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Which Analysts Make the Best Stock Recommendations?

- An Analysis on the Swedish Market

Hampus Öberg [a] *Alexander Helge* [b]

Abstract

This paper uses a set of 4566 stock recommendations for companies traded on the Stockholm stock exchange during the five year period 2010-2014 to investigate what factors affect analysts' stock-picking ability. We begin our analysis by using a buy-and-hold strategy to establish the presence of stock recommendation announcement effects and long term over performance. We find average three-day event window abnormal returns of 1.58%, as well as average six-month holding period abnormal returns of 2.54%. Subsequently, we attempt to deepen our understanding of analysts and their working conditions, by posing four hypotheses regarding analyst-level factors that could affect the abnormal returns of their recommendations. *Number of individual stocks covered* has a strong statistically significant impact, with incremental abnormal returns of 0.21% per stock covered, for a six-moth holding period. *Nationality of employer* has no impact on long-term abnormal returns, but there is a significant difference in announcement effects, with 0.8% higher average three-day event-window returns for local firms. However, both of these factors have ambiguous economic interpretations. Recommendations made by *analysts who work in teams* are associated with 2.55% higher abnormal returns for a six-month holding period, with high statistical significance. *Years of experience* has a slightly positive relation to stock-picking ability, but statistical significance is low. These two factors on the other hand, both align with our hypotheses. As a last step, a transition matrix of analyst rankings is created and shows that analyst performance persistence is very low, suggesting that there might not be strong determinants of performance on the analyst level.

Keywords: Stock Recommendation, analyst performance, event study, BHAR, experience, stocks covered, nationality, dual analysts

Tutor: Assistant professor Ramin Baghai

[a]22697@student.hhs.se
[b]22688@student.hhs.se

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1. Introduction

Every year brokerage firms spend an enormous amount of money and effort searching for, analyzing, and publishing information through different research reports and recommendations. Such efforts are conducted in the hopes of earning appropriate profits from underwriting fees, trading profits, or commissions from increased securities trading. The question is whether recommendations actually have any real investment value. Will an investor be better off paying commission and trading on a recommended stock, rather than just investing in the market index? Since analysts use publicly available information for their recommendations, according to the semi-strong version of Fama's (1970) efficient market hypothesis, this information should already be incorporated in security prices. However, Grossman & Stiglitz (1980) point out that in a competitive market, security prices cannot incorporate all public information. If this were the case, information gatherers such as the firms producing stock recommendations would not get compensated for their efforts, which we can assume they are, given their significant presence in today's global financial market.

In the academic world there is evidence pointing in both ways, with some studies finding over performance for recommended stock, and some finding opposite results. In his pioneering study from 1933, Cowles made the first structured approach to evaluating stock recommendations on a larger scale, and found that returns from recommended stocks were lower than those from the average stock traded on the market. However, there are several more recent studies, such as the ones by Womack (1996) and Stickel (1995), which find that recommended stocks actually do outperform the market, especially in the short term. Barber et al. (2001) also finds annual abnormal gross returns, in excess of four percent, but accounting for trading costs diminishes net positive returns to zero. Overall, the current academic literature seems to favor the view that analysts do possess some level of stock-picking abilities, but with limited consensus there are still several aspects left for further exploration of the topic.

Thus, the purpose of our thesis is twofold. First, we aim to thoroughly study stock recommendations on the Swedish market for the period 2010-2014, to establish the existence of announcement effects, and to explore the long-term predictive value of recommendations. Stock recommendations on the Swedish stock market have been studied several times before. Lidén (2006), Gylling et al (2008), Ayob & Raisse (2009), Gleichmann & Stattin (2011), Rinaldo (2012) and Ahl & Hedin (2014) all find varying degrees of abnormal returns in the both the short and long term. These studies all use varying methodologies, scopes, data sources

and timeframes. Thus, in this part, our primary contribution will be in updating and expanding results using a more recent timeframe and bigger data set compared to the aforementioned studies.

Second, we also want to expand on previous research, by investigating the underlying factors of recommendation returns on the analyst level. This topic has previously been studied by Stickel (1995), using cross-sectional regressions with a variety of dummy variables to determine their impact on abnormal returns following recommendations. Most of the factors in his study are on the recommendation- or firm-level, such as strength of recommendation, magnitude of change in recommendation, size of brokerage house and size of the recommended firm. However, he also includes one factor on the analyst level, namely the analyst reputation, as measured by their rating on the yearly All-America Research Team list. According to Stickel's findings, a high reputation is one of the variables that has the largest impact on the announcement effect of a stock recommendation, with first-team All Americans having an eleven-day event window abnormal return that on average is 1.18% higher than non-All-Americans.

Inspired by Stickel, we developed hypotheses regarding four different factors on the analyst level that could potentially be important for the magnitude of recommendation announcement effects and long-term performance. The first hypothesis relates to the number of unique firms covered by the analyst, where analysts who cover fewer stock are expected to be less busy and more focused, thereby generating more accurate recommendations. The second hypothesis regards the nationality of the analyst's employer, where analysts at international brokerages are expected to have bigger announcement effects thanks to a wider audience, but analysts at local brokerages are expected to have a better knowledge about the market where they live and work, and therefore generate higher long-term abnormal returns through the stocks they recommend. Our third hypothesis also relates to analysts' working conditions, specifically if they issue recommendations on their own or together with someone else. Analysts who work in teams are expected to benefit from each other's knowledge, thereby producing more accurate recommendations. Finally, our fourth hypothesis relates to experience, where analysts with more years of experience are expected to have better stock-picking abilities and higher announcement effects. The analysis of these factors has, to the extent of our knowledge, not been performed in previous studies. The analysis will offer more generally applicable insights about stock analysts and their performance, which is the main academic contribution of this thesis.

In order to perform this study, a dataset provided by I/B/E/S of 4566 stock recommendations on the Swedish stock market over the years 2010-2014 was used. We begin by looking at abnormal return for different time-periods, using two models, the market-adjusted return model and CAPM. Next, we use a cross-sectional regression of the variables of interest on the abnormal returns to decide whether our hypotheses should be confirmed or rejected. Finally, we use a transition matrix to analyze analyst performance persistence from year to year.

Regarding the value of analyst recommendations on the Swedish stock market, our main results are similar to those of most existing studies. The results indicate significant abnormal returns for both buy and sell recommendations in the short and medium run, and significant abnormal returns to buy recommendations for a one-year holding period. Our buy-and-hold strategy generates average three-day event window abnormal returns of 1.58%, and average six-month holding period abnormal returns of 2.54%. The strength of the recommendation is important for the magnitude of the abnormal return, and statistically significant for the announcement effect and shorter holding periods, mainly due to higher variance in our longer holding periods. This result was expected, and is intuitive in the sense that a strong recommendation naturally implies a higher conviction and therefore a stronger signal from the analyst.

With regard to the analyst-level factors that were subject to our four hypotheses, the results are less uniform. Our first hypothesis is rejected, since the results show that analysts who cover more firms actually perform better than those who cover fewer ones, with incremental abnormal returns of 0.21% per stock covered for the six-moth holding period. Possible reasons for this result are that more successful analysts are assigned more firms to cover, and that analysts who cover many firms get a broader perspective and better understanding of the market, thereby being able to make better recommendations. The announcement effect of employer nationality also contradicts our hypothesis, with stock recommendations from local analysts generating a 0.8% higher price impact. A possible explanation for this result is that followers of local recommendations sources are more prone to invest in the local market. Regarding the long-term effect, coefficients are positive for international firms, but with no statistical significance. Our third hypothesis is confirmed, with significance on the five percent level for abnormal returns of 2.55% and 4.37% for the six-month and one-year holding periods respectively, indicating that analysts who work in teams

actually do outperform their peers who work alone. The last factor we examine, years of experience, also aligns with our hypothesis. However, it is only significant at the ten percent level for one out of the four holding periods. For the six-month period, experienced analysts are associated with abnormal returns that are 1.26% higher than inexperienced ones.

Finally, the transition matrix shows that analyst performance varies greatly from one year to another, suggesting that there might not be strong determinants of performance at the analyst level.

In the following section we summarize the most relevant previous research on the subject of analyst recommendations. In the third section, we discuss factors affecting stock-picking ability and announcement effects on the analyst level and propose our hypotheses. In section four we describe our data, and in the fifth section the methods used in our analysis are presented. In the sixth part of the thesis we announce our results, and in the seventh section we discuss those results. In the eighth and final section we conclude and summarize our findings.

2. Theoretical Framework

As stated previously, there is a significant amount of previous research on the topic of analyst recommendations, with results varying from study to study. This variation is likely to stem from the differences in geographical areas and timeframes studied, and from the differences in methodologies used. Cowles (1933) pioneering study examined 16 financial services companies and 7500 recommendations on the American market over the years 1928-1932 and found that recommended stocks on average performed 1.46% worse than the market. Since then, several interesting subtopics have emerged.

