



Vaasan yliopisto
UNIVERSITY OF VAASA

Pyry Tanskanen

The Impact of Investor Sentiment on Analysts' Outputs

School of Accounting and Finance
Bachelor's Thesis, Finance
Accounting and Finance

Vaasa 2025

VAASAN YLIOPISTO**School of Accounting and Finance**

Tekijä:	Pyry Tanskanen		
Tutkielman nimi:	The Impact of Investor Sentiment on Analysts' Outputs		
Tutkinto:	Kauppätieteiden kandidaatti		
Oppiaine:	Laskentatoimi ja rahoitus		
Työn ohjaaja:	Anupam Dutta		
Valmistumisvuosi:	2025	Sivumäärä:	42

TIIVISTELMÄ:

Tämä tutkielma tarkastelee aiemman tutkimuksen pohjalta sijoittajasentimentin vaikutusta myyntipuolen analyytikoiden tulosennusteisiin, tavoitehintoihin ja suosituksiin sekä näiden tarkkuuteen, informatiivisuuteen ja arvoon. Lisäksi tässä tutkielmassa analysoidaan mahdollisia vaikutuksen syitä ja sääntelytoimenpiteiden roolia sen lieventämisessä. Tutkielman tulokset ovat merkityksellisiä analyytikoille itselleen, päättäjille, sijoittajille ja muille tahoille, jotka hyödyntävät analyytikoiden tuottamaa informaatiota.

Aiemman tutkimuksen perusteella sijoittajasentimentti vaikuttaa markkinoihin monin tavoin. Perinteisesti sen on katsottu vaikuttavan ensisijaisesti vähemmän sofistikoituneisiin ja vähemmän rationaalsiin toimijoihin markkinoilla. Myyntipuolen analyytikot sen sijaan nähdään sofistikoituneempina ja rationaalisempina toimijoina, jotka keräävät, analysoivat ja julkaisevat tietoa sekä vaikuttavat näin merkittävästi markkinoiden toimintaan. Useat tahot hyödyntävät analyytikoiden tuottamaa informaatiota. Siitä huolimatta aiemmat tutkimukset osoittavat, että myyntipuolen analyytikoiden tuotoksien ja sijoittajasentimentin välillä on yhteyksiä. Erityisesti korkeamman sijoittajasentimentin aikana myyntipuolen analyytikoiden tuotokset ovat enemmän optimistisesti vinoutuneita ja niiden tarkkuus, informatiivisuus sekä arvo heikkenevät.

AVAINSANAT: Sijoittajasentimentti, Analyytikot, Arvopaperianalyytikot, Myyntipuolen analyytikot, Tulosennusteet, Tavoitehinnat, Osakesuosituksset

VAASAN YLIOPISTO**School of Accounting and Finance**

Author: Pyry Tanskanen
Title of the Thesis: The Impact of Investor Sentiment on Analysts' Outputs
Degree: Bachelor of Science in Economics and Business Administration
Programme: Accounting and Finance
Supervisor: Anupam Dutta
Year: 2025 **Pages:** 42

ABSTRACT:

The purpose of this thesis is to investigate the impact of investor sentiment on sell-side analysts' earnings forecasts, target prices, and recommendations, as well as their accuracy, informativeness, and value, by reviewing prior literature. Furthermore, this thesis explores the potential causes of the impact and examines the role of regulatory measures in mitigating it. The findings of this thesis are relevant for analysts themselves, policymakers, investors, and other entities who utilize analysts' outputs.

According to prior research, investor sentiment affects the market in various ways. Traditionally, investor sentiment is considered to primarily affect less sophisticated and less rational market participants. Sell-side analysts are considered more sophisticated and more rational market participants who play an important role in the market by collecting, analyzing, and publishing information. Moreover, various market participants utilize analysts' outputs. Nonetheless, prior literature demonstrates that analysts' outputs are associated with investor sentiment. Specifically, during higher investor sentiment, analysts' outputs show increased optimistic bias, and their accuracy, informativeness, and value decrease.

KEYWORDS: Investor sentiment, Analysts, Security analysts, Sell-side analysts, Earnings forecasts, Target prices, Stock recommendations

Contents

1	Introduction	5
1.1	Purpose of the Study	8
1.2	Structure of the Study	9
2	Market Efficiency	10
2.1	The Efficient Market Hypothesis and Alternative Views	10
2.2	The Role of Analysts	13
3	Analysts' Outputs	15
4	Investor Sentiment	19
5	Literature Review	21
5.1	Earnings Forecasts	23
5.2	Target Prices	24
5.3	Recommendations	25
6	Potential Causes of the Impact and Potential Mitigating Factors	29
7	Conclusions	34
	References	36

1 Introduction

Investor sentiment can be regarded as investors' expectations of how prices will develop in the future (Lee et al., 1991), pessimism or optimism regarding stocks overall or the tendency to speculate (Baker & Wurgler, 2006), beliefs regarding future risks and cash flows that go beyond available information (Baker & Wurgler, 2007), or excessively optimistic or pessimistic expectations which fundamentals do not support (Walther & Willis, 2013). The traditional view in finance theory holds that the market prices of securities correspond to their intrinsic values, i.e., the discounted value of expected cash flows, and the cross-section of market risk is the sole factor that affects the cross-section of expected returns (Baker & Wurgler, 2006). According to the traditional view, this is because the competition between rational market participants drives the prices of securities to their intrinsic values (Baker & Wurgler, 2006).

The traditional view in finance posits that markets are highly efficient and, consequently, non-fundamental factors, such as investor sentiment, should not irrationally affect them. However, according to research in behavioral finance, investor sentiment may cause the prices of stocks to diverge from their intrinsic values (e.g., De Long et al., 1990). Investor sentiment varies over time, and there is a positive association between sentiment and the general stock market index (Danbolt et al., 2015). Furthermore, investor sentiment has an impact on the cross-section of stock returns, and hard-to-value firms deliver higher (lower) returns after periods of lower (higher) investor sentiment (Baker & Wurgler, 2006). Furthermore, during periods of higher (lower) investor sentiment, smaller stocks are overvalued (undervalued) compared to larger stocks (Lemmon & Portniaguina, 2006).

Sell-side analysts have an important role in the market, contributing to market efficiency (e.g., Jegadeesh et al., 2004). Prior research shows that analysts' earnings forecasts (e.g., Asquith et al., 2005; Brav & Lehavy, 2003), target prices (e.g., Asquith et al., 2005; Brav & Lehavy, 2003; Da et al., 2016; Dechow & You, 2020; Gleason et al., 2013), and recommendations (e.g., Asquith et al., 2005; Brav & Lehavy, 2003) are each informative.

Furthermore, target prices have predictive capability for future stock returns (Clarkson et al., 2020; Gleason et al., 2013). Similarly, analysts' recommendations and particularly recommendation revisions have investment value and predictive power for future short-term cross-sectional returns (e.g., Jegadeesh et al., 2004; Jegadeesh & Kim, 2006). It is possible to yield positive returns with strategies utilizing analysts' recommendations and particularly recommendation revisions (e.g., Balboa et al., 2008; Balboa et al., 2009; Jegadeesh et al., 2004; Jegadeesh & Kim, 2006). For example, Balboa et al. (2008) show that a strategy that pairs purchasing stocks upgraded by analysts and selling stocks downgraded by analysts produces abnormal positive returns.

Considering the important role of analysts and their outputs in the market, it raises the question of whether investor sentiment also affects analysts and their outputs. Fundamental analysis should, in theory, be based on a rational assessment of companies' fundamentals. Although investor sentiment may impact the prices of securities, it does not theoretically pertain to the fundamentals of stocks (Bagnoli et al., 2009). Traditionally, investor sentiment is thought to mainly affect noise traders (e.g., De Long et al., 1990), and analysts are traditionally regarded as rational (e.g., Easterwood & Nutt, 1999) and sophisticated (e.g., Miwa & Ueda, 2016) market participants. Therefore, although investor sentiment could affect other market participants and cause them to be irrationally optimistic during periods of higher investor sentiment, it should not affect analysts and cause their outputs to be more optimistically biased during periods of higher investor sentiment. Thus, the first hypothesis is:

H1: Investor sentiment does not influence sell-side analysts or their outputs, and sell-side analysts' outputs are not more optimistically biased during periods of higher sentiment.

