



# Do Analysts Provide Value-Added Information to Private Investors?

- An Event Study On Analysts' Recommendations concerning the Danish Stock Market

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## Abstract

The study analysed the price behaviour of stocks recorded under Børsens Aktiepanel in the Danish business magazine *Børsen*. These stocks make up the components of the *KFX*-index, which serves as the main index for the Danish stock market. No significant abnormal return was observed during the 6-day event period when either a new "strong buy" or a new "sell" recommendation was published. Significant positive abnormal returns were noticed in the post-sell recommendation period. At the same time the *KFX* index yielded a positive return. This means that analysts' recommendations concerning the observed stocks surrounding the event day did not seem to offer any value to investors. "Sell" recommendations served as contrarian signals in the long term. "Buy" recommendations never offered any value in excess of market index return. According to the results of this study, analysts on the Danish market do not have timing abilities.

## Ágrip

Greinin er byggð á rannsókn sem gerð var á danska hlutabréfamarkaðinum, þar sem álit greiningardeilda sem birtast vikulega í danska viðskiptablaðinu *Børsen* eru skoðuð. Þau hlutabréf sem gefið var álit tilheyra öll *KFX* vísitölunni sem er sambærileg við úrvalsvísitölu íslenska hlutabréfamarkaðarins. Niðurstöður rannsóknarinnar sýna að engin óvanaleg ávöxtun á bréfunum varð fyrstu þrjá dagana fyrir og eftir atburðinn sem var til skoðunar. Hins vegar var merkjanleg umfram ávöxtun á bréfum eftir að þau höfðu verið merkt "selja" af greiningaraðilum. *KFX* vísitalan hækkaði jafnframt á þessum tíma. Þetta gefur til kynna að breyting á ráðgjöf greinaraðila hafði engin áhrif til skamms tíma. Til langs tíma hefðu fjárfestar hins vegar getað notið umfram ávöxtunar með því að fara á móti ráðleggingum greiningaraðila. "Kaup" ráðlegging gaf aldrei af sér umfram ávöxtun, hvorki til skamms eða langs tíma.

*JEL-flokkun: C12, C22, G20.*

*Lykilhugtök: Analysts, stock recommendations, contrarian signal, abnormal returns.*

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## 1 Introduction

The Danish stock market has a small market capital value but it is nonetheless a very active market and closely followed by financial institutions and the media. The business paper *Børsen* is to the Danish market what the *Financial Times* and the *Wall Street Journal* are to the UK and the USA, respectively. The *Børsen* website gives subscribers an overview of the weekly change in analysts' recommendations. The change of recommendations takes place on a Wednesday but an overall list with the recommendations is published in the Friday edition. In this event study it is important to note that reference to publication day or the event day (0) is based on the Wednesday information.

Børsens Aktiepanel consists of 20 stocks that comprise the *KFX* index<sup>2</sup> which is the main index of the Danish stock market and serves a similar purpose as the *CAC 40* index in France or the *FTSE* index in the UK. This event study aimed to find out whether analysts can pick stocks among the *KFX* index that outperform the index's return.

The Aktiepanel consists of 12 leading investment institutions<sup>3</sup> that operate in the Danish market and the recommendations are aimed to serve as an investment guide for up to six months after they have been published (*Børsen*). The stocks in the Aktiepanel are not all covered by the same investment institution and some stocks enjoy more coverage than others. This event study also only dealt with "strong buy" and "sell" recommendations, i.e. the most extreme recommendations given. This means that all recommendations in between were disregarded, similar to the study of Womack (1996). The main difference is that the Womack study also included panels for "removed from sell" and "removed from buy" recommendations. There is an opportunity for further studies to include these criteria in studies of the Danish stock market. The motive of the present event study is to add knowledge about the Danish stock market.

