in the following research model in estimating the analysts' earnings forecast error in the Dutch Market:

$$FEj,t = \alpha + \beta 1 SIZEj.t + \beta 2 EPSPREVj,t + \beta 3 COVERAGEj,t + \beta 4 CCj,t + Uj.t \quad (3.1)$$

Where the Forecast error (FE) is defined as follows:

$$FEj,t = \frac{EPS\ forecast\ j,t - EPS\ actual\ j.t}{share\ price\ j,t-1} \quad (3.2)$$

Where Company Size (SIZE) is defined as follows:

$$SIZEj,t-1 = \log Market\ Capitalization\ j,t-1 \quad (3.3)$$

Where Earnings predictability (EPSPREV) is defined as follows:

$$EPSPREVj,t = VARIANCE\ (EPSj,t-1,t-2,t-3) \quad (3.4)$$

Where Coverage (COVERAGE) is defined as follows:

$$COVERAGEj,t = number\ of\ analyast\ following\ the\ firm\ J\ at\ T \tag{3.5}$$

Where Consumer Confidence (CC) is defined as follows:

$$CCt = Consumer\ Confidence\ at\ t \tag{3.6}$$

Where *U* is the random disturbance term, this term is added because it is not realistic that the model fits the data perfectly (Brooks (2008)).

For the robustness checks equation 3.4 is first replaced by equation 3.7 and equation 3.6 is first replaced by equation 3.8 and then by equation 3.9. Where equation 3.7 is the EBITDA predictability.

$$EBITDAPREV\ j,t = VARIANCE\ (EBITDA\ j,t-1,t-2,t-3) \tag{3.7}$$

Where equation 3.8 is the GDP growth.

$$GDPt = GDP\ growth\ of\ last\ quarter\ at\ t \tag{3.8}$$

Where the Oil prices are defined as follows:

$$OILt = Price\ of\ Crude\ Oil\ at\ t \tag{3.9}$$

In table 2 an overview of the expected sign of the dependent and independent variables of the model presented in Equation 1 is given.

Since in the data comprise both time series and cross-sectional elements, I will make use of panel data, since panel data can keep firm characteristics and time characteristics constant (Brooks (2008)).

3.2 Data description

In this research I will use the analyst' earnings forecast and the analysts' EBITDA forecast on the 25 most traded Dutch Stocks, the AEX. The data is gathered from the Thomson Reuters database with thanks to the help and access key of Kempen & Co Merchant Bank. The actual earnings per share, actual EBITDA and the market value of the firm I subtract from the DATASTREAM database at the University of Groningen. A downside from the data subtracted from DATASTREAM is the minimum value of zero for the actual earnings per share, this can cause some pessimistic outcomes for the forecast error. For the

consumer confidence and GDP growth, I use the information from the 'Centraal Bureau voor de Statistiek'[1]. The oil prices will be gathered from the OPEC website[2].

This research contains 25 companies which are followed by several analysts for the several years and periods; 2006-2011, this will lead to a total of 8570 data points to generate the consensus EPS forecast for the different years and periods. The same holds for the consensus median EPS forecast which is used as a robustness check. Another robustness check is to use the EBIDTA forecast error, as can be seen in table 3, there are 6525 data points. Furthermore, the amount of data points of the company size and the other independent variables are shown. In formula 3.4 it can be seen that the EPSPREV (EBITDAPREV) is calculated to take the variance in the EPS for the last three years, where the EPS is reported monthly. As a result per company per year 36 EPS (EBITDA) data points are used to calculate the corresponding EPSPREV (EBITDAPREV), this results in a total of 4968 (4824) data point to calculate all the corresponding EPSPREV (EBITDAPREV) for the different companies per year. For the sentiment factor variables (CC, Oil and GDP) there are 6 data points per period since the researched period is 6 years, from 2006 until 2011. As a result, the total researched database consists of **34233** data points (see table 3).

[1] http://statline.cbs.nl/statweb/
[2] http://www.opec.org/opec_web/en/index.htm

Table 3: Content of researched database: size of the research. In this table the data points per variable per period are given, which are used in this research.

	1 week	1 year	2 years	3 years	4 years	Total
Average EPS FE	3228	2800	1983	401	158	8570
Median EPS FE	3228	2800	1983	401	158	8570
EBITDA FE	2479	2112	1537	297	100	6525
Size	139	138	137	136	135	685
EPSPREV	-	-	-	-	-	4968
EBDITDAPREV	-	-	-	-	-	4824
CC	6	6	6	6	6	30
Oil	6	6	6	6	6	30
GDP	6	6	6	6	6	30
Total	-	-	-	-	-	**34233**

Where average (median) EPS FE is the consensus analysts' earnings per share forecast error measured by taking the average (median) of the different analysts' earnings per share forecasts. The EBITDA FE is the consensus analysts' EBITDA forecast error measured by taking the average of the different EBITDA analysts' EBITDA forecasts. The variables Size, EPSPREV, EBITDAPREV, CC, Oil and GDP are, respectively, the company size, earnings predictability, EBITDA predictability, consumer confidence level, Oil price, and GDP growth level.

From the 25 most traded Dutch Stocks I gather the actual earnings from 2006 until 2011 and the forecast period varies between four years before the earnings announcement until 1 week before the earnings announcement. As a result the forecasted earnings period is between 2002 and 2011. However, not all data is applicable, since the AEX underwent some changes over the recent years and not all stocks are followed by analysts 4 or 3 years before the earnings announcement. Air France KLM does not have any available analysts' earnings forecast in the Thomson Reuters Database. Moreover, Aperam and TNT Express are split offs from Arcellor Mittal and Post NL respectively, which occurred in 2011. As a consequence the available data varies per year and period; an overview is presented in table 4 in the Appendix.