2.1 Market Efficiency

The efficient market hypothesis (EMH) developed by Fama (1970) states that asset prices fully reflect all available information. The hypothesis is supported by both weak form and semi-strong form tests, implying that asset prices do include historic as well as obviously publicly available information. The strong form however, in which all private information is also reflected, should rather be seen as a benchmark against which deviations of full market efficiency can be judged, according to Fama. Assuming the semi-strong form of market efficiency holds, whether analysts should be able to generate investment value or not comes down to the interpretation of what information can be regarded as obviously public, or maybe rather, if analysts processing and interpreting information can be said to make information more obvious to the public.

Womack (1996) points out the difference between post earnings announcement drift and post recommendation drift, where earnings announcements represent new information, whereas a recommendation is opinion-based and often independent of new information. He claims that analysts use what could be described as obviously public firm-specific information, such as annual reports and earnings announcements in making their recommendations, which under the semi-strong EMH implies that they should lack investment value since no new information is generated.

On the other hand, analysts often have years of education and experience to help them interpret the information on a higher level compared to the average private investor, implying that processing existing information through a recommendation really is a way of generating new information for the market. Grossman & Stiglitz (1980) argue that since brokerage firms

spend hundreds of millions of dollars on information processing for stock analysis every year, in a rational and competitive world they must get compensated for this through underwriting fees, trading profits and commissions, and thus market prices cannot possibly reflect all publicly available information. With this view, one could argue that analysts generate investment value with their recommendations by gathering and interpreting publicly available information, thereby making it more accessible for investors.

2.2 Event Studies and Announcement effects

Announcement effects relate to the presence of abnormal stock returns around the time of a news announcement. The presence of announcement effects around stock recommendations confirms the view that investors see them as sources of new information, which can be traded on.

Stickel (1995) uses a sample of 17000 recommendations on the US market over the years 1988-1991 to conduct an event study. He finds statistically significant abnormal returns for the recommended stocks, primarily around the announcement dates, with an eleven-day (5 days before and 5 days after the event) event window abnormal return of 1.16 and -1.28 percent for buy and sell recommendations respectively. However, Stickel emphasizes that looking only at averages could be misleading, since they are not controlled for earnings forecast revisions and earnings announcements, and they also obscure the factors that influence price reactions. Thus, one of the main contributions of Stickel is his analysis of the underlying factors affecting the size of the abnormal return. Using cross-sectional regressions with a variety of dummy variables, he looks at the impact of the strength of recommendation, magnitude of change in recommendation, reputation of analyst, size of brokerage house, size of the recommended firm and contemporaneous earnings forecast revisions, and overall they have a significant effect on the abnormal return, even though some of his results are not statistically significant. He finds that a strong buy recommendation that skips a rank and is issued by a “first team All-American” employed by a large brokerage house on a small company, which is accompanied by a positive revision in an earnings forecast, generates eleven-day abnormal returns of 4.61%, which is roughly 4 times higher than the average. Stickel’s study was a main source of inspiration for exploring additional underlying factors in this thesis, and in later sections similar methods to his are used to explore importance of nationality of brokerage and number of firms covered by the analyst.

Womack (1996) uses a three-day event window for his study of roughly 1500 analyst recommendations on the US market for the period 1989-1991. He focuses on strong recommendation changes, specifically stocks that are added to either the buy or the sell list, assuming, in line with Stickel's findings, that the magnitude of the change in recommendation is an important factor. He finds significant announcement effects from analyst recommendations, with three-day abnormal returns of 3.3 and -4.3 percent for added-to-buy and added-to-sell recommendations respectively. In concurrence with the results of Stickel, Womack also finds that the market reaction is significantly stronger to recommendations on smaller-capitalization firms. Overall, Womack's results indicate that analysts do possess market timing and stock picking abilities.

Desai et al. (2000) studied 1242 recommendations by the all-star analysts of The Wall Street Journal, during the years 1993-1996. They used a buy-and-hold strategy with a matching company approach for expected returns, and found publication day abnormal returns of 0.42 percent with significance at the one percent level.

Lidén (2006) uses a similar method with 1775 recommendations from six Swedish newspapers and business magazines during the time period 1996-2000. He finds an average (of the two reference investments) three-day event window returns of 1.93 and -1.18 percentages for buy and sell recommendations respectively. He also compares analysts with journalists and finds that the announcement effect is stronger for recommendations issued by journalists, for both buy and sell recommendations.

2.3 Long Term Performance and Post Recommendation Drift

Whereas announcement effects relate to if stock recommendations contain any new market information, the post recommendation drift relates to whether analysts actually have a stock-picking ability.

Womack (1996) finds significant post event recommendation drifts in the direction predicted by the analyst. For buy recommendations, the post recommendation drift is significant on a one-month post event return basis, with abnormal returns of 2.4 percent. For sell recommendations, the drift is longer and larger, with a six-month post event return of -9,1 percent. Stickel (1995) also finds a post recommendation drift, with abnormal returns for up to 60 days after the event for both buy and sell recommendations, in the direction predicted by the analyst. In their Wall Street Journal study from 2000 Desai et al. finds significant post

recommendation abnormal returns of 0.37, 1.77, 4.02 and 6.04 percent for 10, 125, 250 and 500 day post event windows. Additionally, they find that analysts focusing on a single industry outperform those covering multiple industries.

In his article about Swedish Business press, Lidén finds that both buy and sell recommendations generate negative returns on a 6, 12 and 24-month basis, with only the return from the sell recommendations being statistically significant. Overall, previous studies indicate that analysts in many cases do generate value to investors in the long term by being able to correctly identify over- and underperforming stocks.

2.4 Portfolio Building and Transaction Costs

Barber et al. (2001) use a different method when evaluating analyst recommendations. By constructing portfolios based on the consensus of 360,000 analyst recommendations during 1985-1996, the authors show that the most favorably recommended stocks produce positive abnormal returns, while the opposite holds true for the least recommended firms. Buying the stocks with the most favorable recommendations and selling the stocks with the least favorable recommendations can generate annual abnormal gross returns above four percent. However, the rebalancing and frequent trading required to follow these strategies entail high transaction costs, which diminishes the abnormal returns to zero.

Jegadeesh et al. (2004) uses a similar approach. Based on data from the Zack's Investment Research recommendations database for the period 1985-1998, they group stocks into quintiles based on their recommendations. By selling the quintile with the least favorably recommended stocks, and buying the quintile with the most favorably recommended stocks, they generate a 2.3 percent abnormal return with a six-month holding period.

On the Swedish market, Gylling et al. (2008) formed daily rebalanced stock portfolios based on consensus recommendations during the period 2003-2008, and found that analysts do have stock picking abilities and that positive net returns can be achieved even after accounting for trading costs. Ayob & Raisse (2009) on the other hand explore differences in analyst stock picking abilities by sector, using weekly rebalanced portfolios for the years 2000-2008, and find that analysts do not generate any significant abnormal returns after transaction costs. They also find that on the Swedish market analysts perform best in the Consumer Services, Basic Materials, Technology and Health Care sectors.

2.5 Buy/Sell Ratio and the Relationship View

There are often complex relationships between the brokerage houses that produce the recommendations and the companies they cover. Based on interviews at a big Swedish investment bank, Johansson (2007) argues that analyst recommendations can be ambiguous, or even biased, due to analysts' dependency on first-hand information from the management of the firms. Womack (1996) has similar claims, and also states that sell recommendations can harm present and future investment banking relationship, and are thus discouraged by the firm's investment bankers. Furthermore, he points out that a sell recommendation involves higher risks for the analyst's reputation, given their lower frequency and higher visibility. Similarly, Barber et al. (2001) finds only 6 percent sell recommendations in their sample, and Stickel (1995) finds a bare 12 percent sell recommendations in theirs. Supporting this hypothesis is the 7:1 buy to sell recommendation ratio he finds in his data. In a later study by Womack & Michaely (1999) examining recommendations on firms that have recently been taken public by the same bank that issues the recommendation, finds that recommendation by underwriter analysts show significant evidence of bias. On the other hand, Ljungkvist et al. (2006) finds no result that analyst recommendations issued influence the chances of winning underwriting mandates for US 1993-2002 debt and equity offerings.

3. Hypotheses

3.1 Number of Firms Covered

As mentioned in the literature review, Desai et al. (2000) finds that analysts focusing on a single industry outperform those covering multiple industries, and spell out the implication that covering multiple industries could hurt the analyst's ability to perform thorough analysis on any single industry. Taking a slightly different angle, we hypothesize that it's not only the number of industries covered that limits analysts' ability to create in-depth and accurate recommendations, but also the number of unique firms covered. The rationale behind this is similar to that of Desai et al, namely that analysts who cover too many firms have insufficient time to perform thorough analysis on any single stock. Therefore, we expect recommendations of analysts who cover fewer stocks to have better long-term performance. In terms of announcement effects, we don't see any reason why number of stocks covered would have an impact.

H_1: Buy and sell recommendations made by analysts who cover few unique stocks have higher long-term returns than recommendations made by analysts who cover many stocks.