## 2 Data

The data consist of stocks of firms in the *KFX* index that all trade on a regular basis. Not all stocks were eligible for the comparison for various reasons. First, some stocks were not traded on every single day of the event window, which automatically defaulted them according to event study methodology. Secondly, data were missing for some stocks regarding the recommendations. Recommendations had to reach back to at least the beginning of August 2002 to qualify for the study but some stocks had only recently been added to the composite recommendation list. Lastly, one of the stocks had gone

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<sup>2</sup> *KFX* is the Copenhagen Stock Exchange's leading share index. The index comprises the 20 most actively traded shares of the preceding six-month period. *KFX* is a tradeable index on which futures and options are issued.

<sup>3</sup> The financial institutions are: Danske Equities, Nordea Securities, Amagerbanken, Amtssparekassen Fyn, Jyske Bank, Handelsbanken Securities, Carnegie, Alm. Brand Bank, Finansbanken, Deutsche Bank, Enskilda Securities, Spar Nord.

through a merger, which makes any comparison between recommendations difficult. That left thirteen stocks out of a total twenty that fit the requirements for the event study.

Analysts' recommendations were taken from the Børsen Aktiepanel and included information published on a weekly basis, from the 8th of August 2002 to the 4th of May 2005 - in all 674 observations. Of the stocks included in the study there were 3 from the transport industry, 2 represent the food industry, 2 are from the medical industry, 2 pharmaceutical stocks were included, one telecom equipment stock, one telecommunications stock, one bank stock and one facility service company stock. The total number of "buy" recommendations was 21 and 13 "sell" recommendations. The total number of recommendations was only 34, which is a very low number for such an event study.

Information about stock prices and the *KFX* index was taken from the *Euroinvestor* website.<sup>4</sup> All prices were end-of-day stock prices adjusted for dividends and splits. Returns were calculated as the difference between day-to-day closing prices. Stock prices for every single day were collected from the 8th of August 2002 to the 4th of May 2005. An effort was made to gather information on both recommendations and stock prices prior to the 8th of August 2002 but it turned out that thin stock trading was an even bigger problem before that time, which would have eliminated even more stocks from the event study. Prior to the 8th of August 2002 changes had also been made to the list of recommended stocks in the Børsen Aktiepanel (accordingly with change of elements in the *KFX* index) that would have ruled out comparison with the current list.

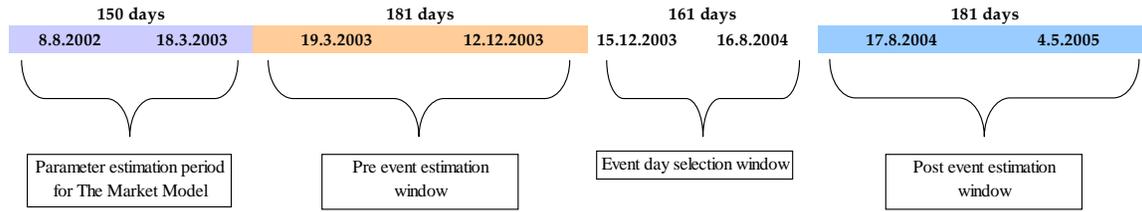
### 3 Methodology

The stock price reactions to the event of an analyst's change in recommendation were tested for the short and longer term. A standard event study methodology was developed, influenced by the Womack (1996) as well as Mathur and Waheed (1995) papers and using the methodology of Fama, Fisher, Jensen and Roll (1969). The event study was as follows:

First, there was a "clean" period of 149 days or the period from the 8th of August 2002 to the 18th of March 2003. This was the parameter estimation period where parameters of The Market Model were found, using standard linear regression. Second, there was the event day selection window. An event (publication of a recommendation) could take place in the 162 day period from the 15th December 2003 to the 16th of August 2004. This left room for a pre-event estimation window and a post-event estimation window that each extended a minimum of 180 days. This can also be explained graphically:

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<sup>4</sup> [www.euroinvestor.dk](http://www.euroinvestor.dk)



