

ANALYSTS' INFORMATION INFLUENCE ON THE DYNAMICS OF STOCK PRICES

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Abstract. The interrelationship of ratings provided by analysts and the dynamics of stock prices is analysed in the article. The paper covers how positive and negative evaluations provided by analysts influence the stock rate of a company. Theories elucidating the factors that effect fluctuations of stock prices, systems of analytic ratings of companies, and particularity of their practice are examined in this paper; moreover the methods of stock price evaluation are also compared in the article. The aim of the paper is to establish dependence between information presented by analysts with the stock prices dynamics. The investigation is based on studying historical data of stock prices fluctuation and using statistical data analysis method. After analysis of theoretical and practical aspects of investments in the stock market it is shown that stock prices modify more than ordinarily when analysts provide either positive or negative recommendation, i.e. investors react to the changes of ratings made by analysts.

Keywords: analysts' estimations, effective market hypothesis, fluctuation of prices, fundamental analysis, large cap companies, market anomalies, stock market, technical analysis.

1. Introduction

One of the most important sources of success investing in financial markets is analysis of stock market prices fluctuations. Majority of investors base their decisions on the opinion of financial analysts about future market trends and about financial perception of activities of investigated companies.

There is no common opinion regarding benefit of such information. Effective market hypothesis states that investors competing for high profits set up "correct" prices. Effective market hypothesis estimates that investors are rational, but not estimates that the market itself acts rationally too. This theory not includes that market could predict future as well, but includes that the future is projected objectively in the market (Ritter 2003).

There are two meanings of rationalism in the effective market hypothesis: market participants accurately overtake and understand all new information; market participants make decisions about prices maximizing their own benefit.

Thus, effective market hypothesis affirms that all news are already estimated in the prices of securities, companies' ratings changed by analysts should not influence stock prices of these companies (Fama 1970). It is asserted that this is not a novelty. This theory influences a lot of discussions both on practical and theoretical levels. Professional investors and scientists present very controversial estimations. Investors not always can name what the sense is of provided recommendations by analysts and what influence on stock price have information spreader. So, authors Barber, Lehavy,

McNichols, Trueman (2001), Roberts (1959), Kendall (1953) and many others pay much attention to various aspects of this problem.

Estimating influence of analysts' information on fluctuation of stock prices it is important to review the theories that explain the influence of financial markets on stock prices and to analyse rating systems of rating companies too.

The aim of this paper is to establish relation between information about changes in ratings provided by analysts and its influence on companies' stock prices. The investigation based on following methods: analysis of scientific literature, logic and systematic analysis, analysis of statistical data.

2. Theories explaining the influence of financial markets on stock prices

In recent decades a series of theories have been formed trying to explain factors making an influence on fluctuations of financial assets and one that is mentioned especially often – it is effective market hypothesis.

Effective market hypothesis became contradictory after ascertainment that capital market is affected by various anomalies: January effect established by Rozeff and Kiney (1976), weekend effect described by Fama and French (1980), S&P index effect expressed by Shleifer (1986) and many others.

Girdzijauskas and Štreimikienė analyze economic bubbles and their possible causes and tools for the prediction of such bubbles development (Girdzijauskas and Štreimikienė 2009). They focus on well-known and widely discussed bubbles in

asset markets and compare it trying to define the main features, causes and signals of such bubbles creation: Dotcom, Telecom, Health South Corporation, NASDAQ, etc. by applying the logistic growth model predicting the bubbles creation as a result of growth satiation in the conditions of limited resources.

Jarrett and Schilling test the random walk hypothesis in the German daily stock prices (Jarrett, Schilling 2008). Their results show that the time series of daily stock returns for a stratified random sample of German firms listed on the stock exchange of Frankfurt exhibit unit roots and that one may predict changes in the returns to these listed stocks. These time series exhibit properties which are forecast able to provide the intelligent data analysts' methods to better predict the directive of individual stock returns for listed German firms.