TABLE I

Descriptive Statistics of Number of Unique Firms Covered

This table shows descriptive statistics for different amounts of unique stocks covered by analysts. 58% of the analysts in the sample cover only 1-3 stocks. Analysts who cover many unique stocks are also the ones issuing most recommendations.

Number of firms variable	Number of analysts	Fraction of analysts	Number of rec.	Fraction of rec.	Rec. Per analyst
1-3 firms	376	58%	1049	23%	2,8
4-7 firms	173	27%	1453	32%	8,4
8-12 firms	80	12%	1462	32%	18,3
13 or more firms	17	3%	602	13%	35,4

3.2 Employer Nationality

There are many different types of brokerage houses making stock recommendations on the Swedish market. From our original dataset, the 23 unique firms with the most observations were kept in the sample. Thus they are mainly large players who produce high volumes of recommendations, such as international investment banks and big domestic banks, with a few exceptions. The firms have been divided into two groups, where the firms headquartered in the Nordic region are classified as local, and the other firms are labeled international, the rationale being that the Nordic countries exhibit similar market characteristics to a high extent (see *Table XI* in appendix). Turning to our hypothesis, we think that analysts who live and work in the market they cover are likely to have a better knowledge about that market. This stems from daily exposure to local news and companies active in the area, as well as growing accustomed to accounting culture and the tone and format of stock reports, etc. Thus we think that they could be better at identifying over- and undervalued stocks, which should reflect in higher long-term performance of their recommendations. In the short term however, we think it is likely that the announcement effect generated by international firms is larger. This assumption relates to the fact that international brokerage houses producing stocks on the Swedish market are big, and often have a global reach. Since their recommendations are likely to reach a much wider audience, we expect to see a bigger announcement effect.

> *H_2: Recommendations made by analysts employed at a local brokerage house have higher long-term returns than recommendations made by analysts employed at international brokerages. However, recommendations from international analysts have bigger announcement effects.*

TABLE II

Descriptive Statistics of Local and International Brokerages

In our sample local brokerages are classified as firms headquartered in the Nordic region. Even though there are fewer local brokerages, they issue 75% of all recommendations.

International variable	Number of brokerages	Fraction of brokers	Number of rec.	Fraction of rec.	Rec per brokerage
Local	9	39%	3438	75,3%	382
International	14	61%	1128	24,7%	80,6

3.3 Working in teams

Some of the brokerage houses let their analysts work in teams of two when producing stock recommendations. Our theory is that analysts who can discuss with, get feedback from, and control each other during the process of generating the recommendations, are likely to make more accurate recommendations than analysts who work alone. The announcement effect should not be affected.

H_3: Buy and sell recommendations made by two analysts jointly have higher long-term returns than recommendations made by single analysts.

TABLE III

Descriptive Statistics of Analyst Working in Teams

23% of all the registered analysts in our sample are teams of two. On average they produce less recommendations, perhaps because it takes more time for two people to agree on what to recommend.

Dual analyst	Number of pairs/analysts	Fraction of analysts	Number of rec.	Fraction of rec.	Rec. Per analyst
Yes	150	23%	730	16%	4,9
No	498	77%	3836	84%	7,7

3.4 Analyst Experience

In most professions it holds true that skill, and with it compensation, increase with experience. Ericsson (1993) introduced the 10,000-hour rule, showing that to achieve world-class skill in any given field, about 10,000 hours of training is required. The question is whether producing stock recommendations is actually a skill that can be improved. We hypothesize that it is, and that analysts with more experience produce superior results. Furthermore, we think that the announcement effect could be bigger for experienced analysts, since they have had time to build a bigger network and gain credibility in the industry.

H_4: Buy and sell recommendations made by analysts who have many years of experience have higher long-term returns than recommendations made by analysts who have few years of experience. Furthermore, announcement effects are bigger for experienced analysts.

TABLE IV

Descriptive Statistics of Analyst Experience Levels

The majority of analysts working with stock recommendations are relatively junior, with less than five years of experience. The reason that recommendations per analyst is higher for experienced, comes partly from the fact that all experienced analysts have been in the dataset for all 5 years, in contrary to the inexperienced analysts.

Experience level	Number of analysts	Fraction of analysts	Number of rec.	Fraction of rec.	Rec. Per analyst
Inexperienced (0-5 years)	505	71%	2532	55%	5,0
Experienced (>5 years)	209	29%	2034	45%	9,7

4. Data Description

The Institutional Brokers Estimates System (I/B/E/S) supplied stock recommendation data for the five-year period 2010-2014. I/B/E/S is owned by Thomson Reuters and collects data on consensus and detail forecasts of EPS, cash flows, revenues as well as stock recommendations from over 900 brokerage houses globally. It is a reliable data source, widely used by financial institutions, companies and researchers. Our main data set consists of 4566 recommendations made on 161 unique stocks traded on the Stockholm Stock Exchange (OMXS).

Each recommendation in the database is associated with 19 variables, the most important being issuing date, strength of recommendation, issuing analyst and brokerage house, and an eight-digit company identifier called CUSIP. I/B/E/S records three different date variables: announcement date, activation date and revision date. Announcement date is the variable of interest, providing the date that the recommendation was issued. Activation date is the date that the recommendation was recorded by Thomson Reuters, and revision date is the date the recommendation was confirmed by I/B/E/S. Both are variables of limited interest.

Brokerage houses use a variety of terms to convey their recommendations, all included in the I/B/E/S database. Conveniently, I/B/E/S provides a standardization of the strength of recommendation term to the Thomson Reuters five-point scale of 1. Strong buy 2. Buy 3. Hold 4. Sell and 5. Strong sell, which is used in our analysis. An overview is presented in *Table I.*

TABLE V

Descriptive Statistics of Total Recommendation Sample by Type

Over the years 2010-2014 a total of 4566 recommendations on 161 unique stocks traded on the Stockholm stock exchange (OMXS) were collected by I/B/E/S. Upon collection they were categorized into the Thomson Reuters five-point scale, ranging from Strong Sell to Strong Buy.

Recommendation	Strong Buy	Buy	Hold	Sell	Strong Sell	Total
Frequency	463	1,563	1,760	626	154	4,566
Percent	10.1	34.2	38.6	13.7	3.4	100

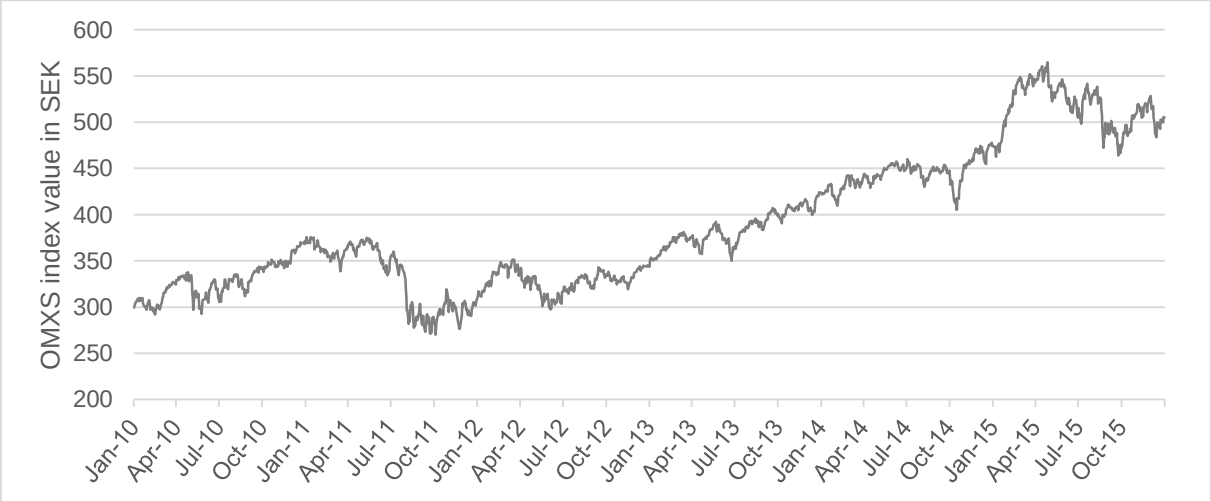
In order to ensure consistency and comparability across our entire dataset, a relatively large amount of observations were dropped due to being issued by brokerage houses with very few recommendations, or being issued by brokerage houses that were impossible to identify. Some companies were dropped in the process of matching CUSIPs with ISIN numbers, and a

few companies were dropped because there was no available stock data. Finally, a few recommendations with announcement dates on weekends or holidays were also dropped, due to lack of available stock data, resulting in a final dataset consisting of 161 different stocks. Daily stock data was then downloaded from the Compustat Global database (2016), which is a source for global fundamental and market information about publicly held companies, owned by Standard & Poor's.