If analysts' outputs were, for example, more optimistic during periods of higher investor sentiment, they would not reflect the fundamentals and intrinsic value of stocks to the same extent, and thus, their informativeness and value could be diminished. Analysts'

outputs that do not reflect fundamentals and intrinsic values (e.g., irrationally optimistic outputs) might skew and distort the estimates and assessments of those market participants who utilize them. This might cause them to make less favorable or even adverse decisions. It might also have a broader impact on, for example, market efficiency.

However, since analysts and their outputs are assumed not to be affected by investor sentiment (e.g., sentiment-driven optimistic bias), investor sentiment should not affect the informativeness and value of analysts' outputs either. Even if investor sentiment did affect analysts and their outputs, analysts, as rational and more sophisticated market participants, should be able to limit or influence the impact so that investor sentiment does not affect the informativeness and value of their outputs. Therefore, the second hypothesis is:

H2: Investor sentiment does not affect the informativeness, profitability, and value of sell-side analysts' outputs.

Both hypotheses are based on prior literature, which suggests that investor sentiment mainly affects market participants who are considered less rational and less sophisticated than analysts. The motivation of this thesis is to investigate and deepen the understanding of investor sentiment and its impact on analysts and their outputs, which play an important role in the market.

Disclosure about the use of AI: Pyry Tanskanen has produced all the text of this thesis. No content generated by AI language models has been directly included in the thesis. Grammarly and ChatGPT have been used to review grammar, refine language, and explore alternative vocabulary, expressions, and phrasings. AI tools have been used following the University of Vaasa's guidelines.

1.1 Purpose of the Study

This thesis aims to determine whether investor sentiment influences analysts' earnings forecasts, target prices, and recommendations. Furthermore, this thesis attempts to determine whether investor sentiment also affects the accuracy, informativeness, or value of analysts' outputs. Moreover, the aim of this thesis is to investigate whether the impact of investor sentiment on analysts and their outputs is caused by strategic or cognitive factors. If the impact of investor sentiment on analysts' outputs is at least partially caused by cognitive factors, the analysts themselves could benefit from a better understanding of the factors influencing their decision-making. Specifically, analysts might be able to further improve the objectivity, reliability, accuracy, informativeness, profitability, and value of their outputs.

This thesis contributes to academic literature by creating an overview of the subject area. Furthermore, this thesis aims to provide practical value for analysts themselves, policymakers, institutional and individual investors, and other entities who use analysts' outputs, for example, in financial decision-making. A better understanding of the impact of investor sentiment on analysts and their outputs could be beneficial, for example, when further assessing the advantages, disadvantages, and constraints of utilizing analysts' forecasts, target prices, and recommendations to support decision-making in a variety of situations, for example, as an individual retail investor as well as a professional investor. This understanding could also benefit policymakers, as they might be able to regulate the market more efficiently. If the impact of investor sentiment on analysts' outputs is at least partially caused by strategic factors, further regulatory measures might be able to mitigate it and, thus, improve the informativeness and value of analysts' outputs. Furthermore, as analysts are regarded as well-informed and sophisticated market participants, examining the potential impact of investor sentiment on them may provide an understanding of the minimum impact that investor sentiment has on less informed or non-professional investors (Hribar & McInnis, 2012).

1.2 Structure of the Study

Chapter 1 covers some theoretical background, including the concept of investor sentiment, develops the hypotheses, and introduces the purpose and the structure of the thesis. Chapter 2 continues the discussion of the theoretical background, covering market efficiency, the Efficient Market Hypothesis, and the differences between traditional and critical views. It also examines analysts' role in the market and provides the foundation for the theoretical examination in the following chapters. Chapter 3 introduces analysts' main outputs (i.e., earnings forecasts, target prices, and recommendations). Chapter 4 examines investor sentiment and different methods of measuring it. Chapter 5 provides a literature review on the subject area of investor sentiment and analysts' outputs. Chapter 6 explores potential causes and mitigating factors. Finally, Chapter 7 concludes the thesis.

2 Market Efficiency

To better understand analysts, their outputs (i.e., their estimates, valuations, forecasts, recommendations, and target prices), and investor sentiment, it is necessary to understand the concept of market efficiency and the analysts' role in the market. The efficiency of securities markets has been studied for decades, and the general view on the matter has varied throughout time.

If the market is inefficient, even to some extent, the importance of analysts' role as market intermediaries who collect and process information is intuitive and logical. On the other hand, if the market is perfectly efficient, all available information, including the information analysts possess, is fully reflected in prices, and thus, analysts cannot generate additional value (Jegadeesh & Kim, 2006). If this is the case, one might wonder what analysts are needed for.

2.1 The Efficient Market Hypothesis and Alternative Views

The Efficient Market Hypothesis posits that the market is efficient, and the prices of securities efficiently and fully reflect all available information (Fama, 1970). The Efficient Market Hypothesis has three levels or forms. The weak form implies that prices reflect all past market information (Fama, 1970). In this case, it is impossible to earn abnormal risk-adjusted returns using technical analysis (Malkiel, 2003). The semi-strong form means that prices reflect all the public information (Fama, 1970). Under these circumstances, it is impossible to earn abnormal risk-adjusted returns using fundamental analysis (Malkiel, 2003). The strong form means that prices fully reflect all information, including insider information (Fama, 1970).

The Efficient Market Hypothesis is closely connected to the random walk theory (Malkiel, 2003). According to the random walk theory, prices of securities follow a random walk, meaning that price changes are random and independent of prior price changes (Fama,

1965; Fama, 1995; Malkiel, 2003). Thus, future price changes cannot be predicted based on prior price changes (Fama, 1965; Fama, 1995).

However, the Efficient Market Hypothesis and the idea of perfectly efficient markets have been challenged over time. For example, Grossman and Stiglitz (1980) argue that prices do not contain all available information because if they did, one could not profit from collecting and processing information. In this case, no one would collect and process information, leading to the market's inefficiency (Grossman & Stiglitz, 1980). Yet, there are a lot of different entities collecting and processing information, even though it requires a lot of resources. For example, brokerage firms analyze stocks, which generates a lot of costs, and they need to earn profits to balance these costs (Womack, 1996).

Furthermore, Shleifer and Summers (1990) argue that not all market participants are entirely rational; instead, they possess sentiments or beliefs that fundamentals do not entirely support but still influence their demand for risky securities. Fama (1995) states that in an efficient market, the price of security accurately reflects the intrinsic value of the security because the price of the security already contains all the information regarding the past and the market's estimate of the future. According to Fama (1995), although market participants may have differing views regarding the intrinsic value of a security, in an efficient market, the price of the security fluctuates near the intrinsic value of the security due to the competition of market participants. Rational arbitrageurs counteract the impact of irrational market participants trading on noise (Fama, 1965).

In contrast, De Long et al. (1990) argue that arbitrage is not always possible. In theory, arbitrage is risk-free and does not demand any capital (Shleifer & Summers, 1990; Shleifer & Vishny, 1997). In practice, however, arbitrage generally demands capital and is not risk-free (Shleifer & Summers, 1990; Shleifer & Vishny, 1997). Furthermore, according to De Long et al. (1990), arbitrageurs often operate with limited time horizons and are risk-averse, and thus, they may be reluctant to counteract noise traders.

Noise traders are regarded as irrational market participants who trade on noise instead of information (e.g., De Long et al., 1990). Noise traders generate additional risk (i.e., noise trader risk) through their erratic beliefs (De Long et al., 1990). This additional risk limits arbitrage, and for this reason, even if there is no fundamental risk, prices of securities may still deviate from their intrinsic values (De Long et al., 1990). If arbitrageurs bet against noise traders' erratic and erroneous beliefs, in addition to the fundamental risk associated with arbitrage, they must carry the risk that noise traders' beliefs stay irrational or become even more irrational (De Long et al., 1990).

Moreover, Shleifer and Vishny (1997) argue that if arbitrageurs use money that is not their own, arbitrage may become more constrained and less effective. This is because the people whose money arbitrageurs use may stop providing additional capital or pull back their capital, forcing the arbitrageur to liquidate positions (Shleifer & Vishny, 1997). Awareness of this possibility may, in turn, preemptively limit arbitrage and reduce its effectiveness (Shleifer & Vishny, 1997). Therefore, arbitrage may not be able to entirely remove the mispricing.

Overall, previous research in behavioral finance (e.g., De Long et al. (1990); Shleifer & Summers, 1990; Shleifer & Vishny, 1997) identifies the existence of irrationality and limits to arbitrage. This challenges the Efficient Market Hypothesis and the traditional view of highly efficient markets. In recent decades, research in behavioral finance and anomalies has further challenged the traditional view of highly efficient markets and the Efficient Market Hypothesis. For example, various calendar anomalies, e.g., the Halloween effect (Jacobsen & Visaltanachoti, 2009) and the turn-of-the-month effect (McConnell & Xu, 2008), have been documented. Furthermore, anomalies related to, for example, IPOs (Ghosh, 2006; Ritter, 1991) and post-recommendation drift (e.g., Jegadeesh & Kim, 2006; Womack, 1996) have also been documented.