In table 5 in the Appendix you can find the descriptive statistics for the dependent variable; the analysts' earnings forecast error. In contrast to the

expectations there are some mixed figures presented in table 5, in 2006-2008 the forecast error signs are mixed. From 2009 until 2011 all figures are positive, which indicates that the analyst forecast was too optimistic. In table 6 the descriptive statistics of all the dependent and independent variables are displayed. Since the average and median level per variable are close to each other, there are no outliers.

In tables 7 through 11 in the Appendix the correlation matrix can be found. The correlation between the size of the company and the earnings predictability is changing during the period, in the period of 1 week and 1 year before the announcement date the correlation has a positive sign, while in the period of 2 until 4 years before the announcement date the sign turns to negative. The opposite is true for the correlation between the earnings predictability and the consumer confidence. However, the correlation is close to zero, therefore, no relevant conclusion can be drawn from this observation. Furthermore, the correlation between the size of the company and the coverage is between 0.335 and 0.579 in the period of 1 week before the announcement date and 3 years before the announcement date. This suggests that more analysts follow larger companies.

The correlation between the Consumer confidence index, the GDP growth and the oil prices are overly high, up to 0.70, see table 12. Therefore, those variables can be a proper replacement for the consumer confidence index to test the model for robustness.

4. Results

4.1 Results from the hypotheses

Recalling the first hypothesis from section 2.3: "There are no overly optimistic analysts' earnings forecasts in the Dutch Market in the period from 2006 to 2011".

In table 14 the average analysts' earnings forecast errors can be found with the probability in table 13 (in the Appendix). The analysis shows that from 2006 until 2008 the forecast error is not significant. In contrast, the results from the years 2009 until 2011 are highly significant and positive, which indicates that the analysts' earnings forecast was overly too optimistic in the Dutch market during these years. The reason for the insignificant numbers in 2006-2008 are the mixed signs of the analysts' earnings forecast error: as a result, the effect of the forecasts errors level each other out. In 2009 and in 2011 several companies are noted whose forecast error is biased, since the actual earnings per share were reported at the minimum level of zero. It is clearly unlikely that the actual earnings per share are exactly zero, as a result the outcomes for the forecast error in 2009 and 2011 is probably even more optimistic. In comparison with the results of previous literature, where the forecast error one year prior to the earnings announcement was between 1.37% and 3.78% too optimistic, this analysis show that analysts are between 1.7% and 8.7% too optimistic.

Table 14: Forecast errors coefficient of the average EPS.

	Forecasted period					
When forecast was made	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*
2002	-0.011					
2003	-0.019	-0.018				
2004	-0.017	-0.012	0.014			
2005	-0.007	-0.007	-0.006	0.050*		
2006	-0.003	0.001	0.005	0.053*	0.028*	
2007		0.004	0.009	0.061*	0.043*	0.038*
2008			-0.002	0.087*	0.051*	0.066*
2009				0.047*	0.017**	0.021**
2010					0.043**	0.024*
2011						0.028**

*Significant for 1 % confidence level

**Significant for 5% confidence level

Recalling the second hypothesis from section 2.3: "There is no optimistic-pessimistic pattern in the analysts' earnings forecast in the Dutch Market".

In table 14, where the average analysts' earnings forecast errors are presented for the various years and period, it can be seen that there is *no* optimistic-pessimistic pattern. Therefore, this hypothesis is true.

Recalling the third hypothesis from section 2.3: "The analysts' earnings forecast error cannot be explained by the level of the consumer confidence".

The results of the regressions analysis are reported in table 15. As expected, the size of the company coefficient is negative in the period '1 week', '1 year', '2 years', and '3 years' before the announcement. However, 4 years before the announcement date, the coefficient is positive and significant.

The figures of the number of analysts following the firm (Coverage) are mixed. However, in the period from '3 years' and '4 years' before the announcement date, like expected, they are negative and significant. These mixed findings are also found by Breton et al. (2011), Jackson (2005), and Das et al. (1998).

The positive coefficient of the earnings predictability are in line with previous findings obtained in the literature, the earnings predictability are positive in each period and insignificant in one period (4 years before the announcement).

The consumer confidence coefficient is negative '1 week' and '1 year' before the earnings announcement and positive in '2 years', '3 years' and '4 years' before the earnings announcement. With an R Squared between 0.39 and 0.76 it seems the model fits the data, however, the constant *α* is overly high and significant, except in the period of '2 years' and '3 years' before the earnings announcement. This can be seen as an indication that the independent variables are not sufficient to explain the forecast error properly.

Table 15: Regression analysis of the average earnings per share forecast error from 2006-2011 for the different periods.

			Period		
Variables	**- 1 week**	**-1 Year**	**-2 Year**	**-3 Year**	**-4 Year**
Size (-)	-0.1678*	-0.0914*	-0.0430	-0.0399	0.1725*
Coverage (-)	0.0010	-0.0002	0.0013	-0.0084**	-0.0143**
EPSPREV (+)	0.0005***	0.0007*	0.0009*	0.0119*	0.0089
CC (+)	-0.0000	-0.0015*	0.0009***	0.0012**	0.0002
C	0.6615*	0.3599*	0.1717	0.2201	-0.6693*
Firm Dummies	Yes	Yes	Yes	Yes	Yes
N	132	131	129	114	80
R^2	0.55	0.50	0.39	0.48	0.76

*significant at a 1% level, **significant at a 5% level, ***significant at a 10% level.