Since all the stocks in our sample trade on the Stockholm stock exchange, a natural candidate for a market portfolio proxy is the OMXS index. Data for this index, which will be used as a benchmark, was retrieved through Thomson Financial's Datastream (2016). The data is used from 2010 to the end of 2015, and during this time period the index rose by almost 70%, as shown in *Figure I*. As a proxy for the risk free rate, we use the daily fixing of the STIBOR Tomorrow/Next interbank lending rate. The data is retrieved from the Swedish Central Bank (2016).

Figure I

The OMXS Price Index Return for 2010-2015



From the I/B/E/S database we have also collected additional data that has subsequently been dropped, in order to generate two of the variables of interest. To generate the variable measuring analyst experience, recommendation data for all stocks in our dataset ranging back to 1992, the earliest year from which data is provided, was collected. This data was used to

record the earliest recommendation date for analysts in our sample, which in turn was used as a proxy for number of years of experience. Furthermore we collected data for 2010-2014 from all other Nordic stock markets (Norway, Denmark, Finland, and Iceland) in order to generate the variable that counts the number of individual firms covered. The reasoning behind this is that many analysts focus on stocks in the entire Nordic region, and thus all markets should be taken into account when trying to measure analyst busyness. As a last part of our data section, a few descriptive statistics are presented in *Table II*.

TABLE VI

Descriptive Sample Statistics by Year

Over the five year time period that we study, a total of 4566 recommendations were made by 647 different stock analysts working for 23 different brokerage houses. The average recommendation was positive, with a value of 0.34, reflecting the uneven distribution of recommendation types depicted in table I.

Year	2010	2011	2012	2013	2014	Whole period
Nr. of recommendations	1039	1114	878	777	758	4566
Average recommendation	0.34	0.44	0.26	0.24	0.39	0.34
Unique Analysts	283	297	276	283	247	647
Unique Brokers	22	23	23	23	22	23

5. Methodology

Analyst recommendations for all stocks on the OMX Stockholm index between 2010 and 2014 have been used to estimate the performance of stock analysts. The abnormal stock performance for five different time periods following the publication of a recommendation have been calculated to see whether analysts generate announcement effects and if they have stock-picking abilities. Subsequently, the abnormal returns were regressed on the variables of interest for our different hypotheses in order to examine what might affect said announcement effect and long term stock picking ability.

5.1 Estimating the Abnormal Return

To investigate the performance of stock recommendations we first have to determine how to define abnormal returns. This is calculated as the excess of the actual return over the expected return:

$$AR_{i,T} = R_{i,T} - E(R_{i,T} \mid X_T)$$

where

$$R_{i,T} = \frac{P_{i,t}}{P_{i,t-1}}$$

In the above formula the daily return is calculated without dividends, in order to match the OMXS price index return, which also excludes dividends. To calculate the abnormal return we, as seen in the formula above, first have to determine what is considered to be the expected normal return. Several approaches are available and used to a varying degree in the literature. One of the simplest methods is the constant mean return model (MacKinlay, 1997) where the expected return is simply the mean return of the security.

The market model (MacKinlay, 1997) on the other hand relates the return of the security to the return of the market, without, however, taking the risk free rate into consideration. This model reduces the variance of the abnormal returns by removing the portion of the return that is related to fluctuations in the market, which in turn can lead to an increased ability to detect event effects. A slightly simpler version of this model called the market-adjusted return model

has been used in the paper. This model can be seen as a restricted market model with beta assumed to be one and alpha zero (MacKinlay, 1997). Another one factor model is the capital asset pricing model, which can also be viewed as a version of the market model. However, the CAPM also takes the risk-free rate into consideration when estimating the alphas and betas. This model has been used in this paper as well.

In addition, multifactor models are sometimes employed to calculate the expected return. One example of a multifactor model is the Fama-French three-factor model. However, the gains from employing multifactor models for event studies are limited, and the reduction in variance of the abnormal return is small (MacKinlay (1997)).

5.1.1 Market-adjusted Return Model

The main model that has been applied in this paper is the market-adjusted return model, where the normal returns are assumed to be the returns of a market index, effectively assuming a beta of one and an alpha of zero for all stocks. The OMX Stockholm equity index (OMXS) has been used to approximate the market return:

$$AR_{i,T} = R_{i,T} - R_{m,T}$$

5.1.2 Capital Asset Pricing Model (CAPM)

The CAPM can be used to calculate the expected return over the risk free rate based on the volatility of the security:

$$E(R_{i,T}) = \propto_i + r_{f,T} + \beta_i(R_{m,T} - r_{f,T})$$

This method has been used in this paper, with the beta estimated by OLS regressions on the excess stock return during the estimation window from 120 to 7 days before the recommendation publishing date. The following regression was performed on daily portfolio returns, risk-free rates and market returns:

$$(R_{i,t} - r_{f,t}) = \propto_i + \beta_i(R_{m,t} - r_{f,t}) + \epsilon_{i,t}$$

The risk-free return have been approximate by the daily fixing of the overnight financing rate (STIBOR T/N), calculated on a daily basis as follows:

$$r_{f,t} = (1 + r_{f,T})^{(\frac{1}{365})} - 1$$

To keep the comparability high between the short-term and long-term studies the same method of estimating the abnormal return has been used in both cases. However, to increase the robustness of the study from changes in estimation methods the study is performed twice, once using the market-adjusted return model and once using the CAPM.

5.2 Return Aggregation Methods

In addition to determining what constitutes the normal return, one faces the choice of how to aggregate returns over time. Two methods are usually considered: the Buy-and-Hold Abnormal Return (BHAR) and the Cumulative Abnormal Return (CAR). For both methods, when calculating returns for sell recommendations, the sign of the abnormal return is reversed, to reflect the fact that a sell recommendation is associated with a short sale of that stock.

5.2.1 BHAR

The geometric summation BHAR is calculated by multiplying returns across *T* periods.

$$BHAR_{i,T} = \prod_{t=-1}^{\mathrm{T}} \left(1 + R_{i,t}\right) - \prod_{t=-1}^{T} \left(1 + E(R_{i,t})\right)$$

The BHAR method, which includes compounding, realizes a more realistic return when compared to the arithmetic summation used in the CAR for studies of long-term performance, as investors in practice rarely engage in daily rebalancing. The BHAR method is not without drawbacks however, but Barber and Lyon (1997) find that overall, BHAR is the preferred method for studying long-term abnormal returns compared to CAR, as the latter is a biased predictor of long-run performance for the former. For these reasons the BHAR methodology has been used in this paper to study the long-term performance of the stock recommendations.

5.2.2 CAR

The arithmetic summation CAR is calculated by adding returns across T periods.

$$CAR_{i,T} = \sum_{t=-1}^{T} AR_{i,t}$$

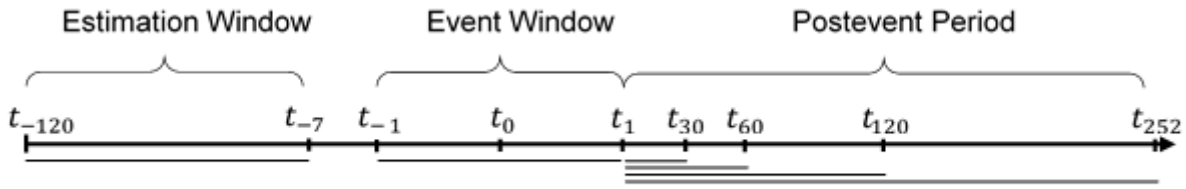
where

$$AR_{i,t} = R_{i,t} - E(R_{i,t})$$

According to Barber and Lyon (1997) this method generates very similar results to the BHAR. For this reason, the BHAR is used consistently throughout this paper, also for the short-term event study, in order to increase the comparability of different time periods. However, in order to verify our results for the event study, regressions with the CAR method was used as well (*Table XIII* in appendix).

5.3 Time Periods

Figure II – Time Periods overview



The time periods studied are 3, 30, 60, 120 and 252 trading days. The shortest time period reaches from the closing price two days before the recommendation is published to the closing price the day after, effectively capturing the stock price change from one day before to one day after the recommendation date. This time period is used to capture the announcement effect of the recommendation. The other time periods cover from the closing price the day before the recommendation and the specified number of days forward, as illustrated in *Figure II*. The closing price the day before the recommendations is announced has been used consistently through the paper as the reference price. One important reason why this has been

done is that over 74% of the recommendations studied are published before the market opens, and part of the announcement effect would thereby be forgone if the opening price at the day of the recommendation was used instead.

5.4 Cross-sectional Regression

Following the methodology used by Stickel (1995) a cross-sectional regression using ordinary least squares (OLS) of the abnormal returns on the variables of interest was used. The regression was performed for the five time periods and for both calculation methods of abnormal return. The main results of the paper are thereby contained in a total of ten regressions with the same four independent variables, as specified below:

$$BHAR/CAR_{i,T} = \beta_0 + \beta_1 NUMBER_i + \beta_2 INTERNATIONAL_i + \beta_3 EXPRIENCE_i + \beta_4 DUAL\_ANALYST_i + \varepsilon_i$$

A dummy variable was included to control for the strength of the recommendation. Yearly dummy variables were also included to control for possible yearly effects, such as the possibility of recommendations on average performing better in boom years. The value of these variables are not reported however, as they are not interesting for our hypotheses.