In summary, the Efficient Market Hypothesis and the traditional view of highly efficient markets have been challenged over time, and market efficiency continues to be a subject

of academic debate. Based on previous literature, it seems that markets are not perfectly efficient or efficient to the extent suggested by the Efficient Market Hypothesis. Busse and Green (2002) conclude that the prices of securities are not immediately adjusted to all available information, but the market is efficient to the extent that gaining profits from broadly available news is only possible if traders act promptly.

2.2 The Role of Analysts

The general view based on previous literature seems to be that analysts contribute to the efficiency of markets by collecting, processing, and finally publishing information to the markets (e.g., issuing earnings forecasts, recommendations, and target prices). In other words, analysts enhance the efficiency of markets by generating information that makes it possible for investors to determine the value of firms more precisely (Jegadeesh et al., 2004). For example, Womack (1996) shows that recommendation revisions are followed by notable market responses and suggests that recommendations convey valuable information since these instant market responses to revisions appear to be long-lasting.

However, some studies also provide evidence against the importance of analysts as information intermediaries. For example, Altinkılıç & Hansen (2009) examine intraday data to overcome the identification problem that stems from the use of overnight and daily stock returns, which also include price responses to other information. Altinkılıç & Hansen (2009) argue that recommendation revisions, on average, have little new valuable information. Bradley et al. (2014) also examine intraday data, but unlike Altinkılıç & Hansen (2009), they also take time stamp delays into account. Bradley et al. (2014) find that, on average, analysts provide valuable information. Furthermore, they show that recommendation revisions are more significant than management guidance or earnings announcements in disseminating information.

According to Bajari & Krainer (2004), analysts collect information and decrease the duplication of outputs. Frankel and Li (2004) find a connection between a rise in analysts following and a decline in the asymmetry of information between investors and management. Similarly, Kim et al. (2021) argue that analysts' recommendations provide valuable information and reduce the asymmetry of information between different market participants. Piotroski and Roulstone (2004) show, in turn, that the quantity of industry-level information reflected in stock prices is expanded by analysts. Likewise, Asquith et al. (2005) find that analysts deliver new information and interpret information that is already available. Moreover, Asquith et al. (2005) conclude that earnings forecast revisions, target prices, and recommendations each offer independent information to the markets. Similarly, Brav & Lehavy (2003) find that earnings forecast revisions, target prices, and recommendations are each informative.

Overall, analysts' outputs are regarded as informative (e.g., Asquith et al., 2005; Brav & Lehavy, 2003). While some studies present opposing views on the role of analysts in the markets (e.g., Altinkılıç & Hansen, 2009), the consensus based on prior research seems to be that analysts are significant information intermediaries who provide valuable new information, interpret information that is already available, reduce the asymmetry of information, and consequently, contribute to the efficiency of the markets.

These findings support the conclusion that the market is not perfectly efficient. If they were, analysts would not be able to generate additional value, as all available information would already be fully reflected in prices (Jegadeesh & Kim, 2006). Consequently, the evidence showing that analysts' outputs have value (e.g., Asquith et al., 2005) supports the conclusion that the market is not perfectly efficient or not as efficient as suggested by the Efficient Market Hypothesis.

3 Analysts' Outputs

Analysts analyze stocks, i.e., collect information and then process it (e.g., Jegadeesh et al., 2004). Based on the information they process, analysts estimate the intrinsic values and investment potential of stocks (e.g., Jegadeesh et al., 2004). Analysts forecast earnings, use these earnings forecasts to construct target prices, and ultimately base their recommendations on the differences between target prices and market prices (e.g., Gleason et al., 2013). Earnings forecasts, target prices, and recommendations may be regarded as analysts' main outputs. Research on earnings forecasts and recommendations is extensive, whereas research on target prices is scarcer and has only started to expand in recent years.

There are subtle variations in how target prices are understood and described between different studies. Some studies emphasize the role of target prices as estimates of true value or intrinsic value (e.g., Gleason et al., 2013), while others highlight their role as estimates of future prices (e.g., Clarkson et al., 2020). A target price can be defined as an analyst's estimate of a stock's price at a specific point in the future (usually after 12 months) (e.g., Asquith et al., 2005; Bilinski et al., 2013; Clarkson et al., 2020). Thus, a target price may deviate from a stock's fundamental value, and analysts might also consider non-fundamental factors when constructing target prices if they believe that these factors influence the stock's future price (Clarkson et al., 2020). Nevertheless, target prices reflect analysts' valuations (Bradshaw, 2002) and analysts' estimates of the investment potential (Dechow & You, 2020) and serve as a cornerstone for analysts' recommendations (Gleason et al., 2013).

A recommendation conveys an analyst's view on a stock's relative short-term return potential (Jegadeesh et al., 2004). Recommendations are typically classified into five categories: strong buy, buy, hold, sell, and strong sell (Asquith et al., 2005). Target prices are often used to justify recommendations, and there is a positive relationship between relatively higher target prices and more positive stock recommendations (Bradshaw, 2002). Miwa and Ueda (2016) suggest that an analyst's recommendation is based on the

divergence between the analyst's estimate of a stock's fair value and the stock's current market price. The market price may be considered the consensus estimate of the stock's fair value by different market participants (Miwa & Ueda, 2016). Therefore, according to Miwa & Ueda (2016) recommendations may reflect the divergences in the estimates of stocks' fair values between analysts and other market participants. Discrepancies in analysts' and the market's valuations could be due to, for example, differences in estimates of future earnings, growth rates, or discount rates (Kecskés et al., 2017).

When evaluating stocks and making recommendations, analysts utilize both firm-level information and industry-level information (Womack, 1996) as well as market-level information (Karadas & Papakroni, 2019). In theory, stock recommendations should be grounded in the valuation of projected financial information (Bradshaw, 2002). However, according to Bradshaw (2002), some research findings (e.g., Barker, 1999) indicate that analysts also apply non-financial factors in addition to, or at the expense of, financial information when making recommendations.

Analysts construct target prices utilizing various fundamental factors (e.g., earnings forecasts) (Dechow & You, 2020). Some of the factors analysts utilize are observable, and some are unobservable (Clarkson et al., 2020). The degree to which different valuation methods employ fundamental information varies, yet fundamental information forms the foundation of sophisticated as well as heuristic valuation methods (Buxbaum et al., 2023; Gleason et al., 2013). For example, earnings estimates are a fundamental component in all valuation methods (e.g., a comparables valuation method and a discounted cash flow valuation method) (Kecskés et al., 2017).

According to Asquith et al. (2005), discounted cash flow models (DCF models), asset multiples, and cash flow or earnings multiples are the three main types of valuation models into which the majority of valuation models may be divided. Discounted cash flow models rely on discount rate estimates and cash flow forecasts (Asquith et al., 2005). Market-to-book value is the asset multiple that analysts use, and revenue multiples,

EBITDA multiples, price-to-earnings ratios (i.e., PE ratios), relative price-to-earnings ratios (i.e., relative PE ratios) are the cash flow or earnings multiples that analysts use (Asquith et al., 2005).

Asquith et al. (2005) examine reports published from 1997 to 1999 by members of the Institutional Investor All-American team and find that target prices are usually formed using an earnings multiple valuation model (i.e., multiplying forecasted earnings by an earnings multiple) rather than methods based on discounting cash flows (e.g., net present value). Asquith et al. (2005) find that 99.1% of analysts constructing target prices disclose using an earnings multiple approach, 25.1% using an asset multiple approach, 12.8% using a discounted cash flow approach, and 3.5% using an alternative valuation approach (e.g., PEG). However, 0.9% of the analysts in the sample do not disclose the valuation approaches they have used, which means that all the analysts who do disclose the valuation approaches utilize an earnings multiple approach (Asquith et al., 2005).