## 1. Graphical Outline of The Event Study Methodology

The event study's aim was to find if investors could enjoy abnormal returns by following the analysts' advice and to compare the returns from recommended stocks to the returns from the *KFX* index. First, it was necessary to calculate the "normal" or expected return  $E[R_{jt}]$  for each firm  $j$  and each day  $t$  in the event window, followed by a calculation of the abnormal return  $AR_{jt} = E[R_{jt}] - R_{jt}$ , where  $R_{jt}$  is the actual return of a firm  $j$ 's stock on day  $t$ . The ultimate computation gave a Standardized Abnormal Return (*SAR*) for each observation and for every day in the event window. Plainly speaking, the *SAR* is equal to the *AR* divided by (or standardized by) the standard deviation of risk. To do this it is necessary to use the following formula taken from Seiler's book *Performing Financial Studies* (Seiler, 2003):

$$SAR_{jt} = \frac{AR_{jt}}{\sqrt{S_{AR_{jt}}^2}}$$

where:

$SAR_{jt}$  *SAR* for observation  $j$  at time  $t$ .

$AR_{jt}$  *AR* for observation  $j$  at time  $t$ .

$\sqrt{S_{AR_{jt}}^2}$  square root of the variance of the *AR* for observation  $j$  at time  $t$ .

The formula for the variance is given by the following equation:

$$S_{AR_{jt}}^2 = \left( \frac{\sum_{t=-674}^{-494} (AR_{jt (est. period)} - \overline{AR}_{j (est. period)})^2}{D_j - 2} \right) * \left( 1 + \frac{1}{D_j} + \frac{(R_{mt (event window)} - \overline{R}_m (est. period))^2}{\sum_{t=-674}^{-494} (R_{mt (est. period)} - \overline{R}_m (est. period))^2} \right)$$

where:

$S_{AR_{jt}}^2$	variance of the AR for observation $j$ at time $t$ .
$AR_{jt} (est. period)$	AR for observation $j$ at time $t$ over the estimation period.
$\overline{AR}_j (est. period)$	mean AR for observation $j$ at time $t$ over the estimation period.
$D_j$	number of observed trading day returns for observation $j$ over the estimation period.
$R_{mt} (event window)$	return on the market (KFX) at time $t$ over the event window.
$R_{mt} (est. period)$	return on the market (KFX) at time $t$ over the estimation period.
$\overline{R}_m (est. period)$	mean return on the market (KFX) at time $t$ over the estimation period.

Please take note that in this event study the term "observation" is used for what usually would be "firm". The reason for this is that the event study included multiple events for every firm rather than just a single event (recommendation change) for every firm.

### 3.1 The Market Model

The Market Model is the most popular method used for calculating expected returns. For every firm's stock a linear connection is observed for the coefficients alpha and beta to estimate the expected return. This gives the following equation:

$$AR_{jt} (event window) = R_{jt} (event window) - \alpha_j (est. period) - \beta_j (est. period) \cdot R_{mt} (event window)$$

where:

$AR_{jt} (event window)$	AR on observation $j$ for each day in the event window.
$R_{jt} (event window)$	return on observation $j$ for each day in the event window.
$\alpha_j (est. period)$	intercept term for stock $j$ measured over the estimation period.
$\beta_j (est. period)$	slope term for stock $j$ measured over the estimation period.
$R_{mt} (event window)$	return on the market for each day in the event window.

The event study dealt with multiple overlapping event windows from different stocks and therefore abnormal returns were averaged across events for each day  $t$ . This means that the event day (0) had to be synchronized for observations that took place on different days. An example explains this a bit better. There were two "buy" recommendations for the same company, one on the 3rd of July 2004 and the other on the 10th of August of the same year. The abnormal return for each of these days was calculated to a maximum of 180 days forward and 180 days backwards. The event days were then synchronized as if they had happened on the same chronological day, and the averaged abnormal return was calculated.