5.4.1 Variables Used in the Regression

i. ***NUMBER.*** A discrete variable with the value number of different firms for which the particular analyst has produced recommendations during the five years studied. This includes all recommendations given by the analyst on the Nordic markets. This variable is used as a proxy for the busyness of the analyst.

ii. ***INTERNATIONAL.*** A dummy variable taking the value 1 for international brokerage houses and the value 0 for local houses. Local houses include all Nordic brokerage houses, not only the Swedish ones.

iii. ***EXPERIENCE.*** A dummy variable taking the value 1 for analyst with five or more years of experience and the value 0 otherwise. The experience is calculated as the time from the first recommendation in the dataset by that particular analyst to the one considered. Data for the whole time period available from I/B/E/S have been used, ranging from December 1992 until December 2014.

iv. ***DUAL_ANALYST.*** A dummy variable taking the value 1 for recommendations produced by two analysts together and the value 0 for recommendations produced by a single analyst.

5.4.1 Standard Errors

The Breusch-Pagan test for heteroscedasticity was performed on all regression, and is presented in *Table XIV* in the appendix. High significance (highest p-value was 0.029) was found indicating heteroscedasticity in the sample. Therefore White-Huber robust standard errors were used consistently throughout the paper. Furthermore, standard errors clustered by analyst have been used to control for the correlation between recommendations given by the same analysts. These standard errors are also heteroscedasticity robust. We also cluster by other variables, such as broker and year to verify that there are no significant changes to our results or their implications.

5.5 Transition Matrix of Analyst Ranking

By establishing the change in ranking of analysts from one year to another, the stability of analyst performance can be analyzed in an intuitive way. Thus, as a last step in our analysis we created year-to-year transition matrixes for analyst rankings over the whole time period. The analysts that had at least one recommendation for each year in the sample (n=135) were divided into quartiles based on their average BHAR of the four long-term holding periods for each year. Then the rank in the first year was compared with the rank in the following year by listing the fractions of analysts in each quartile for the new years in a matrix, presented in *Figure V* in the results section.

6. Results

6.1 Buy-and-Hold Abnormal Returns of Recommended Stocks

Our results from the buy-and-hold strategy indicate that there are significant abnormal returns associated with following analyst stock recommendations. This holds true for both buy and sell recommendations in the medium term, but for the one-year period accuracy of sell recommendations decreases. For the three-day event window there are significant announcement effects for both buy and sell recommendations.

Our results regarding the information and price effects of analyst recommendations on the Swedish stock market were expected, and reinforce previous research on the topic. Numerical as well as graphic illustrations of our results on this topic are presented in the tables and graphs below.

TABLE VII

Average Abnormal Returns by Time Period and Recommendation Type

This table presents absolute abnormal returns over the 3 day event window and the different holding periods, sorted on recommendation type. This tells us that if you for example bought a strongly recommended stock in our sample and held it for one year, on average you got returns 4.24% higher than the market.

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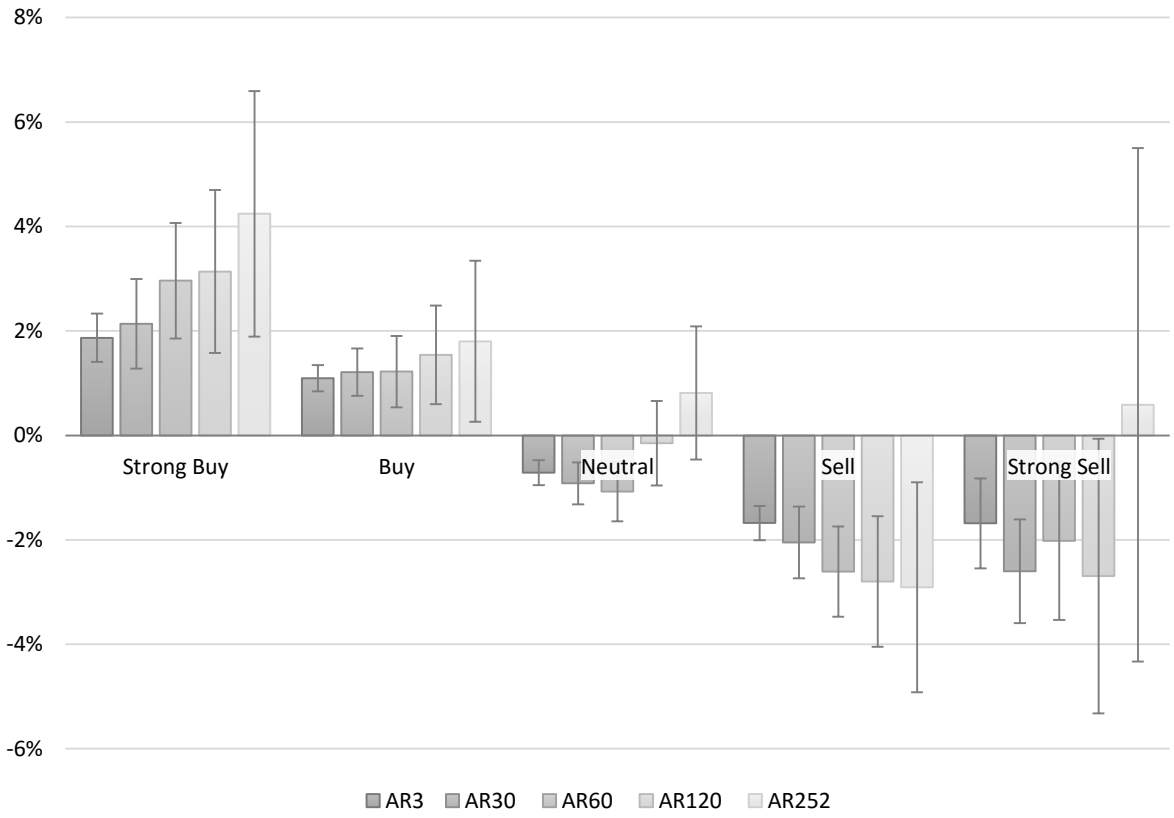
Recommendation type	AR3 (%)	AR30 (%)	AR60 (%)	AR120 (%)	AR252 (%)
Strong Buy	1.87	2.13	2.96	3.14	4.24
Buy	1.09	1.21	1.22	1.54	1.8
Neutral	-0.71	-0.92	-1.08	-0.15	0.81
Sell	-1.68	-2.05	-2.61	-2.8	-2.91
Strong Sell	-1.69	-2.6	-2.02	-2.7	0.59

FIGURE III

Average Abnormal Returns by Time Period and Recommendation Type (95% conf. int.)

This graph presents abnormal returns over the 3 day event window and the different holding periods, sorted on recommendation type. The 95% confidence interval shows that there is substantial variation in for example the one-year holding period strong sell recommendations. Apart from the strong sell observations, there seems to be a clear trend that abnormal returns correlate with length of timeframe.



Based on the averages presented above, there are clear indications that there is a relationship between stock recommendations and abnormal returns, and that the relationship goes in the direction indicated by the type of recommendation. It is also clear that strong recommendations perform better than non-strong ones, and that there are big abnormal returns for the three-day event window. To statistically verify those theories, abnormal returns are regressed on recommendation type, and strength of recommendation is analyzed through a dummy variable, both presented in tables below. Furthermore, compounded abnormal returns are also depicted graphically in *Figure IV,* emphasizing the presence of announcement effects.

TABLE VIII

BHAR Regressed on Recommendation Type, by Time Period

This table shows the regression output for the abnormal returns regressed on the recommendation type variable, ranging from -2 for strong sells, to +2 for strong buys. The results indicate a statistically significant positive linear relationship for all time periods. E.g. for the 60 day BHAR, expect stocks with a sell recommendation to produce abnormal returns that are 1.76% higher than stocks with a strong sell recommendation (Note that AR's are in absolute values, i.e. higher recommendation type value does not necessarily mean higher BHARs, in which short selling is implemented for sell recommendations).