To test for normality a Jacque-Bera test is conducted, of which the results are presented in table 16 in the appendix. In the period from '1 week' before the announcement date until '3 years' before the announcement date, the data is significant Non-Normal. Therefore, the outcomes should be taken with some caution. The data has an overly high kurtosis, due to this non-normality the significance levels can be biased and therefore differ from the presented outcomes in this research.

4.2 Robustness checks

To check the outcomes for robustness I will conduct a regression analysis where the EBITDA forecast error is the dependent variable, this will overcome the biases caused by the minimum of the actual earnings per share of zero.

According to Gu and Wu (2003), the difference between the mean and median can cause severe problems in the analysis. Therefore, I will conduct a

second robustness check, for which I will use the median earnings per share instead of the median earnings per share.

Lastly, to check if the sentiment factor is a robust explanatory variable, consumer confidence will be replaced by the GDP growth and oil prices.

In table 17 the results of the first robustness check are presented; to take the EBITDA Forecast Error instead of the EPS Forecast Error. The results are not constant, since in the period of '1 year' until '3 years' before the announcement date, the cross sectional effects were not significant, so no Firm dummies were used. Secondly, the R squared is overly low, which indicates that the model does not fit the data properly, so the independent variables do not explain the dependent variable properly. Furthermore, in most periods the expected signs of the dependent variables are not in line with the previous literature and not significant.

Table 16: Robustness check, regression analysis with the EBITDA forecast error from 2006-2011 for the different periods.

			Period		
Variables	**- 1 week**	**-1 Year**	**-2 Year**	**-3 Year**	**-4 Year**
Size (-)	0.2363	0.0336	0.1944	0.1085***	0.0252
Coverage (-)	0.0405*	0.0145***	0.0158	-0.0090	-0.0129
EPSPREV (+)	-0.0408	-0.0463	-0.0760	-0.0394***	0.0081
CC (+)	-0.0081**	0.0034	0.0148*	0.0023***	0.0000
C	-1.6655	-0.1541	-0.3727	-0.1655	-0.1065
Firm Dummies	Yes	No	No	No	Yes
N	121	120	118	98	59
R^2	0.34	0.06	0.12	0.09	0.71

*significant at a 1% level, **significant at a 5% level, ***significant at a 10% level.

In contradiction to the unexpected results of the first robustness check the second robustness check; to use the median forecasted EPS instead of the average EPS, is in line with the expected results. Where the R squared is between 0.39 and 0.75 and the signs of the independent variables are comparable with the regression analysis of the average analysts' earnings per share forecast. In table 19 the median analysts' earnings forecast error can be seen. The results are comparable with the average analysts' earnings forecast error in table 14, so the findings are robust. However, the median analysts' earnings forecast error is slightly less optimistic.

Table 18: Robustness check, regression analysis with the median Earnings per share forecast error from 2006-2011 for the different periods.

			Period		
Variables	**- 1 week**	**-1 Year**	**-2 Year**	**-3 Year**	**-4 Year**
Size (-)	-0.1283*	-0.0777**	-0.0345	-0.0244	0.1652*
Coverage (-)	0.0002	0.0001	0.0011	-0.0088**	-0.0145**
EPSPREV (+)	0.0006*	0.0007*	0.0009*	0.0117*	0.0089
CC (+)	-0.0003	-0.0016*	0.0009***	0.0011**	0.0003
C	0.5107*	0.2972**	0.1382	0.1567	-0.6382*
Firm Dummies	Yes	Yes	Yes	Yes	Yes
N	132	131	129	114	80
R^2	0.67	0.50	0.39	0.49	0.75

*significant at a 1% level, **significant at a 5% level, ***significant at a 10% level.

Table 19: Forecast errors coefficient of the median EPS.

	Forecasted Period					
When forecast was made	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*
2002	-0,007					
2003	-0,014	-0,027				
2004	-0,020	-0,012	-0,004			
2005	-0,005	-0,016	0,002	0,063*		
2006	-0,002	-0,003	0,014	0,059*	0,020*	
2007		0,001	0,008	0,062*	0,031*	0,058*
2008			0,006	0,079*	0,054*	0,075*
2009				0,030*	0,001**	0,012**
2010					0,017*	0,014*
2011						0,018*

*Significant for 1 % confidence level
**Significant for 5% confidence level

In tables 20 through 23 in the appendix, the results are presented from the last robustness check; to replace the sentiment factor "consumer confidence", by the GDP growth and the Crude Oil Prices, since the GDP growth and Oil prices are highly correlated with the Consumer Confident index (see table 12 in the appendix). In table 24 the results from tables 20 through 23 are summarized. Both the average EPS forecast error and the median EPS forecast error are used as an extra check for robustness. The GDP Growth signs fluctuate over time and are not consistent with the expectations, like the consumer confidence factor. On the contrary, the oil prices do seem to have limited negative influence on the analysts' earnings forecast error, however, the findings are not significant.

Table 24: Summarized regression analysis for the sentiment factor with the average and median earnings per share forecast error.