Pinto et al. (2019) examine valuation approaches utilized by equity analysts who are CFA Institute members and find that 92.8% of them utilize market multiples, 78.8% present discounted value approaches (i.e., discounted cash flow approaches), and 61.4% asset-based approaches. Of the analysts utilizing discounted cash flow approaches, 35.1% utilize a dividend discount model, and 86.8% utilize a free cash flow (FCF) approach (Pinto et al., 2019). Moreover, analysts utilize free cash flow to the firm (FCFF) models nearly twice as often as they utilize free cash flow to equity (FCFE) models (Pinto et al., 2019). Bradshaw (2004) demonstrates that recommendations have a positive association with valuations derived from the PEG method and a significant association with long-term growth forecasts, and in contrast, an insignificant or negative association with valuations derived from the residual income method. This suggests that rather than relying solely on present value approaches, analysts employ valuation heuristics when making recommendations.

In summary, analysts do not rely solely on financial information. Instead, analysts also appear to use non-financial factors when making recommendations (Bradshaw, 2002) and target prices (Clarkson et al., 2020). Moreover, when estimating valuations, analysts appear to use price multiples or market multiples more than discounted cash flow methods (Asquith et al., 2005; Pinto et al., 2019). In summary, analysts tend to employ valuation heuristics (e.g., Bradshaw, 2004), which are less justified theoretically than more sophisticated and rigorous valuation methods.

4 Investor Sentiment

Prior research presents two ways in which sentiment could influence stock prices (Hribar & McNnis, 2012). On the one hand, uncertain stocks could be more expensive to arbitrage as limits to arbitrage differ between stocks (e.g., De Long et al., 1990; Hribar & McNnis, 2012). In this way, as limits to arbitrage differ, they may lead to more prevalent mispricing in uncertain stocks, even if sentiment influences perceptions similarly across all stocks (Hribar & McNnis, 2012). On the other hand, investors' perceptions could be more strongly influenced by sentiment in stocks that are hard to value (i.e., small, young, volatile, financially distressed, high-growth, or non-dividend paying firms) (Baker & Wurgler, 2006; Baker & Wurgler, 2007; Hribar & McNnis, 2012).

Investor sentiment can be measured with approaches based on, for example, survey data, market data, and text and media data (Zhou, 2018). Using closed-end fund discounts (i.e., CEFDs) is one of the traditional approaches to measuring investor sentiment (Lemmon & Portniaguina, 2006). CEFDs indicate what individual investors expect (Zweig, 1973). More specifically, changes in investor sentiment may influence the demand for closed-end funds, which in turn influences CEFDs (Lee et al., 1991). There are also other possible measures for investor sentiment. For instance, sentiment can also be measured using survey data, for example, on consumer confidence or consumer sentiment (e.g., the Conference Board survey of consumer confidence or the University of Michigan survey of consumer sentiment), measures that are not dependent on market prices (Lemmon & Portniaguina, 2006).

Baker & Wurgler (2006) construct a composite sentiment index, which has been widely used in subsequent research (e.g., Bagnoli et al., 2009; Corredor et al., 2013; Hribar & McNnis, 2012; Miwa & Uewa, 2016; Kaplanski & Levy (2017)). The index consists of six proxies: trading volume (NYSE turnover), the dividend premium, the closed-end fund discount, the number and first-day returns of IPOs, and the equity share in new issues (Baker & Wurgler, 2006).

Nevertheless, Lemmon & Portniaguina (2006) find that the association between the sentiment part of consumer confidence and CEFDs or the composite sentiment index (developed by Baker & Wurgler (2006)) is not significant. According to Lemmon & Portniaguina (2006), these measures might omit key elements of investor sentiment or reflect distinct elements of it. In more recent studies (e.g., Baker et al., 2012; Corredor et al., 2014), sentiment is often measured by global sentiment indexes constructed with local sentiment proxies.

5 Literature Review

Although analysts' earnings forecasts, target prices, and recommendations are informative (e.g., Asquith et al., 2005; Brav & Lehavy, 2003), they may not always be accurate. For example, target prices tend to be inaccurate (e.g., Bonini et al., 2010; Bradshaw et al., 2013). Nevertheless, the informativeness of analysts' target prices increases with more sophisticated and rigorous valuation methods (Gleason et al., 2013) and when systematic forecast errors are eliminated (Dechow & You, 2020).

Furthermore, analysts' earnings forecasts, target prices, and recommendations appear optimistically biased. Specifically, earnings forecasts tend to be optimistically biased, with actual earnings being lower than earnings forecasted by analysts (e.g., Das et al., 1998; Qian, 2009). Likewise, analysts' target prices are optimistically biased, with implied returns being significantly higher than actual realized returns (e.g., Bilinski et al., 2013; Bonini et al., 2010; Bradshaw et al., 2013). And across all investor sentiments, analysts' target prices are consistently higher than contemporaneous market prices (Buxbaum et al., 2023; Brav & Lehavy, 2003). Analysts' recommendations tend to be optimistically biased as well, with buy recommendations being significantly more frequent than sell recommendations (e.g., Asquith et al., 2005; Balboa et al., 2008; Balboa et al., 2009; Corredor et al., 2013; Jegadeesh & Kim, 2006; Womack, 1996).

Analysts tend to react excessively to positive information while reacting insufficiently to negative information, which is consistent with the inclination of analysts to assess new information with optimism (Easterwood & Nutt, 1999). Analysts' optimistic bias may stem, for example, from economic incentives (e.g., Asquith et al., 2005; Dechow & You, 2020; Easterwood & Nutt, 1999; Hong & Kubik, 2003; Womack, 1996), the risk that their access to executives' non-public information might be compromised if they do not present firms positively (e.g., Asquith et al., 2005; Das et al., 1998; Easterwood & Nutt, 1999; Womack, 1996), or the skewness of earnings distributions (Gu & Wu, 2003; Qian, 2009).

In turn, Lim (2001) suggests that it might be optimal for a rational analyst to publish optimistically biased forecasts, as, by doing so, they may enhance their access to executives' non-public information and, consequently, improve the accuracy of their forecasts. Furthermore, Womack (1996) suggests that analysts face greater reputational risks when publishing sell recommendations because inaccurate sell recommendations stand out more than inaccurate buy recommendations, as sell recommendations are less common and draw more attention.

Analysts' optimistic bias could also be associated with sentiment. For example, Qian (2009) shows that analysts' forecast optimism has a positive connection with investor sentiment, and time-varying investor sentiment, in addition to the cross-sectional skewness of earnings forecasts, significantly contributes to explaining the variation in analyst optimism over time. Investor sentiment could also influence analysts and their outputs in other ways. For instance, Kaplanski and Levy (2017) show that investor sentiment influences analysts to update their recommendations and earnings forecasts. However, they determine that, at the aggregate level, sentiment does not result in major inaccuracies in analysts' forecasts.

Hribar & McInnis (2012), Walther & Willis (2013), and Corredor et al. (2014) investigate the connection between investor sentiment and analysts' earnings forecasts, whereas Bagnoli et al. (2009), Corredor et al. (2013), and Miwa and Ueda (2016) examine the association between investor sentiment and analysts' recommendations. While the connection between investor sentiment and earnings forecasts or recommendations has been studied more extensively, the association between investor sentiment and target prices has received less attention. However, recently, this topic has started to gain more attention, along with a growing body of research on target prices themselves. For example, Clarkson et al. (2020) and Buxbaum et al. (2023) investigate the connection between investor sentiment and analysts' target prices.

5.1 Earnings Forecasts

Prior research provides evidence of links between investor sentiment and analysts' earnings forecasts. Walther & Willis (2013) examine analysts' earnings forecasts in the U.S. from the Zacks Investment Research database. They show that analysts' earnings forecasts are more optimistic and less accurate during periods of higher sentiment and, vice versa, more accurate during periods of lower sentiment.

In turn, Hribar & McInnis (2012) examine analysts' earnings forecasts and long-term earnings growth forecasts in the U.S. from the I/B/E/S database for the period from 1983 to 2006. They find that during periods of higher sentiment, earnings forecasts for firms that are hard to value or uncertain (i.e., young, small, unprofitable, volatile, or non-dividend paying firms) are more optimistic compared to earnings forecasts for certain firms. Yet, the effect appears to be diminished or reversed during periods of low sentiment (Hribar & McInnis, 2012). Furthermore, Hribar & McInnis (2012) find that during periods of higher sentiment, long-term growth forecasts, especially for uncertain firms, are relatively more optimistic as well. In addition, they show that the connection between sentiment and future stock returns can be at least partially explained by errors in earnings forecasts and long-term growth forecasts.

Corredor et al. (2014) examine earnings forecasts in Europe (France, Germany, Spain, and the UK) from the FactSet database for the period from 1994 to 2007. They find that analysts' earnings forecasts are optimistically biased, and investor sentiment contributes to errors in earnings forecasts, particularly for firms that are hard to value. In contrast to Hribar and McInnis (2012), Corredor et al. (2014) find that errors in earnings forecasts do not significantly explain the connection between sentiment and future stock returns.