VARIABLES	(1) AR 3	(2) AR 30	(3) AR 60	(4) AR 120	(5) AR 252
Recommendation type	1.23***	1.50***	1.76***	1.83***	1.80***
	(0.0897)	(0.137)	(0.198)	(0.277)	(0.468)
Constant	-0.0613	-0.243	-0.445	0.588	2.44*
	(0.133)	(0.296)	(0.456)	(0.745)	(1.35)
Observations	4,566	4,566	4,566	4,566	4,566
R-squared	0.056	0.027	0.019	0.013	0.008

TABLE IX

Strength of Recommendation Impact on BHAR

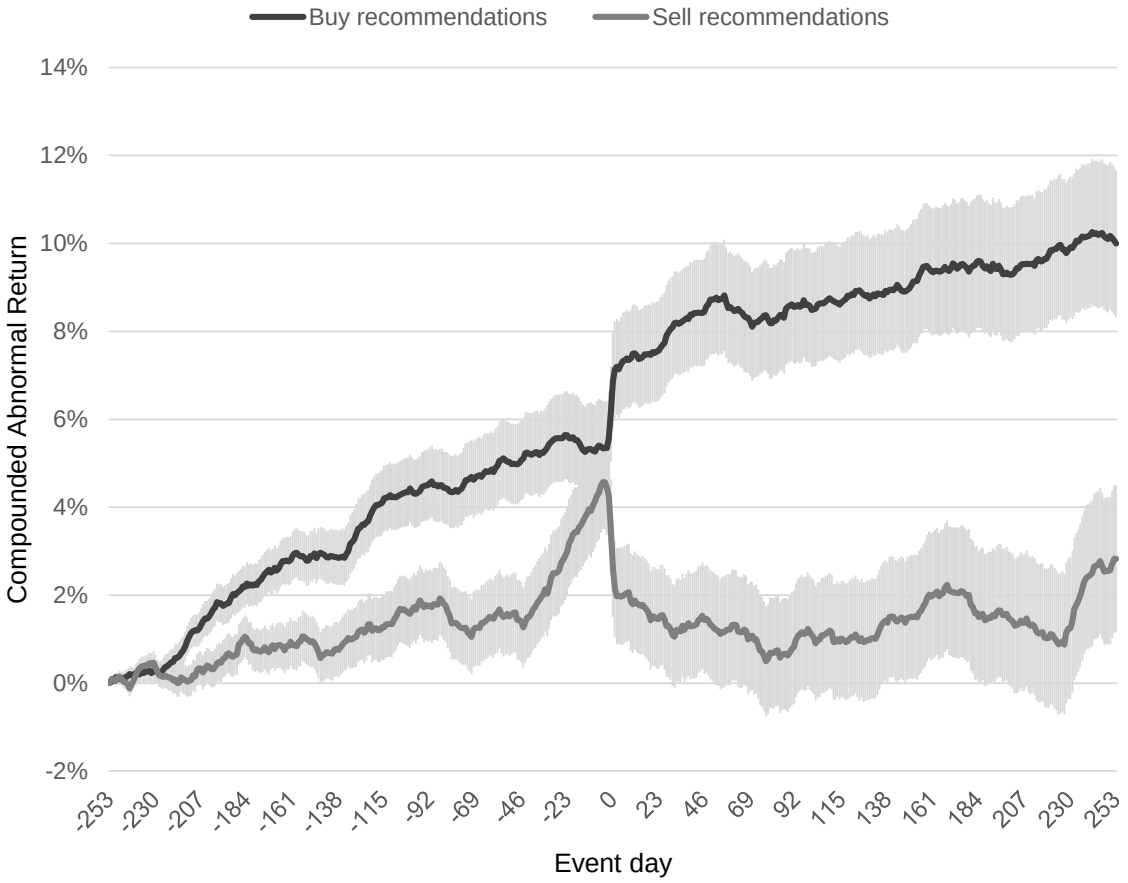
This table regresses BHARs for all time periods on a dummy that takes on the value 1 for strong recommendations and 0 for non-strong ones. Hold recommendations are not included in the regression, hence the lowered number of observations. The strength of recommendation variable is significant in the short to medium term. For the one-month period, strong buy and sell recommendations generated on average 0.77% higher abnormal returns than buy and sell recommendations.

VARIABLES	BHAR 3	BHAR 30	BHAR 60	BHAR 120	BHAR 252
Strong	0.552**	0.767**	1.04*	1.02	0.693
	(0.255)	(0.371)	(0.568)	(0.756)	(1.24)
Constant	1.46***	1.28***	0.886*	0.892	0.342
	(0.176)	(0.375)	(0.527)	(0.757)	(1.22)
Observations	2,806	2,806	2,806	2,806	2,806
R-squared	0.004	0.003	0.004	0.005	0.003

FIGURE IV

Compounded Abnormal Returns for Two Years Around the Event Day (95% conf. int.)

This graph presents compounded average abnormal returns starting at 0 one year before the event day, ending one year after the event day. The announcement effect following the event day is shown by the big increase and drop in compounded return for buy and sell recommendations respectively.



6.2 Factors Affecting Analyst Performance

The main focus of this paper is the analysis of four different factors that potentially have an impact on individual stock analyst's stock picking ability and their announcement effects. Our results, presented in *Table X*, vary in statistical significance from factor to factor, where all of them are significant for at least one time period, as highlighted in the table. The results from using the CAPM model were similar, with slightly lower statistical significance, and is reported in *Table XII* in the appendix. The *Number* variable, relating to number of unique stock covered by an analyst, is the only factor that is statistically significant over all time periods, but it switches sign between the event window and long term holding periods. However, it is important to make a distinction between the short-term event study and the longer holding periods, as they have different economic interpretation. This, along with discussions about each factor and how the results relate to our hypotheses, is presented in the discussion section of the thesis.

TABLE X - Main Results

Analyst Factors and Their Impact on BHAR

By regressing BHAR for different timeframes on our variables of interest, the following results are obtained. Most variables are statistically significant for the announcement effect, but economic meaning is limited. For the longer holding periods results vary from factor to factor, but overall, lack consistency.

VARIABLES	(1) BHAR 3	(2) BHAR 30	(3) BHAR 60	(4) BHAR 120	(5) BHAR 252
Number	-0.0416*	0.0619**	0.125***	0.211***	0.331***
	(0.0222)	(0.0291)	(0.0430)	(0.0644)	(0.109)
International	-0.817***	0.303	0.0698	0.532	2.39
	(0.228)	(0.414)	(0.638)	(0.934)	(1.62)
Dual Analyst	-0.742*	0.591	1.10	2.55**	4.37**
	(0.390)	(0.618)	(0.899)	(1.25)	(2.12)
Experienced	0.123	0.434	0.872	1.26*	1.80
	(0.216)	(0.367)	(0.580)	(0.763)	(1.38)
Strong	0.531**	0.791**	1.05*	1.04	0.828
	(0.255)	(0.368)	(0.575)	(0.774)	(1.30)
Constant	2.04***	0.495	-0.548	-1.69	-4.08**
	(0.316)	(0.557)	(0.848)	(1.18)	(1.89)
Observations	2,806	2,806	2,806	2,806	2,806
R-squared	0.010	0.004	0.008	0.010	0.008

6.3 Analyst performance persistence

Following the analysis of the analyst level factors, we examine the persistence of analyst performance to gain further insights about performance on the analyst level. Looking at *Figure V*, we can see that there are no clear trends whatsoever. If an analyst is ranked in the top quartile one year, they are essentially equally likely to be in any of the four quartiles the following year, indicating extremely low analyst performance persistence.

FIGURE V

2010-2014 Average Analyst Ranking Transition Matrix

This matrix presents analyst performance persistence through the average year-by-year analyst ranking transitions over 2010-2014. For example, if an analyst in year T was ranked in the first quartile based on their average BHAR for the four holding periods, then the probability that they will be ranked in the first quartile again the following year is 26.4% (based on our sample), but it's almost equally likely, 23.3%, that they will be in the last quartile the following year. Total values due not add up to 100 due to rounding.

		Average (%)			
		Quartile Year T+1			
		1	2	3	4
Quartile Year T	1	26,4	25,4	25,4	23,3
	2	24,6	25,1	26,8	23,8
	3	29,0	25,8	23,6	22,0
	4	23,4	20,4	27,9	28,4

7. Discussion

7.1 Buy-and-Hold Abnormal Returns of Recommended Stocks

Our results show that analysts do possess some degree of stock-picking ability, given the statistically significant abnormal returns we observe in our output. The economic values of the abnormal results are quite large. In our sample, stocks with a strong buy recommendation perform on average 4.24% better than the market in one year's time. Perhaps precisely because future abnormal returns are expected, we also observe significant three-day announcement effects, ranging in magnitude from 1.09 to 1.97%.

These result are in line with what has been found in other studies, both in Sweden and abroad, and were expected at the outset of our writing process. Relating our results to the discussion about market efficiency in section two, the prevalence of abnormal returns for recommended stocks indicate that the view presented by Grossman & Stiglitz (1980), namely that information gatherers must be compensated for their efforts in a rational market, probably holds true. In order for brokerage houses to be able to make any money on their recommendations it must be true that in the long run the various clients who pays for their services should expect some investment value from following those recommendations. In terms of Fama's (1970) efficient market hypothesis, this implies that in order for the semi-strong version to hold, analysts' information sources such as annual reports and earnings announcements, cannot be considered obviously public. Physically accessing the information must be considered easy to do for everyone, given that most companies today publish all such information on their websites. Interpreting the information on the other hand, is not as easy for the average investor to do. In this regard, one could claim that for example a company earnings announcement actually is not obviously public information, and then the semi-strong efficient market hypothesis could hold, even in a world where stock analysts' recommendations generate announcement effects and long-term over performance.