Anomalies show the deviation from specific theoretical models and economic interpretations but do not deny them. I.e. return on investments is influenced by much more factors than they are investigated. Anomalies in stock markets are not constant. Many of them have already disappeared or influence of anomalies is rarely seen.

These entire phenomena (anomalies) contradict to efficient market hypothesis. They show that not only information influence the share market price. Importance of psychological factors or just rumours that influence stock market as strong as news accepted by real fact also could not be forget.

Trying to explain influence of various market participants on financial markets, behavioural finances (which outset some authors derive from 1994 (Uchitelle 2001), others try to proof that the beginning of this theory lies in 1950ies or in early 1960ies or even before WW II yet (Hoseini 2003)) appears and expand. This theory became popular in Lithuania too. Some authors use it explaining behaviour of insurance market participants (Kindurys 2008); others use it to explain individuals' savings and personal finance management behaviour (Jurevičienė, Bikas 2008 and Bikas, Jurevičienė 2009).

Analyzing the main factors that influence stock price volatility Teresienė (Teresienė 2009) pays attention to investor's psychology as the main factor of price volatility and analysis the returns of the OMXV index and stock prices of the Lithuanian stock market.

Some scientists movements in financial markets link with government or governmental institutions too, so called (New) Institutional Economics. For example Coase (Coase 1937, 1960) first creates attitude to transaction and explains that trans-

action costs refer to the cost of providing goods and services through markets rather than providing them from within the firm. Later this standpoint was adapted to search and information costs, costs of bargaining and decision as well as costs of policing and enforcement. Williams (Williams 2008) based on the Release of Information Index (RI) shows the correlation between economic development and release of information by the government.

Separately or linked with behavioural finances cultural economics is mentioned too, for example Katayama and Ursprung pointed out importance of culture for policy formation (Katayama, Ursprung 2003).

Discussions about the market stimulate a lot of empirical investigations. It is presented in majority of conclusions that there is no concrete strategy that could help to predict prices of securities but mentioned above anomalies are met too.

3. Fundamental and technical analysis as methods of ascertainment of securities' prices

A pack of various methods could be used for forecasting prices of securities but financial analysts usually use data received from technical or fundamental analysis or combine them both. The aim of such analysis – is to ascertain what securities are wrong evaluated and to determine their characteristics.

Expediency of such evaluations is widely discussed both in scientific literature and information publications of professional market participants. Technical analysis is defined as graph investigation of past stock prices trying to find some regularity and using them to make a short forecast of stock prices. It is a forecast of prices' trend and scale in financial markets by means of statistical and graphical methods analyzing prices in past (Mayall 2006). Technical analysis supporters think that it is possible to predict development of events in future using historical data about stocks and market. So, the main reasoning of technical analysis supporters' could be determine as importance of historical analysis of stock rates that allow to ascertain cyclicity and future trends of a specified stock price making investment decisions (Fig. 1).

Fundamental analysts analyse everything: starting with general economy or industry status up to financial conditions and management of a company. They use real data for evaluation of stock value: earnings, profit, competence of management etc. Though fundamental analysts can not be interested in status of entire market they much more concerned with activities and ratios of a spe-

cific company that predetermine decision – to buy or to sell stocks of such company.

Fundamental analysis is criticized due to some practical problems. High standard analysis affords detail economic forecast, but the environment is changing, so the forecast loses its value too. Positive standpoint for fundamental analysis is formed with precondition that financial analysts have reliable information. But usually only valuable data are chosen even having a lot of them.

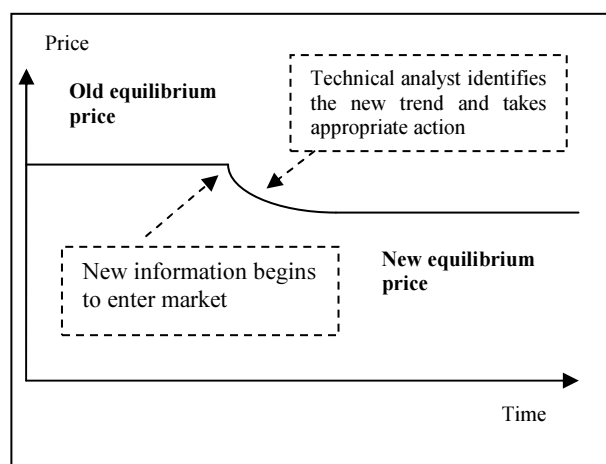


Fig. 1. Influence for the Price of new Information from the Standpoint of Technical Analysts (according to Reilly, Brown 2007)

The main differences between fundamental and technical analysis are indicated in Table 1.