			Period		
Variables	**- 1 week**	**-1 Year**	**-2 Year**	**-3 Year**	**-4 Year**
Average EPS FE					
GDP Growth (+)	-0.0035**	-0.0008	-0.0016	0.0008	0.0074***
Oil prices (-)	-0.0000	-0.0000	0.0000*	-0.0000	-0.0000
Median EPS FE					
GDP Growth (+)	-0.0029**	-0.0004	-0.0014	0.0004	0.0083***
Oil (-)	-0.0000*	-0.0000	0.0000*	-0.0000	-0.0000

*significant at a 1% level, **significant at a 5% level, ***significant at a 10% level

5. Conclusion and discussion

5.1 Conclusion

Few research to the analysts' earnings forecasts error is done into the Dutch market, does that imply that analysts for the Dutch market are more accurate than their counterparts in the US and/or the UK? In this research I found evidence for the contrary. While analysts in the US market are between 2.14% and 3.78% too optimistic and in the UK market 1.37% too optimistic for a 1 year earnings per share forecast, in the Dutch market analysts are on average between 1.7% and 8.7% too optimistic. So the analysts' earnings forecast error in the Dutch market is on average between the 0.33%-point and 4.92%-point higher than in the US market and the UK market. This results suggests that investors should make a bigger correction to analysts' earnings per share forecast in the Dutch market than in the US market or the UK market. The goal of this research was to investigate how investors can use the sentiment factor to make the adjustment on the analysts' earnings per share forecast to find a more accurate value of the earnings forecast. This can lead to a greater shareholder value.

Since analysts are human, they have to do with sentiment changes. To test if an analyst is more optimistic in a more positive investing environment, I tested if the consumer confidence level had a positive influence on the analysts' earnings forecast error. The results were mixed: the consumer confidence level had a negative influence on the analysts' earnings per share forecast error if the announcement date was just in 1 week and in 1 year. While the consumer confidence level on the other hand had a positive influence on the analysts' earnings forecast error if the announcement date was in 2 or 3 years. One reason for this outcome can be the fact that the consumer level cannot influence the company performance on short term basis, while on the other hand the consumer confidence level can have an influence on the company performance over a longer time horizon.

In spite of conclusions from previous literature, I could not find evidence for the influence of the GDP growth level and the Oil prices on the forecast error. One reason for this finding can be the fact that both the forecasted EPS and the Actual EPS are changing in the same direction, and therefore the effects

outweigh each other. If the GDP growth level is positive this will both give a rise to the actual EPS as the forecasted EPS.

Another goal of this research was to identify the existence of overly optimistic analysts' earnings forecast in the Dutch Market in the period from 2006 until 2011 and to observe if there was evidence for the optimistic-pessimistic pattern in the analysts' earnings forecast. The results for the Dutch market in the period from 2006 until 2008 are overly pessimistic and not significant. This is caused by the wide differences in the forecast error for the underlying companies, since the sign of the forecast error of the underlying companies differed largely, and the outcomes were not significant. In contrast, in the period from 2009 until 2011 the analysts' earnings forecast error was optimistic and significant for all forecasted time frames; from 1 week before the earnings announcement until 4 years before the earnings announcement. The optimistic-pessimistic pattern could not be observed in the data from 2006 until 2011. If the median earnings per share forecast error is used the outcomes do not differ much in comparison with the average EPS forecast error, so the EPS forecast errors are robust.

In previous research, the size of the company has had a negative influence on the analysts' earnings forecast error, while the earnings predictability should have a positive influence on the analysts' earnings forecast error (Breton et al. (2011), Gell et al. (2010), Jackson (2005), Lim (2001), and Das et al. (1998)). The company size had an overly negative influence on the earnings per share forecast error with a coefficient of -0.17 to -0.09 in the significant period (1 week and 1 year before the announcement date). The earnings predictability has a positive sign in all the periods and a coefficient between the 0.0005 and 0.0119 in the significant periods. The results of the coverage ratio is mixed and inconsistent, this is in line with previous research (Breton et al. (2011), Jackson (2005), and Das et al. (1998)).

In spite of the results, all the outcomes should be taken with some caution because of the existence of non-normality: the data used in this research had an overly high kurtosis. Due to this non-normality the significance levels can be biased and therefore differ from the presented outcomes in this research.

5.2 Discussion

In this section I will elaborate on some discussion points and I will give some recommendations for further research.

Firstly, the lack of information in the forecasted period of 4 years before the announcement date can be an explanation for the inconsistent results in comparison with the previous periods. Since few analysts give a forecast about the EPS of a stock 4 years prior the actual announcement, as a consequence the consensus earnings per share forecast consists on average of two analysts' earnings forecast. Therefore, it could be wise to delete those findings from the research.

To have a more comprehensive analysis, I would recommend also taking the analysts' characteristics into account. This was beyond the scope of this research, but can be useful in further research, since previous research found evidence for the influence of analysts' characteristics on the analysts' earnings forecast error, like general experience of the analyst, the complexity of the analyst portfolio, the size of the broker and past accuracy of the analyst. (Breton et al. (2011), Lim (2001), and Brown and Larocque (2012)).

Another suggestion for further research is to investigate by which level the Dutch investors take into account the previous research to analysts' earnings forecast errors, and base their adjustments on the analysts' earnings forecasts on the research results. This way, you can observe the empirical relevance of the research to analysts' earnings forecast errors.

Moreover, in this research the 25 most traded companies in the Dutch Market were taken into account. To verify the findings of this article and to check for robustness, more companies can be added. As a result, more comprehensive conclusions can be drawn from the analysts' earnings forecast error in the Dutch Market.

Finally, it can be useful to use the changes of the Consumer confidence or Oil prices instead of the absolute value, since a reference point might be needed to measure a change in sentiment. Therefore, the results of this research might not truly measure the impact of a sentiment factor on the analysts' earnings forecast error.

