Can Investors Profit from the Stock Recommendations on the Journalism? Testing Conditional Heteroscedasticity in the Market Model

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Abstract

This study employs an event study using the market model with conditional heteroscedasticity to investigate the effects of media recommendations on the performance of electronics companies listed on the Taiwan Stock Market. The empirical results confirm that investors obtain significantly abnormal returns following different types of information around the announcement date when the news is released. These analytical results provide evidence that the stock market information is frequently leaked in advance of the announcement date and the investors generally adopt a conservative strategy following the release of information regarding a recommended stock.

Keywords: GARCH, Recommendatory Stock，Abnormal Return，Event Study
JEL Classification Codes: G11, G14

1. Introduction

Participants in the stock market can be divided into institutional investors and retail investors. Over the past ten years, retail investors occupied the trade proportion of 80% or more in the Taiwan Stock Exchange Market. Institutional investors have better information pipelines and specialty stock investment analysis abilities compared to retail investors. Jensen and Meckling (1976) argue that security analysts have a comparative advantage in the firm-specific information. Therefore retail investors seek the specialized suggestions of specialty analysts or institutional investors in order to earn a higher investment gain. All investors want to have the most up-to-date information at minimal cost.

Stock recommendations, such as those in the investment columns of financial papers, magazines and general newspapers, can be obtained at minimal cost in the market.

There are three common forms of the efficient market hypothesis "Weak Form Efficiency Market", "Semi-Strong Form Efficiency Market" and "Strong Form Efficiency Market" (Fama, 1970). In the "Weak Form Efficiency Market", an investor cannot obtain abnormal returns based on historical pricing, but can obtain abnormal returns by relying on public or private information. In the "Semi-Strong Form Efficiency Market", an investor cannot obtain abnormally high returns by relying on public information, but can obtain abnormally high returns by using private information. In the "Strong Form Efficiency Market", private or public information correlates with price, and an investor cannot obtain abnormally high returns. If new information induces investors to change the distribution of the probability of returns, and then change the market equilibrium price, this information is called "Information Content". Therefore, the reaction in the stock price after new information is announced can be used to discuss this information whether to be the "Information Content". In an efficient market, securities have no information content, stock recommendations will not impact the stock price, and an investor cannot obtain additional returns based on the information content.

Many empirical studies have distinguished between three types of efficient markets using the content in the information set. Most of these studies used Heard on the Street (HOST) and the "Dartboard" column of the Wall Street Journal. Some researchers (Davies and Cance 1978, Liu et al. 1990 and Barber et al. 2001, 2003) have discussed the usefulness of analysts' recommendations investigating whether an investor following those recommendations gains an abnormal return. They found that an investment strategy of buying and selling stocks based on recommendations yields abnormal returns. Sayrak and Dhiensiri (2002) and Irvine (2003) also indicated that strategies based on expert recommendations yield significant short-term stock return.

An attempt has been made to understand further stock recommendations based on stock information, that expecting gained support from columns recommending stocks. When the stock price reacts to a public recommendation, the stock price will not overturn. The abnormal stock return on announcement of the analysts is a result of naive buying pressure effect as well as the information content effect (Barber & Loeffler, 1993). Analysts can credibly publish unfavorable information, but cannot publish favorable information. It is impossible for an analyst to report good news about a firm's valuation because investor's uncertainty about incentives. Thus full revelation of information is impossible (Morgan & Stocken, 2003). Some studies examine the effect of information asymmetry on announcement-period and long-run returns by analyzing the role of security analysts as information intermediaries (Brennan and Hughes, 1991, Chung and Jo, 1996, D'mello and Ferris, 2000). Womack (1996) also finds evidence consistent with the information-generating role of security analysts. Some studies show that analyst forecasts are recalculated each time a recommendation changes (Barber et al., 2001, 2003), and some have found that initiating recommendations adds information to the market encouraging participants to trade (Brennan & Tamarowski, 2000; Irvine, 2003). Dhiensiri et al. (2005) find the direction of the revisions (an upgrade or a downgrade) determines the direction of the stock price reaction.. They also show there is a negative relationship between analyst opinions and stock market performance. Hussain (2007) has suggested both composite leading index and the money supply have a potentially important role to play as elements within the information sets of security analysts.