Table 1. Comparison of Fundamental and Technical Analysis According to Time and Analysed Information

Characteristic features of technical analysis	Characteristic features of fundamental analysis
<ul style="list-style-type: none"> – analysis of past previous prices; – trend analysis; – observation of historical prices changes and predicting of price changes in future (conclusions received observing on part of concurrency and adopting or expanding to another its part); – all information reflect stock prices; – comparing with fundamental technical analysis needs less time. 	<ul style="list-style-type: none"> – analysis of financial leverages; – analysis of company's management and advantages in market; – analysis is carried out basing not only on historical data but on present too; – presented conclusions based on evaluation of companies value; – comparing with technical fundamental needs more time.

Comparing with fundamental analysis technical analysis needs less by far time. Stock prices changes faster than economic situation, so information needed for analysis is accumulate more during the same time. Consequently the predicted time of price's change is identified more accu-

rately than by means of fundamental analysis. Fundamental analysis is more valuable for long term investors as forecasts could be formed for longer period.

Technical analysis is more broadly used and has a great impact for participants of financial markets. Analysis results are published in financial press and comments of stock markets.

4. Analysis and evaluation of analysts' presented information

Financial analysis is made trying to evaluate degree of risk and probable return of investment. Financial analyst makes such analysis and presents recommendations what securities to buy.

Analysts estimate influence to the value of securities made by various factors and also estimate possible risk after purchasing them. Financial analysts usually work at brokers', consulting companies or investment funds.

Chartered Financial Analysts (CFA) are highly estimated and recognized in financial industry. This name operates as an indicator that analyst is professional expert in his area and adopts high ethic and professional standards (Jones 1996).

All analytic companies have their own rating systems that usually consist of 3–5 ratings placed in decreasing order starting with positive estimation (the most strong) up to negative (the most weak). Majority of analytic companies according to their rating systems give ratings for a long, medium and short period.

Analysts can: upgrade, downgrade, initiate or reiterate rating of a company.

As rule analysts of securities analyze ratios of companies' activities and create financial models and using them try to predict the future trend of stock price mostly based on expected profit and earnings. According to results received they declare their recommendations to buy or sell particular stocks. Names of analysts' estimations differs significantly (for example, estimations of two analysts' companies „Strong Buy” and „Top Pick” are the highest, so means the same), but normally they form well-known to all investors rating system (Analysts and Earnings Estimates):

- Strong buy;
- Buy;
- Hold;
- Sell.

Most of analytic companies use a „Sell” rating as the worst of all recommendations, but some market participants use 5-th – the lowest rating:

- Strong Sell.

This five-point scale is commonly used by analysts.

If one company gets 5 ratings “1” (reflecting a strong buy recommendation), gets 5 ratings “2” (a hold) and gets 5 ratings “3” (a sell) it comes to an average “2”. Total result shows that it is recommended to buy stocks issued by this company though there were holding recommendations as well.

Figure 2 shows approximate interaction of various ratings.