5.2 Target Prices

Similarly, previous literature provides evidence of links between investor sentiment and analysts' target prices. This is reasonable, as investor sentiment appears to be associated with earnings forecasts, which are used in various valuation methods. For instance, Clarkson et al. (2020) examine target prices in the U.S. from the I/B/E/S database for the period from 1999 to 2018 and find that non-fundamental factors (i.e., investor sentiment and the 52-week high price) affect the level of target prices. They demonstrate that analysts' target prices tend to be optimistically biased, and this bias becomes more significant when investor sentiment is higher or when stocks are close to the 52-week high. Furthermore, they find evidence indicating that the use of non-fundamental factors (i.e., investor sentiment and the 52-week high) in constructing target prices contributes to the optimistic bias in target prices and weakens the capability of target prices to predict future returns. They also find evidence suggesting that analysts utilize non-fundamental factors more for firms that are hard to value (e.g., smaller firms and firms whose earnings are volatile) and under circumstances where analysts are less capable of producing accurate forecasts.

Buxbaum et al. (2023) examine target prices in the U.S. for the period from 1999 to 2014 and demonstrate similarly that analysts' target prices tend to be optimistic. The informativeness and capability of analysts' target prices to predict future returns is better when the valuation methods used by analysts are more sophisticated (Gleason et al., 2013). And during periods of lower investor sentiment, analysts appear to use more sophisticated valuation methods (Clarkson et al., 2020). Consistently, Buxbaum et al. (2023) find that due to analysts' use of more sophisticated valuation methods as well as analysts' optimism, target prices are closer to intrinsic values during periods of lower sentiment. Consequently, the capability of analysts' target prices to predict future returns (i.e., the investment value of analysts' target prices) is higher during periods of lower sentiment, especially for target prices constructed using more sophisticated valuation (Buxbaum et al., 2023).

In contrast, Buxbaum et al. (2023) find that during periods of higher investor sentiment, analysts' optimism pushes target prices away from intrinsic values. Consequently, the capability of analysts' target prices to predict future returns (i.e., the investment value of analysts' target prices) is minimal, and the valuation method used makes no difference. In other words, the way analysts' optimism in target prices affects the informativeness and investment value of target prices fluctuates with investor sentiment (Buxbaum et al., 2023).

5.3 Recommendations

Prior research demonstrates that links also exist between investor sentiment and analysts' recommendations. This is reasonable as well because investor sentiment appears to be associated with both earnings forecasts and target prices, which analysts use when making recommendations. Corredor et al. (2013) examine analysts' recommendations in Europe (the United Kingdom, Germany, Spain, and France) from the FactSet Research Systems database, covering the period from January 1994 to December 2007. They demonstrate that investor sentiment has a substantial impact on analysts' consensus recommendations. Specifically, they demonstrate that when investor sentiment is higher, analysts' consensus recommendations are more optimistically biased. Furthermore, they find that investor sentiment has a greater impact on analysts' recommendations for stocks that are hard to value or hard to arbitrage (i.e., stocks that have a higher book-to-market ratio, do not pay dividends, and are volatile and small).

Similarly, examining analysts' recommendations in the U.S. from the I/B/E/S for the period from 1994 to 2005, Bagnoli et al. (2009) find evidence suggesting that investor sentiment affects analysts' recommendations. They show that analysts' recommendations are more optimistic when recent or future investor sentiment is higher. However, Hribar and McNinnis (2012), in turn, do not find a notable association between sentiment and recommendations.

Miwa & Ueda (2016) examine analysts' recommendations in the U.S. for the period from 1993 to 2010 from the I/B/E/S and find that analysts issue more optimistic recommendations for growth stocks during periods of higher sentiment, even though they are overvalued. They suggest that recommendations for growth stocks (i.e., high growth, positive momentum, high trading volume, and overvalued stocks) are optimistically biased during periods of higher sentiment because analysts place excessive emphasis on stocks' growth components. This is consistent with the findings of Bradshaw (2004), which indicate that analysts favor growth when making recommendations, even when the growth expectations are already priced in. Likewise, Jegadeesh et al. (2004) find that analysts have a bias towards growth stocks, which they attribute to analysts' job-related economic incentives.

Estimating the values of stocks and their growth components is based on the discounting of expected future cash flows (Miwa & Ueda, 2016). The valuation of growth stocks is more sensitive to discount rates, and higher sentiment may imply lower discount rates (Miwa & Ueda, 2016). As analysts place a greater emphasis on stocks' growth components than other market participants, analysts' valuations of growth stocks may be more positively biased than other market participants' valuations during periods of higher sentiment (Miwa & Ueda, 2016). While analysts' valuations of low-growth stocks may also be influenced by investor sentiment, the growth components of low-growth stocks are less affected by sentiment (i.e., changes in discount rates) (Miwa & Ueda, 2016). Therefore, analysts' valuations of low-growth stocks are less affected by sentiment (Miwa & Ueda, 2016).

Furthermore, investor sentiment appears to have links to the value of analysts' recommendations. For example, Corredor et al. (2013) show that the value of analysts' consensus recommendations fluctuates along with investor sentiment. They demonstrate that recommendation-based strategies that take investor sentiment into account offer higher risk-adjusted returns than portfolios based on all recommendations.

In turn, Bagnoli et al. (2009) find that recommendations by analysts whose recommendations have a positive association with investor sentiment are relatively less profitable. Similarly, Miwa and Ueda (2016) suggest that analysts' optimism for growth stocks reduces the investment value of analysts' recommendations during periods of higher sentiment. Consistently, they demonstrate that the stocks recommended by analysts provide relatively lower returns following periods of higher investor sentiment, which they link to analysts' optimism for growth stocks.

Overall, it appears that investor sentiment affects analysts' outputs if no other factor explains the associations between them. Prior research provides evidence indicating that analysts' outputs are associated with investor sentiment. Specifically, during periods of higher investor sentiment, analysts' earnings forecasts (e.g., Walther & Willis, 2013), target prices (e.g., Clarkson et al., 2020), and recommendations (e.g., Corredor et al., 2013) are more optimistically biased. Therefore, Hypothesis 1 does not hold and is rejected. In addition, analysts' outputs for stocks that are uncertain, hard to value, and hard to arbitrage seem to show greater optimistic bias during periods of higher investor sentiment (e.g., Corredor et al., 2013; Hribar & McInnis, 2012). This is consistent with the findings of Baker and Wurgler (2006, 2007), which show that sentiment has a more significant impact on these kinds of stocks, such as small, young, volatile, financially distressed, high-growth, or non-dividend paying firms.

Furthermore, investor sentiment appears to affect the accuracy, informativeness, and value of analysts' outputs (e.g., Buxbaum et al., 2023; Clarkson et al., 2020; Corredor et al., 2013; Corredor et al., 2014; Miwa & Ueda, 2016; Walther & Willis, 2013). As a result, Hypothesis 2 is rejected as well. Furthermore, analysts' earnings forecasts are less accurate when sentiment is higher and, conversely, more accurate when sentiment is lower (Walther & Willis, 2013). Consistently, target prices are less accurate and less informative and have less investment value during periods of higher sentiment (e.g., Buxbaum et al., 2023; Clarkson et al., 2020). Similarly, the value of analysts' consensus recommendations changes with investor sentiment (e.g., Corredor et al., 2013; Miwa &

Ueda, 2016). Overall, it appears that investor sentiment also affects the accuracy, informativeness, and value of analysts' outputs if no alternative factor explains the associations between them. Consequently, Hypothesis 2 is rejected for each of the three: earnings forecasts, target prices, and recommendations. However, it is important to consider the geographical and temporal differences between the studies, as they utilize data from different years and countries.

6 Potential Causes of the Impact and Potential Mitigating Factors

Various market participants use analysts' outputs (i.e., earnings forecasts, recommendations, and target prices) when making financial decisions. By collecting, analyzing, and disseminating information to the market, analysts contribute to market efficiency. Based on prior research, investor sentiment appears to amplify the optimistic bias in analysts' outputs (e.g., Clarkson et al., 2020; Corredor et al., 2013; Walther & Willis, 2013). Furthermore, it appears to affect their accuracy, informativeness, and value (e.g., Buxbaum et al., 2023; Corredor et al., 2013; Walther & Willis, 2013). To effectively address this issue, it is necessary first to understand the underlying causes.