The main goal of our current study is to confirm the information connotation of financial newspapers' public recommendations and to develop an understanding of whether the information is leaked out before the time of the recommendation. The empirical results can also help us to understand what kind of efficiency market the stock exchange market of Taiwan belongs to. We choose the Weekly Well-Chosen & Potential Stock column in the Economic Daily News published every Sunday from January 1, 2006 to December 31, 2006 as the data source. We examines how stock recommendations have investment value and impact on stock prices around the time of announcement date in order to understand whether an analyst's recommendation is a positive or negative signal. This study addresses the: reactions to abnormal returns near the time an analyst's recommendations are

announced. First, we demonstrate that the stock recommendations lead to additional abnormal returns around the time of announcement. Second, those issues may deliberately change the stock recommendation around the announcement date, whereas information regarding a successful stock recommendation may appear that the information leaked affects stock prices leading investors to buy or sell recommended stocks. Investors believe that public information can lead to an additional gain in performance, as investors obtain positive abnormal returns during the pre-announcement period (Saleh, 2007). Nevertheless, public information will lead investors to buy or sell stocks, and appears to affect the price of the recommended stock.

Prior researches have demonstrated that recommendations generate abnormal returns (Cowles, 1993; Longue & Tuttle, 1973; Bidwell, 1977, Dimson & Marsh, 1984; Elton et al., 1986; Stickel, 1995; Womack, 1996; Barber et al., 2001). The performance of recommended and non-recommended stocks indicated that average weekly returns for recommended stocks were significantly higher than those of non-recommended stocks, indicating that stock recommendations are valuable (Bjerring et al., 1983). Existing researches recommend information effect in the short-term, but Lee (1986) finds that the column recommends have no information value in the long-term. Stock analysts have been shown to obtain abnormal returns based on published information (Davies & Cance, 1978; Liu et al., 1990; Saleh, 2007). Investors purchasing stocks one or two days before a recommendation obtain positive abnormal returns, whereas those selling before a recommendation obtain negative abnormal returns. These findings demonstrate the value of information obtained by investors (Beneish, 1991).

Earlier studies indicate that analysts rarely issue buy or sell recommendations and researchers have found statistically significant positive or negative stock return around the time of analysts' buy or sell recommendations announcements (Beneish, 1991, Chen et al., 2002). The market variables and strong buy and buy recommendation variables appearing in a recommendation are statistically significant (Chan, et al., 2006). Buy or sell recommendations make up less than five percent of all recommendations (Jegadeesh et al., 2004). The trading strategies recommended are to buy certain stocks and sell the less favorable stocks (Barber et al., 2001; Jegadeesh et al., 2004).

These studies suggest that analyst's recommendations may play an important role in explaining a change in abnormal returns. Nevertheless, the above studies were only based on observing abnormal returns and ignore the assumption of homoscedasticity of the OLS residuals having efficient parameter estimates using the market model. Therefore, employing an event study with conditional heteroscedasticity, the current study utilizes abnormal returns as an indicator of how stock returns react to analyst recommendations regarding Taiwanese electronic corporations. The paper is organized as follows. Section 2 describes the methodology and data source, while Section 3 presents the empirical evidence. Section 4 includes a discussion of the results and conclusions.

2. Database and Methodology
2.1. Description of the sample

The data of this study are derived from the column of the Weekly Well-Chosen & Potential Stock appearing in the Economic Daily News every Sunday from January 1, 2006 to December 31, 2006. The sample includes electronics companies listed on the Taiwan Stock Market. Daily stock index data are provided by the Taiwan Economic Journal (TEJ). We collected total of 366 buy recommendations in the Economic Daily News.