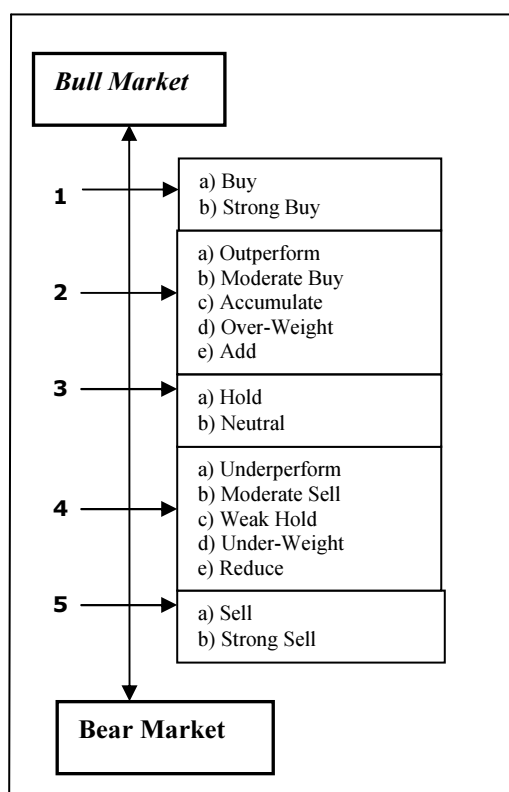


Fig. 2. Approximate Interaction of Ratings Given by Various Analysts

During 1985–1996 Zacks Investment Research examined more than a third million recommendations. Zacks included all firms listed in CRSP NYSE (New York Stock Exchange), AMEX (American Stock Exchange) and NASDAQ (National Association of Securities Dealers Automated Quotations).

After structurizing data from Zacks database it was totalized the rate of giving a 4–5 point selling recommendations. Buying recommendations make 54.1 %, while selling fill in only 6.5 % of all recommendations (Barber *et al.* 2001).

In one of researches made during 1986–1996 period Barber, Leheavy, McNichols and Trueman stated an idea that changed analysts' recommendations has a significant influence on stock prices. They came to a conclusion that market has no semi strong efficiency form (Barber *et al.* 2001).

They have examined that buying the stocks with the most favourable consensus recommendations earns an annualized geometric mean return of 18.8 %, whereas buying those with the least favourable consensus recommendations earns only 5.78 %. As a benchmark, during the same period an investment in a value-weighted market portfolio earns an annualized geometric mean return of 14.5 %. Portfolio made of the most highly recommended stocks provides an average annual gross return of 4.13 % whereas a portfolio of the least favourably recommended ones yields a losing average annual gross return of – 4.91 % (Barber *et al.* 2001).

In spite of the fact that Barber and others state they take investor-oriented calendar-time perspective, 10 years is a very long term. It is obvious that during this period most of studied companies were leaving the market and new ones were entering.

Talking about this research it is important to point out also that authors involve small and medium-sized firms. They use a number of investment strategies to watch a portfolio changes and provide them in percentage (increase or decrease as a result). According to Yin-Wong Cheung and Lillian K. Ng (Yin-Wong, Lillian 1992) who made an investigation about stock Price Dynamics and Firm Size, small firms' stock volatilities tend to be more responsive to changes in their stock prices.

5. The analysis of stock prices dynamics after changing of ratings

Companies for investigation were selected taking into consideration two main factors:

1. Capitalization – analysis includes only large cap companies;
2. Analysts ratings variations – “upgrade“ and “downgrade“. At least 4 upgrades and 5 downgrades were suitable for making a research.

These are the main parameters that give a possibility to analyse stock price dynamics.

Large cap companies presenting in a research is a part of “Dow Jones Industrial Average“ (Dow) index. The index shows how 30 large, public-owned companies have traded during a standard trading session in the stock market.

The stock price percentage change of investigated companies in this research is compared with “Standard and Poors 500“(S&P 500) percentage change value. “Standard and Poors 500“ index includes 500 companies (companies analyzed in the research are in this number) selected by the market size, liquidity and industrial group they belong to.

Most of the members constitutive index S&P 500 are large or mid cap companies. They form more than 70 % of the US stock market price. S&P 500 is considered as weighted market value index (the bigger is a company, the greater influence it makes in changing an index value) (S&P500, Wilshire 5000 and Other Indexes).

Eight companies were selected for the investigation. During the period 2008.01.01–2009.07.01 analytic companies have changed their ratings 116 times.