7.2 Factors Affecting Analyst Performance

The four hypothesis posed in this paper all relate to factors on the analyst level that could affect short-term and long-term abnormal return of analyst recommendations. It is important to make a distinction between those two effects when analyzing the results of the

regression. The three-day event-window announcement effect shows the market reaction to the recommendation, and reflects how much new information the market reads into the recommendation. The longer holding periods on the other hand, ranging from one to twelve months, relate to how good the analyst is at making accurate recommendations, i.e. their stock-picking ability. Thus, for some of the variables, there is no intuitive economic interpretation for both effects. The economic interpretation of the regressions presented in the results section, as well as the results related to our hypotheses, are discussed for each variable in the sections below.

7.2.1 Long Term Positive Effect of Number of Stocks Covered

The findings suggest that there is a long term positive effect of number of stocks covered. For example, for the one year time period, each additional stock covered by an analyst is associated with a 0.33 percent increase in abnormal returns for recommendations made by that analyst. This finding contradicts our hypothesis, which was that analysts who cover few stocks should have more time to specialize and therefore perform better. Thus, it seems like there might be other opposing elements in play. For example, the dominating factor might be that more successful analysts are assigned a larger selection of firms than less successful ones, which could explain the positive effect of number of firms covered. Alternatively, the positive sign could be explained by analysts covering a broader spectrum of firms developing a more diverse knowledge base, which could give them a competitive advantage over more niched analysts. Whichever the reason, the economic value of the coefficients are quite large for all holding periods, ranging from 0.06 to 0.33 percent per firm covered.

The announcement effect is statistically significant with a negative sign. However, this effect is much more difficult to bestow economic interpretation. We see no reasons why the market should react less to recommendations made by analysts who cover many firms.

7.2.2 Lower Announcement Effect for International Analysts

In the longer term the null hypothesis of equal returns for local and international firms cannot be rejected, and thus we have to reject the part of our H_2 that relates to locals having better market knowledge and thereby picking better stocks. The reason might simply be the lack of such an effect, perhaps because of global accounting and reporting harmonization, and the fact that most analyst research is now done online, leaving little room for geographic specialization. It might also be because due to opposing influences, such as international

brokerage houses being more prestigious and paying higher salaries, thereby attracting analysts with superior skills.

In terms of the announcement effect, it is on average 0.82% lower for international firms. This too is in disagreement with our hypothesis, which was that international banks would have wider reach for their recommendations and thereby generate higher announcement effects. One reason why this does not seem to be the case could be that recommendations published by international firms reach a group of investors that on average are less likely to invest in the Swedish market, whereas the local brokerage houses have more local clients and followers, who are more likely to invest in their local market.

7.2.3 Long-term positive effect of working in teams

Our results indicate a long term positive effect of working in teams. This finding is statistically significant for the two longest holding periods, and economically relatively large, with dual analysts having 2.6 and 4.4 percent higher abnormal returns for six and twelve holding months respectively. This confirms our H_3, which was that analysts who work in pairs should make better long-term recommendations due to being able to use each other's competencies in the research process. The negative announcement effect has limited economic relevance.

7.2.4 Insignificant Long-Term effect of Experience

The experience variable is positive for all holding periods, indicating that our H_4, which stated that analysts with more experience should produce better recommendations, is correct. However, the results are only statistically significant for one of our four holding periods, and only at the ten percent significance level. Additionally, there is no statistically significant announcement effect. Thus, the results are very weak, and should not be considered reliable. Hence, it seems like experience has a very limited effect for stock analysts. The reasons for this might be that analysts use the same techniques for valuing stock, regardless of experience, or that junior analyst's recommendations are checked and approved by more senior analysts before they are published. Another interpretation is that stock picking is not really a skill that you can improve but rather a more or less random selection that anyone could do. This view however, is discharged by our results in the first section, which shows that long-term abnormal returns exist.

7.3 Analyst Performance Persistence

The results indicate that analyst performance persistence is very low, meaning that an analysts who makes the best recommendations one year is not likely to be in the top the following year as well. Desai & Jain (1995) find similar results when studying so called superstar money managers invited to *Barron's* annual roundtable. These money managers were considered the best in the business, i.e. based on recent performance, but on average did not produce abnormal returns through the recommendations made at the roundtable. Hence, it seems like there could be reason to believe that there are not strong determinants of performance on the analyst level. If there in fact were certain factors or characteristics that strongly affected the performance of analysts one would expect to see a much higher persistence in the results matrix. Relating the lack of persistence to the results obtained in the previous section, it makes sense that we do not see persistence when the results for the hypothesized factors are so weak. Take for example one of the most intuitive factors that we analyze, experience. The fact that there is no strong correlation between experience and abnormal returns, on its own gives a strong hint that analyst persistence is likely to be weak. However, if there is no performance persistence on the analyst level, the question that arises is where there is persistence? Since recommended stocks do outperform the market on average, at some level there has to be a source of the outperformance. Whether that source is on the macro level, the firm level, or on some other level, is an interesting topic for future research.

8. Conclusion

The purpose of this thesis was twofold; to thoroughly study stock recommendations on the Swedish market to establish if there are announcement effects, and if recommendations have any longer-term predictive value, as well as to investigate the underlying factors of recommendation returns on the analyst level.

We can now conclude that there are both announcement effects and long-term abnormal returns for recommended stock on the Stockholm stock exchange, and that some analyst-level factors seem to have a statistically significant impact on these. The economic interpretation of the impact however, is in several cases not very clear. The only hypothesis that can be somewhat confirmed is that analysts who work in teams are associated with superior long-term results. The overall uncertainty, along with our results indicating very low analyst performance persistence, could mean that the importance of analyst-level factors for stock recommendations is limited.

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10. Appendix

TABLE XI

Descriptive statistics by brokerage house

This graph presents information relating to the factors which are subject to our hypotheses, by brokerage house. For example, it shows which brokerages are considered to be local, for our International *variable, i.e. the brokerages who are headquartered in the Nordic region.*

	Number of analyst	Recommendations	Average number covered	International	Fraction produced by dual analysts	Average experience (years)
ABG_Sundal_Collier	65	382	6.5	NO	72%	1.5
Bank_of_America_Merril_Lynch	26	88	3.6	YES		4.2
Barclays_Capital	21	81	3.1	YES		1.6
Carnegie	31	418	10.0	NO		7.2
Citi_Investment_Research	22	55	3.3	YES		4.3
Credit_Suisse	30	101	4.0	YES		5.3
DNB_Markets	24	218	11.6	NO		3.4
Danske_Bank_Markets	40	323	5.7	NO	47%	4.1
Deutsche_Bank	27	85	4.5	YES		5.6
Exane_BNP_Paribas	24	58	2.7	YES	9%	3.2
Goldman_Sachs&Co	36	109	5.9	YES		3.1
HSBC	13	57	2.9	YES		2.5
Handelsbanken_Capital_Markets	37	404	9.4	NO		2.5
JP_Morgan	20	60	3.4	YES		3.4
Kepler_Cheuvreux	24	112	6.4	YES	4%	5.4
Morgan_Stanley	29	122	3.9	YES		4.5
Natixis_Securities	10	18	1.3	YES	72%	0.8
Nordea_Markets	33	569	8.9	NO	2%	6.9
Pareto_Securities	28	209	9.3	NO	10%	2.9
SEB_Equities	26	395	7.7	NO		8.7
SG_Equity_Research	12	60	2.7	YES		4.5
Swedbank	74	520	8.1	NO	46%	4.8
UBS	25	122	6.7	YES	9%	4.5

TABLE XII

Analyst Factors and Their Impact on BHAR – CAPM version

By regressing BHAR for different timeframes on our variables of interest, the following results are obtained. This regression shows the results from using the CAPM model instead of the market-adjusted return model. Results are similar, but some variable lose statistical significance.

VARIABLES	(1) CAPM 3	(2) CAPM 30	(3) CAPM 60	(4) CAPM 120	(5) CAPM 252
Number	-0.0300	0.107*	0.234***	0.394***	0.917***
	(0.0221)	(0.0548)	(0.0713)	(0.107)	(0.271)
International	-0.863***	-1.00	-1.19	-0.232	6.45*
	(0.234)	(0.646)	(0.928)	(1.50)	(3.72)
Dual Analyst	-0.492	0.746	1.90	4.76**	11.5***
	(0.386)	(0.965)	(1.34)	(1.95)	(4.16)
Experienced	0.203	0.313	0.839	1.24	-0.0394
	(0.222)	(0.550)	(0.825)	(1.27)	(3.05)
Strong	0.665**	0.682	0.751	0.364	-1.34
	(0.272)	(0.585)	(0.858)	(1.39)	(2.98)
Constant	1.96***	1.40*	-0.326	-2.72	-11.0**
	(0.322)	(0.832)	(1.22)	(1.85)	(4.51)
Observations	2,762	2,762	2,762	2,762	2,762
R-squared	0.011	0.006	0.009	0.009	0.007

TABLE XIII

Analyst Factors and Their Impact on CAR

This graph presents the results of using cumulative abnormal return, CAR, instead of BHAR, for the three-day event window, for the market-adjusted return model. Results are very similar to using BHAR.