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7. Appendix

Table 1-1: An overview of previous Literature.
In this table the results of previous literature is presented for the analysts' earnings forecast error.

Author	*Market*	*Period*	*Results*
Ali et al. (1992)	5365 US Firms	1978-1989	-Average eight month forecast error mean: 3.02%, Median: 0.24%. -One month forecast error, Mean: 1.38%, Median: 0.03%, all significant.
Francis and Philbrick (1993)	313 US Firms	1987-1989	-9% average optimism annually.
Clayman and Schwartz (1994)	399 US firms	1982-1992	-On average 57.1% overestimation in the first month and 11.9% in the last month. -Excess of 39.8% of first estimate over last estimate. -If the companies who made a loss were omitted, the overestimation was on average 2.5% in the final month.
Lim (2001)	103242 US Firms	1984-1996	-0.23-0.46 % overestimation per quarter.
Chopra (1998)	US Firms: S&P	1985-1997	-1985-1997 on average overestimation of 6.1%.

	500		-1991 overestimation of 30 %. -1988 underestimation over 8%. -1985-1992 average overestimation 9.4%. -1985-1997 Average overestimation beginning of the year: 11.2%, three months later is it 8.7%, three months later 6.6%, another three months later it is 3.6% and at the end 1%. -Before 1993 average overestimation beginning of the year of 17% and after 5 months it was 10%. -Since 1993 average overestimation beginning of the year of 2% and after 7 months it turned negative.
Helbok and Walker (2004)	4454 UK Firms	1990-1998	-The average forecast error in this period is 1.37%. -1991: 3.82% too optimistic forecast error. -1992: 2.80% too optimistic forecast error. -1993: 1.78% too optimistic forecast error. -1994: 0.69% too optimistic forecast error. -1995: 0.84% too optimistic forecast error. -1996: 1.03% too optimistic forecast error. -1997: 0.57% too optimistic forecast error. -1998: 0.82% too optimistic forecast error.
Bosquet et al. (2011)	2773 US Firms, first forecast and	1996-2006	-First forecast error of 0.0003%, last revision -0.1% forecast error, so first

	747 US Firms last revision.		optimistic then pessimistic.
Brown (2012)	298361 US Firms	1990-2006	-Average 1 year ahead forecast error is around the 25%, too optimistic.
Libby et al. (2008)	Experimental: 47 experienced sell-side analysts among the top 10 investments firms	2006-2007	-Find a clear OP pattern which is steeper for analyst who has the incentive to hold a good relationship with the firm instead of have the incentive to have a higher accuracy. -Analyst who has the incentive to keep a good relationship instead of being more accurate, were on average an 1.65% more optimistic at the beginning of the period and on average 7.35% more pessimistic at the end of the period. (forecast for year 2006 and 2007)
Breton et al. (2011)	241 French firms from SBF 250	1997-2007	-The absolute forecast error in the period of 1 year ahead; mean of 2.46, max. 162.57 and min. 0.
Bradshaw et al. (2012)	1y ahead: 10919 2y ahead: 9870 3y ahead: 7636 US Firms	1983-2008	-Forecast error 11 months prior earnings announcement: 2.14%, 23 months: 3.08% and 35 months: 3.59%. Median respectively: 0.30%, 1.04% and 1.73%.
Brown and Larocque	32019 US firms	1996-2008	-Average overestimation of 3,78% per year and 0.42% for Q1.

(2012)			
Boudt et al. (2012)	3400 US Firms	1995-2010	-Average forecast error 5days before announcement in 10 deciles ranked as a %. -Decile 1: -1.467, -Decile 2: -0.364, -Decile 3: -0.211, -Decile 4: -0.132, -Decile 5: -0.085, -Decile 6: -0.052, -Decile 7: -0.026, -Decile 8: 0.036, -Decile 9: 0.172, -Decile 10: 2.402, -sample mean 0.024. Where in Decile 1 and 10 the firms are small, have less coverage.

Table 4: Data availability.
In the columns the period before the announcement days is shown and in the rows the several years, so each cell indicates how many companies are included in which year for which period before the announcement date.

	-1 week	**-1 year**	**-2 Year**	**-3 Year**	**-4 Year**
2006	22	22	20	19	14
2007	22	22	22	19	17
2008	21	21	21	19	11
2009	22	22	22	20	13
2010	22	22	22	21	12
2011	24	22	22	17	13
Total	133	131	129	115	80

Table 5: Descriptive Statistics of the analysts' earnings forecast error.
Forecast error in the Dutch Market in the different periods, where –1W, -Y1, -Y2, -Y3 and –Y4 are respectively 1 week, 1 year, 2 years, 3 years and 4 years before the actual earnings announcement.