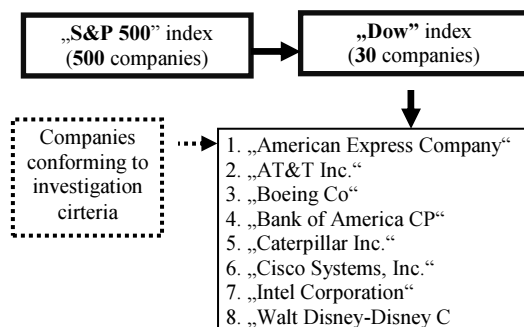


Fig. 3. Research Sample Selection Process

Ratings were upgraded 42 and downgraded 74 times. The research period was set during economic crisis. This fact explains a majority of downgraded ratings that makes 64 % of all rating changes.

All the data used in a research was not a random pick. It was constructed to satisfy sample criteria. During analytic period investigated company must get a certain number of ratings: at least 4 upgrades and 5 downgrades.

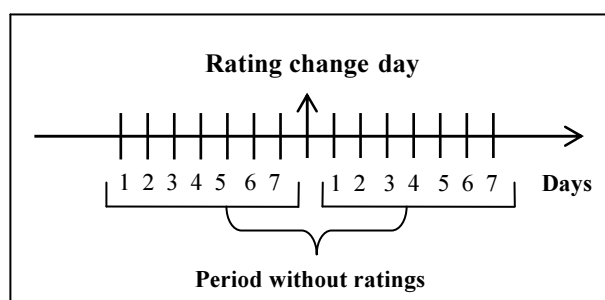


Fig. 4. Upgrades and Downgrades Selection Criteria

The analysis includes more downgrades and this fact is followed by a crisis period.

Two different ratings (downgrade and upgrade) given the same day or during the nearest week were eliminated, i. e. there must be a period of seven days without any rating before or after analyzed rating changing day.

This is the way to avoid influence that one rating may have to another and get adequate results.

According to these criteria 42 downgrades and 10 upgrades are analyzed in a research¹.

During investigative period ratings were changed 45 times by analytic companies or analysts.

Most of the ratings were changed by „Citigroup“ and „UBS“ (8 changes), „JP Morgan“ and „Stifel Nicolaus“ (7 changes), „Argus“, „Credit Suisse“ and „Robert W. Baird“ (6 changes).

The main stages of research:

1) The change of companies' stock price is calculated comparing it to a base day (the day before analyzed rating change day). This percentage-change shows how the stock price is moving during the following days after rating change day.

2) S&P500 index value change is calculated comparing to a base day and beta (β) weight is valued.

3) Companies' stock price percentage change is subtracted from index value percentage change. The result is net stock price percentage change.

4) After analysts' rating change (downgrade or upgrade) during a period of 6 days the net total stock price percentage change average and standard deviation² is calculated.

Beta³ (β) value average was used in a research. Every company has its' own beta value. Beta average values used to make a calculation:

- American Express Company (ASP) – 2.2
- Boeing Co (BA) – 1.3
- Caterpillar Inc. (CAT) – 1.8
- Bank of America CP (BACK) – 2.6
- Cisco Systems, Inc. (CASCO) – 1.1
- Intel Corporation (INTEC) – 1

¹ All the data of research was taken from „Yahoo! Finance“ website that provides the most actual financial information. It is one of the most visited financial website in the USA. Investors can find information on: stock rates, news reviews, and links to the most important websites, financial reports, and portals allowing discussions about stock prices, companies' prospects and other problems. Also it offers personal investment tools. „Yahoo! Finance“ stores all the information about rating changes since 1998 and it archives stock prices dynamics history since 1997 April 1.

² Standard deviation shows stock price volatility (risk) level, i.e. deviation from stock price average. The lower is standard deviation the bigger is possibility to expect particular stock price fluctuation trend. If standard deviation is much higher than average then it can be stated that there is no relation – stock price varies unpredictably to analysts' change of ratings.