An intriguing question is whether analysts contribute to or even initiate investor sentiment. Kaplanski and Levy (2017) demonstrate, using causality analysis, that analysts are influenced by investor sentiment and not the other way around. They examine analysts' recommendations in the U.S. from the I/B/E/S for the period from 1980 to 2013 and determine that analysts neither start investor sentiment nor determine its features. However, they argue that the spread of sentiment to stock prices is accelerated by analysts and, furthermore, the impact of investor sentiment is also likely amplified by analysts. According to Kaplanski & Levy (2017), this is because analysts also have an impact on professional investors whom, according to Danbolt et al. (2015), sentiment does not directly influence as much as it does uninformed traders.

Another intriguing question is whether analysts as sophisticated and well-informed market participants are aware of the impact of investor sentiment on other market participants and consciously take advantage of it (i.e., strategic behavior) or whether investor sentiment influences analysts without them being fully aware of it (i.e., cognitive bias). If the impact of investor sentiment on analysts' outputs is at least partially caused by strategic factors, it might be possible to further mitigate the impact through regulatory measures. Kaplanski and Levy (2017) propose that experienced

analysts can regulate how investor sentiment influences their outputs. They find evidence suggesting that experienced analysts are at least somewhat aware of investor sentiment and consider it when making recommendations and forecasts, and therefore, the impact of investor sentiment on analysts' outputs mostly represents what kind of impact they believe investor sentiment will have on stock prices.

According to Hribar & McInnis (2012), analysts may inflate their earnings forecasts during periods of higher sentiment to promote trading activity and maintain or enhance access to executives' non-public information. However, Hribar & McInnis (2012) do not find evidence suggesting that analysts are aware of sentiment and consciously exploit it by biasing their earnings forecasts (i.e., strategic behavior), meaning that the optimistic bias might be caused by an unintentional impact of investor sentiment (i.e., cognitive bias). On the other hand, Corredor et al. (2014) demonstrate that optimism in analysts' earnings forecasts is a result of both strategic bias and cognitive bias. Furthermore, according to Corredor et al. (2019), analysts' cognitive biases are stronger in stocks that are hard to value or hard to arbitrage.

Clarkson et al. (2020) suggest that analysts might employ non-fundamental factors (i.e., investor sentiment and the 52-week high) when making target prices due to availability, representativeness, and anchoring, introduced by Tversky & Kahneman (1974). Clarkson et al. (2020) suggest that analysts' optimistic biases in target prices are at least partly caused by anchoring, meaning that in challenging situations, analysts may consciously or subconsciously use reference points to ease and simplify the decision-making process. For example, analysts may anchor their target prices to benchmarks influenced by investor sentiment or the 52-week high (Clarkson et al., 2020). On the other hand, since analysts appear to use valuation heuristics (e.g., Asquith et al., 2005; Bradshaw, 2004) and valuation heuristics derive target prices from market prices (Buxbaum et al., 2023), the impact of investor sentiment on stock prices might be transmitted to analysts' outputs in this way.

Bagnoli et al. (2009) suggest that analysts might knowingly attempt to take advantage of sentiment by considering it when making recommendations. For example, if an analyst believes that the price of a stock will rise, for example, due to bullish sentiment, they might give a positive recommendation (i.e., buy or strong buy), even though the price of the stock was already higher than the analyst's private estimate of the stock's intrinsic value (Bagnoli et al., 2009). This, in turn, may lead to inconsistencies between the analyst's earnings forecasts and their recommendations (Bagnoli et al., 2009). However, Bagnoli et al. (2009) demonstrate that recommendations by analysts who seem to consider investor sentiment are relatively less profitable. Therefore, although it may seem rational upon first consideration if an analyst takes investor sentiment into account when making recommendations, it is not necessarily rational when considering the findings of Bagnoli et al. (2009).

Some studies have reported a decline in analysts' optimistic bias over the years. For example, Brown (1997) examines analysts' earnings forecasts from 1985 to 1996 and shows that analysts' optimistic bias in earnings forecasts has declined over time. Hribar & McInnis (2012) also find this trend. Nevertheless, Qian (2009) examines analysts' earnings forecasts from 1984 to 2002 and shows that the optimistic bias has not reduced considerably, excluding the years from 1999 to 2000. Presumably, regulations affect at least the component of analysts' optimistic bias caused by strategic factors (Corredor et al., 2019). As analysts' optimistic bias appears to be caused by both strategic and cognitive factors (Corredor et al., 2014), regulatory measures might be unable to mitigate the optimistic bias fully.

Regulations adopted in the U.S. include, for example, the Regulation Fair Disclosure (i.e., Reg FD adopted in 2000) and regulations related to the Global Analyst Research Settlement (adopted in 2003). Regulations adopted in the EU include, for example, the Market Abuse Directive (MAD) (passed in 2003). Regulation Fair Disclosure (Reg FD) obliges companies to provide material information to all market participants at the same time, meaning that they must provide the information they share with analysts to the

public as well (Asquith et al., 2005; Kolasinski, 2006). The regulations related to the Global Analyst Research Settlement aim to limit the connection between research and investment banking units (Kolasinski, 2006). Similarly, in the EU, the Market Abuse Directive (MAD) limits the connection between research and investment banking units, and it was adopted to deter strategic behavior among analysts (Corredor et al., 2019).

Based on prior research, regulatory measures seem to have reduced analysts' optimistic bias to some extent. For example, Corredor et al. (2019) demonstrate that in the UK, the MAD has reduced the magnitude of the effect that investor sentiment has on analysts' effectiveness of translating earnings forecasts into recommendations (i.e., translational effectiveness) but not in stocks that are hard to value or hard to arbitrage. In turn, Buxbaum et al. (2023) find that in the U.S., analysts' optimism in target prices diminished after the adoption of new regulations from 2000 to 2003 (i.e., Regulation Fair Disclosure, the Global Research Analyst Settlement, Regulation AC, NASD Rule 2711, an amendment to NYSE Rule 472). Kaplanski & Levy (2017) demonstrate that the regulations related to the Global Research Analyst Settlement reduced sentiment-driven optimism in analysts' forecasts in the U.S. After the implementation, positive sentiment has influenced experienced analysts and analysts from the sanctioned banks less and negative sentiment more, resulting in more pessimistic forecasts but not in aggregate errors (Kaplanski & Levy, 2017).

In addition to regulatory measures, other factors may also influence how sentiment affects analysts and their outputs. For example, Walther and Willis (2013) show that management's long-term earnings forecasts may reduce the impact of investor sentiment on the accuracy and optimism of analysts' earnings forecasts. Moreover, Del Río et al. (2024) find that the disclosure of sustainability information mitigates the optimistic bias in analysts' recommendations, which is induced by investor sentiment.

Overall, analysts' optimistic bias appears to be a result of strategic factors as well as cognitive factors (e.g., Corredor et al., 2014). Furthermore, regulatory measures have

diminished analysts' optimistic bias (Buxbaum et al., 2023; Corredor et al., 2019; Kaplanski & Levy, 2017). The decline in analysts' optimistic bias after the implementation of regulatory measures is consistent with the conclusion that analysts' optimistic bias is partially caused by strategic factors. On the other hand, since analysts' outputs still appear to be optimistically biased (e.g., Clarkson et al., 2020), it supports the conclusion that analysts' optimistic bias is partially caused by cognitive factors. It suggests that additional regulatory measures may have the capacity to partially, though not entirely, mitigate the impact of investor sentiment on analysts' outputs.

7 Conclusions

By reviewing prior literature, this thesis examines the impact of investor sentiment on sell-side analysts' earnings forecasts, target prices, and recommendations, as well as their accuracy, informativeness, and value. The thesis concentrates on analysts' outputs during periods of higher investor sentiment. Furthermore, the thesis explores potential reasons behind the impact and examines the role of regulatory measures in mitigating it. Theoretical background is discussed, and relevant literature is used to develop and answer the hypotheses.

Despite analysts' important role in the market, investor sentiment appears to affect their outputs. Prior research indicates that analysts' outputs are associated with investor sentiment. Specifically, during periods of higher investor sentiment, analysts' outputs are more optimistically biased, and their accuracy, informativeness, and value are decreased. In other words, it appears that investor sentiment amplifies analysts' optimistic bias if no other factor explains the associations between them. Therefore, both Hypothesis 1 and Hypothesis 2 are rejected for each of the three: earnings forecasts, target prices, and recommendations. Additionally, particularly analysts' outputs for stocks that are hard to value or hard to arbitrage appear to be more optimistically biased during periods of higher sentiment.