		AEGON	Ahold	Air France KLM	Akzo Nobel	Aperam	Arcellor Mittal	ASML	Boskalis	Corio	DSM	Fugro	Heineken	ING	KPN
2006	-1W	-0.012	0.038		-0.023		0.026	0.010	0.003	-0.102	-0.004	0.004	0.005	-0.007	-0.011
	-Y1	-0.023	0.047		-0.036		0.007	-0.005	0.001	-0.147	-0.004	-0.005	0.002	-0.016	-0.026
	-Y2	-0.039	0.053		-0.041			-0.017	-0.003	-0.154	-0.012	-0.005	0.005	-0.031	-0.049
	-Y3	-0.034	0.086		-0.035			-0.018	-0.003	-0.228	-0.014	-0.012	0.008	-0.044	-0.067
	-Y4		0.084		-0.010			-0.051		-0.277	-0.007		0.014		-0.039
2007	-1W	-0.013	0.033		-0.006		0.001	-0.002	0.002	-0.119	0.011	0.006	0.001	-0.001	0.001
	-Y1	-0.010	0.032		-0.007		0.012	-0.008	-0.007	-0.099	0.015	-0.004	-0.002	-0.009	0.001
	-Y2	-0.019	0.049		-0.017		-0.057	-0.016	-0.011	-0.152	0.012	-0.023	-0.010	-0.018	-0.007
	-Y3	-0.030	0.055		-0.009			-0.032	-0.038	-0.170	-0.010	-0.013	-0.013	-0.042	-0.037
	-Y4	-0.024	0.072		-0.001			-0.037	-0.046	-0.235	-0.003		0.002	-0.057	-0.038
2008	-1W	0.049	0.011		0.066		0.002	-0.027		-0.100	-0.013	0.013	0.020	-0.023	-0.055
	-Y1	0.100	0.011		0.041		-0.023	0.008		-0.039	-0.019	0.003	0.017	0.031	-0.044
	-Y2	0.079	0.020		0.045		-0.004	-0.002		-0.027	-0.015	-0.019	0.017	0.023	-0.052
	-Y3	0.084	0.033		0.049		-0.130	-0.014			0.006	-0.052	0.007	0.015	-0.077
	-Y4	0.109	0.045		0.074			-0.005			-0.030		0.014		
2009	-1W	0.104	-0.004		0.058		0.007	-0.004	0.029	0.054	-0.020	-0.003	0.046	0.105	0.007
	-Y1	0.200	0.000		0.110		0.209	0.042	0.069	0.094	0.033	0.022	0.078	0.227	0.013
	-Y2	0.131	-0.001		0.071		0.112	0.092	0.026	0.064	0.036	0.007	0.054	0.121	0.006
	-Y3	0.101	0.019		0.080		0.207	0.072	-0.002		0.026	-0.032	0.053	0.084	0.002

	-Y4	0.108	0.019		0.097			-0.014		0.034		0.066	0.080	0.008
2010	-1W	0.033	0.001		0.021	-0.025	0.008	0.004	0.009	0.030	0.004	0.003	0.149	-0.033
	-Y1	0.002	0.002		0.016	-0.020	-0.022	-0.022	-0.007	0.013	0.001	0.002	0.144	-0.039
	-Y2	0.080	0.009		0.056	0.088	-0.033	-0.013	0.016	0.075	0.047	0.015	0.245	-0.043
	-Y3	0.069	0.010		0.029	0.066	0.021	-0.014	0.020	0.092	0.020	0.011	0.125	-0.043
	-Y4		0.021		0.035			-0.022		0.078		0.008	0.078	-0.046
2011	-1W	0.201	0.006	0.579	0.008	0.053	-0.018	-0.021	-0.020	-0.041	-0.002	0.009	0.086	-0.002
	-Y1	0.156	0.010		0.019	0.048	-0.039	-0.016	-0.004	-0.045	0.007	0.014	0.058	-0.002
	-Y2	0.161	0.008		0.011	0.074	-0.085	-0.039	-0.011	-0.077	-0.002	0.014	0.054	-0.009
	-Y3	0.240	0.009		0.089	0.235	-0.122			-0.062	0.009	0.030	0.176	-0.005
	-Y4	0.117	0.008				-0.068					0.015	0.109	-0.005

Table 5 (continued). Where the Average* is the adjusted average. In the years 2006 and 2007 Coria and Unibail Rodamco are excluded and in the year 2011 Air France KLM and Post NL are excluded because of their extreme values.

		Philips	Post NL	Randstad	Reed Elsevier	SBM Offshore	Royal Dutch Shell	TNT Express	Tom Tom	Unibail Rodamco	Unilever	Wolters Kluwer	N	Average	Average*
2006	-1W	-0.085	0.032	-0.007	0.024	-0.029	-0.025		0.005	-0.120	-0.017	0.011	22	-0.013	-0.003
	-Y1	-0.093	0.043	-0.019	0.029	-0.011	-0.028		-0.006	-0.245	-0.005	0.014	22	-0.024	-0.007
	-Y2	-0.123	0.051	-0.030	0.007	-0.020	-0.034			-0.332	-0.009	-0.003	20	-0.039	-0.017
	-Y3	-0.120	0.044	-0.086	0.018	-0.018	-0.042				-0.006	-0.007	19	-0.030	-0.019
	-Y4	-0.062	0.056	-0.196	0.030		-0.011				0.000	0.049	14	-0.030	-0.011
2007	-1W	0.022	0.051	-0.008	-0.024	0.000	-0.024		0.002	-0.208	0.007	0.017	22	-0.011	0.004
	-Y1	0.003	0.040	-0.006	-0.021	-0.003	-0.028		-0.007	-0.174	0.008	0.020	22	-0.012	0.001
	-Y2	0.016	0.050	-0.021	-0.020	-0.004	-0.046		-0.018	-0.317	0.005	0.023	22	-0.027	-0.007