³ Beta (β) shows stock price responsiveness to changes in the overall market return, i.e. how much the unit value changes in percents (%) per day when index value changes 1% per day. If $\beta = 0$, then stock return is independent to the market fluctuation. Positive β value means that stock prices move in the same direction as the market. When $\beta < 0$, stock price moves in the opposite direction than the market (when market price is increasing, stock price is going down).

- AT&T Inc. (T) – 0.7
- Walt Disney-Disney C (DIES) – 2.1

This bias of beta (β) emerged because of its variation during the analyzed period should not influence research results.

The final result (stock price net total percentage change average and standard deviation) is shown in chart:

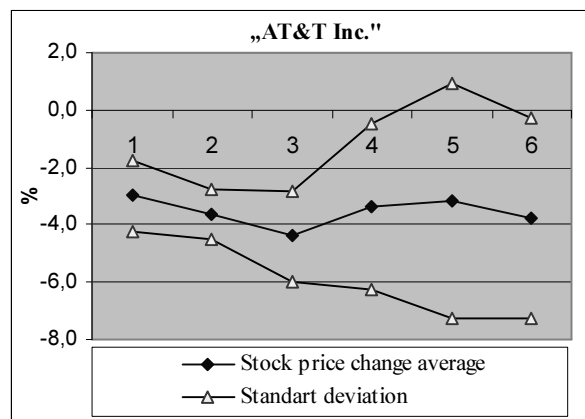


Fig. 5. „AT&T Inc.“ Average Stock Price Change Trend after Downgrade

Standard deviation means deviation from average to both sides. In the Fig. 5 average curve is seen between two curves.

For example, if the first day after upgrade value average is 3 % and standard deviation value is 3.5 %, then first day after upgrade stock price fluctuates between – 0.5 % and 6.5 % and average line in the chart will be found within this range.

Similar results were received after analyzing stock price changes of all other investigated companies. The impact of analysts' ratings can be noticed after both upgrades and downgrades.

Stronger impact is noticeable when rating is given by more than one analytic company.

After receiving upgrades or downgrades the majority of companies' stock prices changes in a predictable way, but there are some that can not be forecasted.

After analyzing stock value dynamics of 8 different companies, was found 78 % probability that stock market price is sensitive to new information published by analytic companies. Usually every company has its own specific stock price regular changing, so this result is reasonable. After upgrade stock prices start growing. After downgrade only 29 % of average stock prices were able to reach its previous value or significantly overgrow the average value that was set before receiving a downgrade.

The strongest impact of analysts' changed ratings is noticeable during the first three days period.

6. Conclusions

Absolutely effective market exists only on theoretical level. Investors in reality can not react to new information at the same time, all in the same manner and adequately situation. Speed of dispersion of information and intelligent investors make the market more effective. Distribution technologies of information make a great impact to creation of effective market either.

Market anomalies contradict to effective market hypothesis too. Investigations ascertain that usually in January prices increase more than during all rest months. Anomalies prove that not only they have impact on stock prices. Psychological factors, rumours, manipulation in stock prices and even government actions or culture have a significant influence on stock prices.

Investigation presented in this article shows the variation of stock price change, its movement tendencies and dependence after changing of companies' ratings made by analysts. These results provide a better understanding of stock price dynamic and act as a guide to understanding behaviour of stock prices. It is necessary to specify that trying to avoid inaccuracies the time period of this investigation was set for 1.5 year and a group of large cap companies with a lifetime history were analyzed.

Changes of analysts' ratings have a substantial affect on stock prices either. Thousands of analysts work in companies that have right to grand ratings and spend million dollars for financial analysis of companies. It shows that it is worth to analyze companies and provide recommendations otherwise analytics' work would be meaningless.

Some of analytic companies' rating systems mislead investors. It is easier to understand and use a rating system which has the same number of negative and positive ratings. Also it must state a realistic situation of industry, company and macro-economic environment.

Analytic companies often provide more buying recommendations. This phenomenon is associated with analysts' dependence on company they are working to and whose financial information they are analyzing.

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