The optimistic bias in analysts' outputs seems to be caused by both cognitive and strategic factors. Moreover, the impact of investor sentiment on analysts' outputs could be a result of analysts' optimism for growth stocks, availability, representativeness, and anchoring. Regulatory measures have reduced the optimistic bias in analysts' outputs. However, analysts' outputs are still optimistically biased, and a part of the optimistic bias appears to be a result of analysts' strategic behavior. Therefore, it might be beneficial to consider whether further regulatory measures could mitigate the impact of investor sentiment and, thus, enhance the objectivity, reliability, accuracy, informativeness, and value of analysts' outputs, for example, in supporting financial decision-making.

Considering the findings of this thesis, analysts should perhaps use more sophisticated valuation methods and fundamental factors instead of utilizing valuation heuristics and incorporating investor sentiment into their analysis. Accounting for the impact of investor sentiment may enhance the usefulness and profitability of analysts' outputs, for example, in different investment decisions and strategies. The findings of this thesis hold relevance for analysts themselves, policymakers, investors, and other entities using analysts' earnings forecasts, target prices, or recommendations. However, carrying out empirical research would allow for more robust conclusions.

Overall, the findings demonstrate the importance of further investigating investor sentiment and its effects on analysts and their outputs. Future research may investigate whether investors understand the impact of investor sentiment on analysts and their outputs and if they consider it and adjust their actions accordingly. Specifically, future research may investigate whether the market reacts differently to analysts' outputs during periods of higher investor sentiment compared to periods of lower investor sentiment. Moreover, future research may also further examine the roles of strategic and cognitive factors in the impact of investor sentiment on analysts' outputs. This might help identify ways to address the issue and assess whether further regulatory measures would be beneficial. Additionally, future research may examine how different regulatory measures affect analysts' outputs and their optimistic bias.

References

- Asquith, P., Mikhail, M. B., & Au, A. S. (2005). Information content of equity analyst reports. *Journal of Financial Economics*, 75(2), 245-282. <https://doi.org/10.1016/j.jfineco.2004.01.002>
- Altinkılıç, O., & Hansen, R. S. (2009). On the information role of stock recommendation revisions. *Journal of Accounting and Economics*, 48(1), 17–36. <https://doi.org/10.1016/j.jacceco.2009.04.005>
- Bagnoli, M. E., Clement, M. B., Crawley, M. J., & Watts, S. G. (2009). The Profitability of Analysts' Stock Recommendations: What Role Does Investor Sentiment Play?. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.1430617>
- Bajari, P. L., & Krainer, J. (2004). An Empirical Model of Stock Analysts' Recommendations: Market Fundamentals, Conflicts of Interest, and Peer Effects. *NBER Working Paper Series*, 10665. <https://doi.org/10.3386/w10665>
- Baker, M., & Wurgler, J. (2006). Investor Sentiment and the Cross-Section of Stock Returns. *The Journal of Finance (New York)*, 61(4), 1645-1680. <https://doi.org/10.1111/j.1540-6261.2006.00885.x>
- Baker, M., & Wurgler, J. (2007). Investor Sentiment in the Stock Market. *The Journal of Economic Perspectives*, 21(2), 129-151. <https://doi.org/10.1257/jep.21.2.129>
- Baker, M., Wurgler, J., & Yuan, Y. (2012). Global, local, and contagious investor sentiment. *Journal of Financial Economics*, 104(2), 272–287. <https://doi.org/10.1016/j.jfineco.2011.11.002>
- Balboa, M., Gomez-Sala, J. C., & Lopez-Espinosa, G. (2008). Does the value of recommendations depend on the level of optimism? A country-based analysis. *Journal of Multinational Financial Management*, 18(4), 405–426. <https://doi.org/10.1016/j.mulfin.2008.02.001>
- Balboa, M., Gómez-Sala, J. C., & López-Espinosa, G. (2009). The Value of Adjusting the Bias in Recommendations: International Evidence. *European Financial Management*, 15(1), 208-230. <https://doi.org/10.1111/j.1468-036X.2007.00421.x>

- Barker, R. G. (1999). The role of dividends in valuation models used by analysts and fund managers. *European Accounting Review*, 8(2), 195–218. <https://doi.org/10.1080/096381899335998>
- Bilinski, P., Lyssimachou, D., & Walker, M. (2013). Target Price Accuracy: International Evidence. *The Accounting Review*, 88(3), 825–851. <https://doi.org/10.2308/accr-50378>
- Bonini, S., Zanetti, L., Bianchini, R., & Salvi, A. (2010). Target Price Accuracy in Equity Research. *Journal of Business Finance & Accounting*, 37(9–10), 1177–1217. <https://doi.org/10.1111/j.1468-5957.2010.02209.x>
- Bradley, D., Clarke, J., Lee, S., & Ornathanalai, C. (2014). Are Analysts' Recommendations Informative? Intraday Evidence on the Impact of Time Stamp Delays. *The Journal of Finance*, 69(2), 645–673. <https://doi.org/10.1111/jofi.12107>
- Bradshaw, M. T. (2002). The use of target prices to justify sell-side analysts' stock recommendations. *Accounting Horizons*, 16(1), 27–41. <https://doi.org/10.2308/acch.2002.16.1.27>
- Bradshaw, M. T. (2004). How Do Analysts Use Their Earnings Forecasts in Generating Stock Recommendations? *The Accounting Review*, 79(1), 25–50. <https://doi.org/10.2308/accr.2004.79.1.25>
- Bradshaw, M. T., Brown, L. D., & Huang, K. (2013). Do sell-side analysts exhibit differential target price forecasting ability? *Review of Accounting Studies*, 18(4), 930–955. <https://doi.org/10.1007/s11142-012-9216-5>
- Brav, A., & Lehavy, R. (2003). An Empirical Analysis of Analysts' Target Prices: Short-term Informativeness and Long-term Dynamics. *The Journal of Finance*, 58(5), 1933–1967. <https://doi.org/10.1111/1540-6261.00593>
- Brown, L. D. (1997). Analyst Forecasting Errors: Additional Evidence. *Financial Analysts Journal*, 53(6), 81–88. <https://doi.org/10.2469/faj.v53.n6.2133>
- Busse, J. A., & Clifton Green, T. (2002). Market efficiency in real time. *Journal of Financial Economics*, 65(3), 415–437. [https://doi.org/10.1016/S0304-405X\(02\)00148-4](https://doi.org/10.1016/S0304-405X(02)00148-4)

- Buxbaum, M., Schultze, W., & Tiras, S. L. (2023). Do analysts' target prices stabilize the stock market? *Review of Quantitative Finance and Accounting*, 61(3), 763-816. <https://doi.org/10.1007/s11156-023-01164-1>
- Clarkson, P., Nekrasov, A., Simon, A., & Tutticci, I. (2020). Target price forecasts: The roles of the 52-week high price and recent investor sentiment. *Journal of Business Finance & Accounting*, 47(9-10), 1365-1399. <https://doi.org/10.1111/jbfa.12497>
- Corredor, P., Ferrer, E., & Santamaria, R. (2013). Value of Analysts' Consensus Recommendations and Investor Sentiment. *Journal of Behavioral Finance*, 14(3), 213-229. <https://doi.org/10.1080/15427560.2013.819805>
- Corredor, P., Ferrer, E., & Santamaria, R. (2014). Is cognitive bias really present in analyst forecasts? The role of investor sentiment. *International Business Review*, 23(4), 824-837. <https://doi.org/10.1016/j.ibusrev.2014.01.001>
- Corredor, P., Ferrer, E., & Santamaria, R. (2019). The role of sentiment and stock characteristics in the translation of analysts' forecasts into recommendations. *The North American Journal of Economics and Finance*, 49, 252-272. <https://doi.org/10.1016/j.najef.2019.04.008>
- Danbolt, J., Siganos, A., & Vagenas-Nanos, E. (2015). Investor sentiment and bidder announcement abnormal returns. *Journal of Corporate Finance*, 33, 164-179. <https://doi.org/10.1016/j.icorpin.2015.06.003>
- Da, Z., Hong, K. P., & Lee, S. (2016). What Drives Target Price Forecasts and Their Investment Value? *Journal of Business Finance & Accounting*, 43(3-4), 487-510. <https://doi.org/10.1111/jbfa.12176>
- Das, S., Levine, C. B., & Sivaramakrishnan, K. (1998). Earnings Predictability and Bias in Analysts' Earnings Forecasts. *The Accounting Review*, 73(2), 277-294.
- Dechow, P. M., & You, H. (2020). Understanding the Determinants of Analyst Target Price Implied Returns. *The Accounting Review*, 95(6), 125-149. <https://doi.org/10.2308/TAR-2015-0265>