	-Y3	0.004	0.061	-0.048	-0.042	-0.007	-0.041				0.003	0.038	19	-0.020	-0.012
	-Y4	-0.026	0.057	-0.092	-0.034	-0.003	-0.058				0.005		17	-0.030	-0.018
2008	-1W	-0.112	0.087	0.031	-0.030	0.013	-0.051		-0.028	0.051	-0.011	0.026	21	-0.004	-0.002
	-Y1	-0.039	0.063	0.039	-0.019	0.022	-0.049		0.020	0.070	-0.008	0.022	21	0.010	0.009
	-Y2	-0.043	0.049	0.020	-0.009	0.017	-0.056		0.017	0.055	-0.010	0.023	21	0.006	0.005
	-Y3	-0.039	0.057	0.003	-0.007	0.002	-0.076		0.002		-0.001	0.028	19	-0.006	-0.006
	-Y4	-0.052	0.072	-0.009			-0.060				-0.004		11	0.014	0.014
2009	-1W	0.035	0.051	0.033	0.058	0.025	0.278		0.110	0.035	0.000	0.026	22	0.047	
	-Y1	0.090	0.103	0.143	0.073	0.024	0.090		0.178	0.078	0.007	0.037	22	0.087	
	-Y2	0.071	0.085	0.150	0.053	0.027	0.061		0.066	0.067	0.009	0.029	22	0.061	
	-Y3	0.059	0.063	0.084	0.060	0.016	0.072		0.069		0.011	0.025	20	0.053	
	-Y4	0.063	0.073	0.080			0.026				0.004		13	0.050	
2010	-1W	0.015	0.071	0.018	0.470	0.021	0.048		0.019	0.007	0.001	0.066	22	0.043	
	-Y1	-0.007	0.070	0.010	0.040	0.036	0.058		0.022	-0.002	-0.001	0.071	22	0.017	
	-Y2	0.024	0.122	0.077	0.076	0.048	0.052		0.087	0.005	0.007	0.092	22	0.051	
	-Y3	0.034	0.098	0.091	0.058	0.042	0.038		0.059		0.013	0.061	21	0.043	
	-Y4	0.015	0.071	0.063			0.022				0.008		12	0.028	
2011	-1W	0.074	0.500	0.017	0.026	0.075	0.019	0.038	0.120	-0.076	0.002	0.070	24	0.071	0.028
	-Y1	0.077	0.090	0.014	0.022	0.090	0.013		0.093	-0.073	0.005	0.059	22	0.027	0.024
	-Y2	0.067	0.085	0.007	0.031	0.118	0.019		0.110	-0.070	0.003	0.064	22	0.024	0.021
	-Y3	0.125	0.117	0.075	0.151		0.000				0.015	0.090	17	0.069	0.066
	-Y4	0.077	0.093	0.096	0.066		-0.027				0.016	0.058	13	0.043	0.038

Table 6: Descriptive statistics of the dependent and independent variables for the various periods.

		FE	Size	EPSPREV	Coverage	Consumer confidence	GDP	Oil Prices
-1W	Average	0.023	4	8	24	-17	3	76
	Min	-0.208	3	0	1	-40	-4	36
	Max	0.579	5	347	40	6	6	107
	Median	0.007	4	0	23	-15	3	83
	N	133	139	138	133	150	150	150
-1Y	Average	0.018	4	8	21	-13	3	67
	Min	-0.245	3	0	3	-31	-4	36
	Max	0.227	5	347	38	6	6	91
	Median	0.008	4	0	20	-15	5	67
	N	131	138	138	131	150	150	150
-2Y	Average	0.014	4	8	15	-16	3	58
	Min	-0.332	3	0	3	-32	-4	36
	Max	0.245	5	347	28	6	6	91
	Median	0.009	4	0	15	-16	4	55

	N	129	137	138	129	150	150	150
-3Y	Average	0.018	4	8	4	-19	4	50
	Min	-0.228	3	0	1	-32	2	30
	Max	0.240	5	347	10	6	6	91
	Median	0.010	4	0	3	-25	4	45
	N	114	136	138	114	150	150	150
-4Y	Average	0.009	4	8	2	-18	4	49
	Min	-0.277	2	0	1	-32	2	30
	Max	0.117	5	347	5	6	6	91
	Median	0.008	4	0	2	-24	4	45
	N	80	135	138	80	150	150	150

Table 7: Correlation Matrix '1 week' before the announcement date of the independent variables.

	Size	Coverage	EPSPREV	CC
Size	1.000	0.577	0.037	0.028
Coverage	0.577	1.000	-0.126	-0.041
EPSPREV	0.037	-0.126	1.000	-0.003
CC	0.028	-0.041	-0.003	1.000

Table 8: Correlation Matrix '1 year' before the announcement date of the independent variables.

	Size	Coverage	EPSPREV	CC
Size	1.000	0.579	0.014	0.031
Coverage	0.579	1.000	-0.165	-0.088
EPSPREV	0.014	-0.165	1.000	-0.005
CC	0.031	-0.088	-0.005	1.000

Table 9: Correlation Matrix '2 years' before the announcement date of the independent variables.

	Size	Coverage	EPSPREV	CC
Size	1.000	0.498	-0.022	0.045
Coverage	0.498	1.000	-0.253	-0.182
EPSPREV	-0.022	-0.253	1.000	0.091
CC	0.045	-0.182	0.091	1.000

Table 10: Correlation Matrix '3 years' before the announcement date of the independent variables.

	Size	Coverage	EPSPREV	CC
Size	1.000	0.335	-0.046	0.122
Coverage	0.335	1.000	-0.238	-0.224
EPSPREV	-0.046	-0.238	1.000	0.244
CC	0.122	-0.224	0.244	1.000

Table 11: Correlation Matrix '4 years' before the announcement date of the independent variables.