VARIABLES	(1) CAR 3
Number	-0.0321
	(0.0211)
International	-0.625***
	(0.214)
Dual Analysts	-0.636*
	(0.361)
Experienced	0.234
	(0.206)
Strong	0.629**
	(0.253)
Constant	1.88***
	(0.305)
Observations	2,806
R-squared	0.010

TABLE XIV

Breusch-Pagan Test for Heteroscedasticity

The R-squared value multiplied with the number of observations give an LM value that is asymptotically distributed as a chi-square distribution with n degrees of freedom under the null hypothesis of homoscedasticity. As can be seen homoscedasticity can be rejected on a 5% significance level for all time periods, and we therefore assume heteroscedasticity for all regressions in the paper.

	BHAR3	BHAR30	BHAR60	BHAR120	BHAR252
Number of observations	2806	2806	2806	2806	2806
R-squared	0,0095	0,0084	0,0101	0,0095	0,0066
Degrees of freedom	9	9	9	9	9
Probability	**0,0016**	**0,0049**	**0,0009**	**0,0016**	**0,029**

FIGURE VI

List of Recommended Stocks in the Sample

This figure presents a list of the 161 unique stocks that were recommended in our data sample.

AAK AB
AB SAGAX
ACANDO AB
ACTIVE BIOTECH AB
ADDTECH AB
AF AB
ALFA LAVAL AB
ARCAM AB
ATRIUM LJUNBERG AB
AVANZA BANK HOLDING AB
AXIS AB
B&B TOOLS AB
BACTIGUARD HOLDING AB
BE GROUP AB
BEIJER ALMA AB
BEIJER ELECTRONICS AB
BEIJER REF AB
BILLERUDKORSNAS AB
BIOGAIA AB
BIOINVENT AB
BIOTAGE AB
BLACK EARTH FARMING LTD
BOLIDEN AB
BONG AB
BUFAB HOLDING AB
BULTEN AB
BURE EQUITY AB
BYGGMAX GROUP AB
CASTELLUM AB
CAVOTEC SA
CLAS OHLSON AB
CLOETTA AB
COM HEM HOLDING AB
CONCENTRIC AB
CONCORDIA MARITIME AB
COREM PROPERTY GROUP AB
CREADES AB
DGC ONE AB
DIOS FASTIGHETER AB
DORO AB
DUNI AB
EAST CAPITAL EXPLORER AB
ELANDERS AB
ELECTROLUX AB
ELEKTA AB
ENIRO AB
EPISURF MEDICAL AB
ERICSSON
FABEGE AB
FAGERHULT AB
FAST PARTNER AB
FASTIGHETS BALDER AB
FENIX OUTDOOR INTL AG
FORMPIPE SOFTWARE AB
GETINGE AB
GHP SPECIALTY CARE AB
GRANGES AB
GUNNEBO AB
HALDEX AB
HENNES & MAURITZ AB
HEXAGON AB
HMS NETWORKS AB
HOLMEN AB
HUFVUDSTADEN AB
HUSQVARNA AB
ICA GRUPPEN AB
INDUSTRIAL & FINL SYSTEMS AB
INDUSTRIVARDEN AB
INDUTRADE AB
INTRUM JUSTITIA AB
INVESTMENTS AB KINNEVIK
INVESTOR AB
INWIDO AB
JM AB
KAPPAHL AB
KAROLINSKA DEVELOPMENT AB
KNOWIT AB
KUNGSLEDEN AB
LAMMHULTS DESIGN GROUP AB
LATOUR INVESTMENT AB
LE LUNDBERGFORETAGEN AB
LIFCO AB
LINDAB INTL AB
LOOMIS AB
LUNDIN PETROLEUM AB
MEDA AB
MEDIVIR AB
MEKONOMEN AB
MELKER SCHORLING AB
MICRONIC AB
MIDELFART SONESSON AB
MILLICOM INTL CELLULAR SA
MQ HOLDING AB
MTG-MODERN TIMES GROUP AB
MUNKSJO OYJ
NAXS NORDIC ACCESS BUYOUT FD
NCC AB
NEDERMAN HOLDING AB
NET INSIGHT AB
NEW WAVE GROUP AB
NIBE INDUSTRIER AB
NOBIA AB
NOLATO AB
NORDNET AB
NOTE AB
OASMIA PHARMACEUTICAL AB
ODD MOLLY INTL AB
OPCON AB
OPUS GROUP AB
ORESUND INVESTMENT
OREXO AB
OSCAR PROPERTIES HOLDING AB
PEAB AB
PLATZER FASTIGHETER AB
POOLIA AB
PRICER AB
PROACT IT GROUP AB
PROBI AB
PROFILGRUPPEN AB
QLIRO GROUP AB
RATOS AB
RAYSEARCH LABORATORIES AB
RECIPHARM AB
REJLERS AB
REZIDOR HOTEL GROUP AB
ROTTNEROS AB
SAAB AB
SANDVIK AB
SCA-SVENSKA CELLULOSA AB
SCANDI STANDARD AB
SECURITAS AB
SEMCON AB
SKANDINAVISKA ENSKILDA BANK
SKANSKA AB
SKF AB
SKISTAR AB
STORA ENSO OYJ
SVEDBERGS I DALSTORP AB
SVOLDER AB
SWECO AB
SWEDBANK AB
SWEDISH MATCH AB
SWEDISH ORPHAN BIOVITRUM AB
SWEDOL AB
SYSTEMAIR AB
TELE2 AB
THULE GROUP AB
TIETO CORP
TRADEDOUBLER AB
TRELLEBORG AB
TRENTION AB
TRIGON AGRICULTURE
UNIFLEX AB
VBG AB
VENUE RETAIL GROUP AB
VICTORIA PARK I MALMO AB
VITROLIFE AB
VOLVO AB
WIHLBORGS FASTIGHET

FIGURE VII

Analyst Performance Persistence – Year-by-Year Transition Tables

This figure presents the yearly transition tables for all holding periods and all years. The average of all 16 tables is presented in Figure V.

BHAR 30

Quartile 2010 \ Quartile 2011	1	2	3	4
1	19	25	31	25
2	20	27	27	27
3	44	19	19	19
4	20	27	27	27

Quartile 2011 \ Quartile 2012	1	2	3	4
1	25	44	19	13
2	33	0	27	40
3	25	13	38	25
4	20	40	20	20

Quartile 2012 \ Quartile 2013	1	2	3	4
1	13	25	50	13
2	27	20	20	33
3	25	44	13	19
4	40	7	20	33

Quartile 2013 \ Quartile 2014	1	2	3	4
1	25	19	19	38
2	33	20	27	20
3	25	31	31	13
4	20	27	27	27

BHAR 60

Quartile 2010 \ Quartile 2011	1	2	3	4
1	19	25	31	25
2	27	27	27	20
3	31	31	13	25
4	27	13	33	27

Quartile 2011 \ Quartile 2012	1	2	3	4
1	25	25	13	38
2	20	40	20	20
3	38	6	50	6
4	20	27	20	33

Quartile 2012 \ Quartile 2013	1	2	3	4
1	38	25	13	25
2	13	20	40	27
3	25	31	31	13
4	27	20	20	33

Quartile 2013 \ Quartile 2014	1	2	3	4
1	25	13	25	38
2	40	27	7	27
3	31	38	19	13
4	7	20	53	20

BHAR 120

Quartile 2010 \ Quartile 2011	1	2	3	4
1	25	13	31	31
2	13	47	20	20
3	31	13	38	19
4	33	27	13	27

Quartile 2011 \ Quartile 2012	1	2	3	4
1	13	31	44	13
2	27	20	13	40
3	38	31	6	25
4	27	13	40	20

Quartile 2012 \ Quartile 2013	1	2	3	4
1	25	31	31	13
2	20	13	40	27
3	19	31	19	31
4	40	20	13	27

Quartile 2013 \ Quartile 2014	1	2	3	4
1	19	25	25	31
2	33	27	27	13
3	31	31	6	31
4	20	13	47	20

BHAR 252

Quartile 2010 \ Quartile 2011	1	2	3	4
1	38	31	6	25
2	13	40	33	13
3	25	25	19	31
4	27	0	47	27

Quartile 2011 \ Quartile 2012	1	2	3	4
1	38	19	19	25
2	7	27	47	20
3	38	19	31	13
4	20	33	7	40

Quartile 2012 \ Quartile 2013	1	2	3	4
1	38	25	31	6
2	27	27	27	20
3	25	25	13	38
4	13	20	33	33

Quartile 2013 \ Quartile 2014	1	2	3	4
1	38	31	19	13
2	40	20	27	13
3	13	25	31	31
4	13	20	27	40