### 3.2 Testing the Model

According to the null hypothesis ( $H_0$ ) the SAR equals zero if the event (the recommendations) has no impact for investors. It is assumed that return,  $R_{jt}$ , is independent and identically normally distributed. It is also assumed that residuals, or the abnormal returns, are identically and independently normally distributed. The average standard abnormal return was used in the event study for comparison over a short period of time only, i.e., to find whether a standard abnormal return during the six surrounding days before and after the event was statistically significant. For longer term study (60, 120 and 180 days) the Cumulative Standardized Abnormal Return (CSAR) was used. But before this calculation is possible it is necessary to calculate the Total SAR (TSAR) and the TSAR Z-statistic to give the TSAR  $p$ -value that indicates whether or not the result is statistically significant. As the name indicates, the TSAR is the aggregate standardized abnormal return on each day for all the observations. The formula for the Z-statistic is given by:

$$Z - statistic_t = \frac{TSAR_t}{\sqrt{\sum_{j=1}^N \frac{D_j - 2}{D_j - 4}}}$$

where:

$Z$ -statistic <sub><math>t</math></sub>	Z-statistic for each day in the event window.
$TSAR_t$	TSAR for each day in the event window.
$D_j$	number of observed trading day returns for firm $j$ over the estimation period.
$N$	number of firms in the sample.

## 4 Empirical Results And Conclusions

The results from the study are presented in figure 2. The overall short-term results show that there was no statistically significant relationship between the abnormal return and the event day. The six day period surrounding the event day showed no significant relationships for either "buy" or "sell" recommendations. This is a strong indicator that when analysts for the Danish market go bullish or bearish in their analyses their opinions do not have a sudden influence on the stock market. This result is unlike the results of many similar studies that have been carried out. The conclusion from this is that Danish investors do not believe in finding any "new" information involved in the change of recommendation. This is not very surprising since the analysts' recommendations are officially suggested on the Børsen Aktiepanel as a prognosis for a 6 month period and not a 6 day period.

The long-term effect is much clearer. For "buy" recommendations, there was no significant abnormal return to be found after the event day. This means that if an

investor had followed a new publication of a "buy" recommendation, he would not have outperformed the *KFX* index for the next 180 days. But there was significant abnormal return to be found in the 60 and 120 day periods prior to the publication day. This means that approximately 2 to 4 months before an analyst changed his recommendation to "buy" for a certain stock, the same stock had outperformed the *KFX* index significantly with 95% certainty, by 0.63% in the 60 day period and by 2.58% in the 120 day period.

Abnormal Returns for *BUY* recommendations

<i>Panel A</i>			
Window			
a. Short-term Performance, N=21	Average SAR <sup>d</sup>	z-stat <sup>c</sup>	Average KFX index return
-3	0.24%	0.10	-0.15%
-2	0.11%	0.50	-0.11
-1	0.19%	-0.86	0.55%
<i>0 (Publication day)</i>	0.22%	1.00	-0.09%
1	-0.06%	-0.29	0.29%
2	0.16%	0.71	0.20%
3	0.14%	0.62	-0.01%
b. Long-term Performance, N=21	CSAR <sup>a</sup>	z-stat	C KFX return <sup>b</sup>
Prior 180 days	5.92%	0.53%	9.62%
Prior 120 days	2.58%	2.25**	4.98%
Prior 60 days	0.63%	2.09**	1.02%
<i>Publication day</i>	0.22%	1.00	0.29%
Post 60 days	1.00%	0.89	1.64%
Post 120 days	1.77%	0.47	7.60%
Post 180 days	2.32%	0.49	18.89%

Abnormal Returns for *SELL* recommendations

<i>Panel B</i>			
Window			
a. Short-term Performance, N=13	Average SAR <sup>d</sup>	z-stat <sup>c</sup>	Average KFX index return
-3	0.24%	-0.05	-0.16%
-2	0.11%	0.69	0.00%
-1	-0.19%	-0.25	0.17%
<i>0 (Publication day)</i>	0.22%	0.33	0.17%
1	-0.06%	-0.48	0.35%
2	0.16%	0.60	0.36%
3	0.14%	0.50	0.54%
b. Long-term Performance, N=13	CSAR <sup>a</sup>	z-stat	C KFX return <sup>b</sup>
Prior 180 days	7.75%	0.54	6.48%
Prior 120 days	5.76%	0.98	0.28%
Prior 60 days	3.43%	16438,00	-1.79%
<i>Publication day</i>	0.22%	0.33	0.17%
Post 60 days	3.18%	2.55***	4.20%
Post 120 days	4.82%	2.62***	15.54%
Post 180 days	4.85%	2.40**	23.14%