	Size	Coverage	EPSPREV	CC
Size	1.000	0.051	-0.084	0.079
Coverage	0.051	1.000	-0.262	-0.027
EPSPREV	-0.084	-0.262	1.000	0.062
CC	0.079	-0.027	0.062	1.000

Table 12: Correlation matrix of the sentiment factor.

	CC	GDP	OIL
CC	1.00	0.48	0.70
GDP	0.48	1.00	0.29
OIL	0.70	0.29	1.00

Table 13: Z-Test of the Forecast error from 2006 until 2011 for the different periods.

Year	Period	Probability	Year	Period	Probability
2006	-1W	0.932	2009	-1W	0.000
	-Y1	0.959		-Y1	0.000
	-Y2	0.982		-Y2	0.000
	-Y3	0.978		-Y3	0.000
	-Y4	0.875		-Y4	0.000
2007	-1W	0.840	2010	-1W	0.025
	-Y1	0.887		-Y1	0.027
	-Y2	0.954		-Y2	0.000
	-Y3	0.960		-Y3	0.000
	-Y4	0.971		-Y4	0.008
2008	-1W	0.638	2011	-1W	0.013
	-Y1	0.131		-Y1	0.008
	-Y2	0.210		-Y2	0.037
	-Y3	0.690		-Y3	0.002
	-Y4	0.201		-Y4	0.004

Table 16: Non-Normality test of the data for the different periods.

	- 1 week	-1 Year	-2 Year	-3 Year	-4 Year
Kurtosis	14.92	4.55	4.58	5.67	2.94
Skewness	2.28	0.34	0.09	-0.30	0.02
Jacque-Bera	896.71	15.70	13.62	35.61	0.02
Probability	0.000	0.000	0.001	0.000	0.990
N	132	131	129	114	80

Table 20: Robustness check, regression analysis with the median Earnings per share forecast error and the GDP growth as sentiment factor, from 2006-2011 for the different periods.

			Period		
Variables	**- 1 week**	**-1 Year**	**-2 Year**	**-3 Year**	**-4 Year**
Size (-)	-0.1270*	-0.1388*	0.0122	0.0340	0.1348*
Coverage (-)	0.0000	0.0008	-0.0001	-0.0101**	-0.0134**
EPSPREV (+)	0.0006*	0.0007*	0.0009*	0.0123*	0.0086
GDP Growth (+)	-0.0029**	-0.0004	-0.0014	0.0004	0.0083***
C	0.5219*	0.5475*	-0.0380	-0.0936	-0.5564*
Firm Dummies	Yes	Yes	Yes	Yes	Yes
N	132	131	129	114	80
R^2	0.68	0.44	0.38	0.46	0.77

*significant at a 1% level, **significant at a 5% level, ***significant at a 10% level.

Table 21: Robustness check, regression analysis with the median Earnings per share forecast error and the Oil prices as sentiment factor, from 2006-2011 for the different periods.

	Period				
Variables	**- 1 week**	**-1 Year**	**-2 Year**	**-3 Year**	**-4 Year**
Size (-)	-0.1255*	-0.1327*	-0.0661***	0.0377	0.1786*
Coverage (-)	-0.0003	0.0008	0.0014	-0.0086***	-0.0133**
EPSPREV (+)	0.0007*	0.0007*	0.0009*	0.0122*	0.0118
Oil (-)	-0.0000*	-0.0000	0.0000*	-0.0000	-0.0000
C	0.5451*	0.8194***	-2.0967*	0.1686	-0.4193
Firm Dummies	Yes	Yes	Yes	Yes	Yes
N	132	131	129	114	80
R^2	0.69	0.44	0.46	0.46	0.76

*significant at a 1% level, **significant at a 5% level, ***significant at a 10% level.

Table 22: Robustness check, regression analysis with the average Earnings per share forecast error and the Oil prices as sentiment factor, from 2006-2011 for the different periods.

	Period				
Variables	**- 1 week**	**-1 Year**	**-2 Year**	**-3 Year**	**-4 Year**
Size (-)	-0.1579*	-0.1481*	-0.0729***	0.0298	0.1816*
Coverage (-)	0.0007	0.0006	0.0016	-0.0083***	-0.0133**
EPSPREV (+)	0.0005**	0.0007*	0.0009*	0.0126*	0.0115
Oil prices (-)	-0.0000	-0.0000	0.0000*	-0.0000	-0.0000
C	0.6484*	0.7695***	-2.0973*	0.2293	-0.4486
Firm Dummies	Yes	Yes	Yes	Yes	Yes
N	132	131	129	114	80
R^2	0.56	0.45	0.45	0.45	0.76

*significant at a 1% level, **significant at a 5% level, ***significant at a 10% level.

Table 23: Robustness check, regression analysis with the average Earnings per share forecast error and the GDP growth as sentiment factor, from 2006-2011 for the different periods.

			Period		
Variables	**- 1 week**	**-1 Year**	**-2 Year**	**-3 Year**	**-4 Year**
Size (-)	-0.1484*	-0.1485*	0.0069	0.0236	0.1428*
Coverage (-)	0.0007	0.0005	-0.0000	-0.0100**	-0.0134**
EPSPREV (+)	0.0005**	0.0007*	0.0009*	0.0126*	0.0085
GDP Growth (+)	-0.0035**	-0.0008	-0.0016	0.0008	0.0074***
C	0.6001*	0.5970*	-0.0155	-0.0541	-0.5849*
Firm Dummies	Yes	Yes	Yes	Yes	Yes
N	132	131	129	114	80
R^2	0.57	0.45	0.37	0.45	0.77

*significant at a 1% level, **significant at a 5% level, ***significant at a 10% level