- De Long, J. B., Shleifer, A., Summers, L. H., & Waldmann, R. J. (1990). Noise Trader Risk in Financial Markets. *The Journal of Political Economy*, 98(4), 703-738. <https://doi.org/10.1086/261703>
- Del Río, C., Ferrer, E., & López-Arceiz, F. J. (2024). Analyst optimism and market sentiment: Evidence from European corporate sustainability reporters. *Research in International Business and Finance*, 69, 102253. <https://doi.org/10.1016/j.ribaf.2024.102253>
- Easterwood, J. C., & Nutt, S. R. (1999). Inefficiency in Analysts' Earnings Forecasts: Systematic Misreaction or Systematic Optimism? *The Journal of Finance*, 54(5), 1777–1797. <https://doi.org/10.1111/0022-1082.00166>
- Fama, E. F. (1965). The Behavior of Stock-Market Prices. *The Journal of Business*, 38(1), 34. <https://doi.org/10.1086/294743>
- Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *Journal of Finance*, 25(2), 383-417.
- Fama, E. F. (1995). Random Walks in Stock Market Prices. *Financial Analysts Journal*, 51(1), 75-80. <https://doi.org/10.2469/faj.v51.n1.1861>
- Frankel, R., & Li, X. (2004). Characteristics of a firm's information environment and the information asymmetry between insiders and outsiders. *Journal of Accounting and Economics*, 37(2), 229–259. <https://doi.org/10.1016/j.jacceco.2003.09.004>
- Ghosh, A. (2006). The IPO phenomenon in the 1990s. *The Social Science Journal*, 43(3), 487–495. <https://doi.org/10.1016/j.soscij.2006.04.019>
- Gleason, C. A., Bruce Johnson, W., & Li, H. (2013). Valuation Model Use and the Price Target Performance of Sell-Side Equity Analysts. *Contemporary Accounting Research*, 30(1), 80-115. <https://doi.org/10.1111/j.1911-3846.2011.01142.x>
- Grossman, S. J., & Stiglitz, J. E. (1980). On the Impossibility of Informationally Efficient Markets. *The American Economic Review*, 70(3), 393-408.
- Gu, Z., & Wu, J. S. (2003). Earnings skewness and analyst forecast bias. *Journal of Accounting and Economics*, 35(1), 5–29. [https://doi.org/10.1016/S0165-4101\(02\)00095-2](https://doi.org/10.1016/S0165-4101(02)00095-2)

- Hong, H., & Kubik, J. D. (2003). Analyzing the Analysts: Career Concerns and Biased Earnings Forecasts. *The Journal of Finance*, 58(1), 313–351. <https://doi.org/10.1111/1540-6261.00526>
- Hribar, P., & McInnis, J. (2012). Investor Sentiment and Analysts' Earnings Forecast Errors. *Management Science*, 58(2), 293–307. <https://doi.org/10.1287/mnsc.1110.1356>
- Jacobsen, B., & Visaltanachoti, N. (2009). The Halloween Effect in U.S. Sectors. *Financial Review*, 44(3), 437–459. <https://doi.org/10.1111/j.1540-6288.2009.00224.x>
- Jegadeesh, N., Kim, J., Krische, S. D., & Lee, C. M. C. (2004). Analyzing the Analysts: When Do Recommendations Add Value? *The Journal of Finance*, 59(3), 1083–1124. <https://doi.org/10.1111/j.1540-6261.2004.00657.x>
- Jegadeesh, N., & Kim, W. (2006). Value of analyst recommendations: International evidence. *Journal of Financial Markets (Amsterdam, Netherlands)*, 9(3), 274–309. <https://doi.org/10.1016/j.finmar.2006.05.001>
- Kaplanski, G., & Levy, H. (2017). Analysts and sentiment: A causality study. *The Quarterly Review of Economics and Finance*, 63, 315–327. <https://doi.org/10.1016/j.qref.2016.06.002>
- Karadas, S., & Papakroni, J. (2019). Local predictive ability of analyst recommendations. *Review of Financial Economics*, 37(3), 351–371. <https://doi.org/10.1002/rfe.1055>
- Kecskés, A., Michaely, R., & Womack, K. L. (2017). Do Earnings Estimates Add Value to Sell-Side Analysts' Investment Recommendations? *Management Science*, 63(6), 1855–1871. <https://doi.org/10.1287/mnsc.2015.2385>
- Kim, K., Ryu, D., & Yang, H. (2021). Information uncertainty, investor sentiment, and analyst reports. *International Review of Financial Analysis*, 77, 101835. <https://doi.org/10.1016/j.irfa.2021.101835>
- Kolasinski, A. C. (2006). Is the Chinese Wall Too High? Investigating the Costs of New Restrictions on Cooperation between Analysts and Investment Bankers. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.895365>
- Lee, C. M. C., Shleifer, A., & Thaler, R. H. (1991). Investor Sentiment and the Closed-End Fund Puzzle. *The Journal of Finance (New York)*, 46(1), 75–109. <https://doi.org/10.1111/j.1540-6261.1991.tb03746.x>

- Lemmon, M., & Portniaguina, E. (2006). Consumer Confidence and Asset Prices: Some Empirical Evidence. *Review of Financial Studies*, 19(4), 1499–1529. <https://doi.org/10.1093/rfs/hhj038>
- Lim, T. (2001). Rationality and Analysts' Forecast Bias. *The Journal of Finance*, 56(1), 369–385. <https://doi.org/10.1111/0022-1082.00329>
- Malkiel, B. G. (2003). The Efficient Market Hypothesis and Its Critics. *The Journal of Economic Perspectives*, 17(1), 59–82. <https://doi.org/10.1257/089533003321164958>
- McConnell, J. J., & Xu, W. (2008). Equity Returns at the Turn of the Month. *Financial Analysts Journal*, 64(2), 49–64. <https://doi.org/10.2469/faj.v64.n2.11>
- Miwa, K., & Ueda, K. (2016). Analysts' preference for growth investing and vulnerability to market-wide sentiment. *The Quarterly Review of Economics and Finance*, 61, 40–52. <https://doi.org/10.1016/j.qref.2015.11.003>
- Pinto, J. E., Robinson, T. R., & Stowe, J. D. (2019). Equity valuation: A survey of professional practice. *Review of Financial Economics*, 37(2), 219–233. <https://doi.org/10.1002/rfe.1040>
- Piotroski, J. D., & Roulstone, B. T. (2004). The Influence of Analysts, Institutional Investors, and Insiders on the Incorporation of Market, Industry, and Firm-Specific Information into Stock Prices. *The Accounting Review*, 79(4), 1119–1151. <https://doi.org/10.2308/accr.2004.79.4.1119>
- Qian, H. (2009). Time Variation in Analyst Optimism: An Investor Sentiment Explanation. *Journal of Behavioral Finance*, 10(3), 182–193. <https://doi.org/10.1080/15427560903167753>
- Ritter, J. R. (1991). The Long-Run Performance of initial Public Offerings. *The Journal of Finance (New York)*, 46(1), 3–27. <https://doi.org/10.1111/j.1540-6261.1991.tb03743.x>
- Shleifer, A., & Summers, L. H. (1990). The Noise Trader Approach to Finance. *Journal of Economic Perspectives*, 4(2), 19–33. <https://doi.org/10.1257/jep.4.2.19>
- Shleifer, A., & Vishny, R. (1997). The limits of arbitrage. *The Journal of Finance (New York)*, 52(1), 35–55. <https://doi.org/10.2307/2329555>

- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185, 1124–1131.
- Walther, B. R., & Willis, R. H. (2013). Do investor expectations affect sell-side analysts' forecast bias and forecast accuracy? *Review of Accounting Studies*, 18(1), 207–227. <https://doi.org/10.1007/s11142-012-9204-9>
- Womack, K. L. (1996). Do Brokerage Analysts' Recommendations Have Investment Value? *The Journal of Finance*, 51(1), 137–167. <https://doi.org/10.1111/j.1540-6261.1996.tb05205.x>
- Zhou, G. (2018). Measuring investor sentiment. *Annual Review of Financial Economics*, 10, 239-259. <https://doi.org/10.1146/annurev-financial-110217-022725>
- Zweig, M. E. (1973). An Investor Expectations Stock Price Predictive Model Using Closed-End Fund Premiums. *The Journal of Finance (New York)*, 28(1), 67. <https://doi.org/10.2307/2978169>