\*Significant at  $\alpha=0.1$ \*\*Significant at  $\alpha=0.05$ \*\*\*Significant at  $\alpha=0.01$ 

a= Stands for Cumulative Standardized Abnormal Return

b=Stands for Cumulative KFX Return

c=The null hypothesis is that Av.SAR returns are equal zero

d= Stands for Standardized Abnormal Return

## 2. Results from The Event Study On The Danish Stock Market

The long-term effect for "sell" recommendations was even more remarkable and adds evidence to the belief that analysts' recommendations serve as a contrarian signal for investors. In the 180, 120 and 60 days prior to the event of a "sell" recommendation there was no abnormal return to be gained from the recommended stocks. The table also reveals that abnormal return for the "prior-sell" period showed a positive abnormal return which was always above similar returns for the "prior-buy" period. This gives a hint that stocks with higher positive returns prior to the event were more likely to be branded a "sell" rather than a "buy". This tells us that analysts were not afraid to put a "sell" label on stocks that had been showing decent returns. For the long-term "sell" recommendations, a positive abnormal return of 3.18%, 4.82% and 4.85% for the post 60, 120 and 180 days respectively was discovered, where the 60 and 120 days results were significant with a 99% level of certainty. This means that not only were the results after the "sell" recommendations positive and not negative, but that an investor that bought according to a "sell" advice was worse off than if he had bought stocks according to a "buy" advice. The result was that the analysts' recommendations were not only misleading to investors but that investors who followed the strategy of using analysts' advice as a contrarian signal would have gained significant abnormal returns.

Pay special attention to how the *KFX* index developed during the event period. If we only look at the long-term effect we find that the index had a 9.62% prior 180 days return for "buy" recommendations and 6.48% return in the prior 180 days "sell" period. The post 180 days period for "buys" and "sells" are much higher or 18.89% and 23.14%, respectively. This tells us that the market experienced at least more than twice the return in the post era than in the prior era, meaning that any analyst on the sell side given the publication day was not showing any "timing-of-the-market" ability.

The result of the event study on the Danish market supports the view that private investors should use analysts' recommendations as a contrarian signal. The result also opens the door for the view of Jegadeesh, Kim, Krische and Lee (2002) that a change in opinion is more important than the level of opinion: "When selecting among firms with unfavorable quantitative signals, it is better to invest against analyst recommendation than to invest according to these recommendations". The result also collides with the findings of Womack (1996), Bjerring, Lakonishok and Vermaelen (1983) and Jegadeesh et al. (2002) in which studies usually reveal a significant abnormal return surrounding the event day, which was not the case in the study of the Danish market. It is also interesting to see that the Buy-to-Sell ratio was considerably lower than in many similar studies that usually have about 7 "buys" to every

"sell". Analysts in Denmark seem to be unafraid to make "sell" recommendations and therefore "sell" and "buy" recommendations are more balanced. For example when the analysis of the data for this event study took place, one stock had a new "buy" and a new "sell" recommendation for exactly the same day. So not only did analysts totally disagree about whether investors should buy or sell the stock, they disagreed on the exactly the same day!

The problem of few observations in the sample should be pointed out. For the "buy" recommendations there were only 21 observations and for the "sell" recommendations 13. Similar studies on the USA or European markets usually include hundreds of observations that give a stronger hint about the value of the research. The reader must also have in mind that it is not possible to view abnormal returns for single stocks only where the abnormal returns are overlapping and cannot be treated as independent. On the other hand, it is important to be able to make studies of this kind on markets as small as the Danish one.

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