2.2. Event study and Methodology

Event study methodology is used in the current study to explore the research question.. The *event window* in this study contains the announcement day as well as 5 days before and 5 days after in order to explore the possibility of obtaining abnormal returns. The period used to examine the stock returns in 30 days so the observation period includes a total of 36 days (estimation and event periods combined).

The events in the current study can be divided into three types: market-wide, industry-specific, or firm-specific. Events include effects on specific properties of the economic event, changes in laws, changes in company dividend policies, and profit announcements.

The expected return was derived using the market model where the model parameters α and β were obtained from the estimation period

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \tag{1}$$

Bollerslev (1986) generalizes the conditional variances in the ARCH model, assuming that the conditional variances are not only subject to influences by the squared error terms, but also to the previous conditional variances. He takes into account previous conditional variances in the estimation on the transmissions of volatility to propose the GARCH (p, q) model. Hence, this paper utilizes the GARCH model to modify the traditional assumptions of homogeneity

$$\varepsilon_t / \Omega_{t-1} \sim N(0, h_t) \tag{2}$$

$$h_t = \omega + \sum_{i=1}^{p} \alpha_i \varepsilon_{t-i}^2 + \sum_{j=1}^{q} \beta_j h_{t-j} \tag{3}$$

Therefore, abnormal returns on day t (AR_{it}) are calculated for a reference period surrounding the event date of stock i. These are obtained as the difference between the observed returns and those predicted by the market model:

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt}.$$

The mean of abnormal returns ($\overline{AR_{it}}$) on day t for a portfolio of N stocks can be calculated as

$$\overline{AR_t} = \frac{1}{N} \sum_{i=1}^{N} AR_{it} \qquad t = \text{-15, -14, ..., 14, 15.} \tag{4}$$

The cumulative abnormal returns (CAR_t) through τ days ($\tau = \tau_2 - \tau_1$) for a portfolio of N stocks can be calculated as

$$CAR_i(\tau) = \frac{1}{N} \sum_{t=\tau_1}^{\tau_2} \sum_{i=1}^{N} AR_{it} \tag{5}$$

The ordinary cross-sectional method ignores estimation period estimates of variance. Thus, this paper uses the standardized residual cross-sectional for its *t-test* (Boehmer *et al.*, 1991). The resulting *t-test* statistic for $\overline{AR_{it}}$ is

$$t_{SROCSM}^{AR} = \frac{SAR_E}{\sqrt{\frac{1}{N(N-1)} \sum_{i=1}^{N} (SAR_{iE} - \sum_{i=1}^{N} \frac{SAR_{iE}}{N})^2}} \tag{6}$$

where $SAR_E = \sum_{i=1}^{N} \frac{SAR_{i,E}}{N}$.

The *t-test* statistic for CAR_t for the standardized residual cross-sectional is calculated as

$$t_{SROCSM}^{SCAR} = \frac{SAR(\tau_1, \tau_2)}{\sqrt{\frac{1}{N(N-1)} \sum_{i=1}^{N} (SCAR_i(\tau_1, \tau_2) - \sum_{i=1}^{N} \frac{SCAR_i(\tau_1, \tau_2)}{N})^2}} \tag{7}$$

where $SCAR(\tau_1, \tau_2) = \sum_{E=\tau_1}^{\tau_2} SAR_E$. For studying the analyst's recommendations may play an important role in explaining a change in abnormal returns, we test the following hypotheses,

H_o: $\overline{AR_{it}} = 0$

H_1: $\overline{AR_{it}} \neq 0,$ (8)

and

H_o: $SAR_E=0$

H_1: $SAR_E \neq 0$,   (9)

3. Empirical tests

In this section, we discuss the empirical results for price effect momentum strategies. We also examine whether the stock price is higher or lower compared to the event day around the analysts' recommendations. Table 1 presents the results of the abnormal return (AR) and cumulative abnormal return (CAR), Table 2 presents the results of the standardized abnormal return (SAR) and standardized cumulative abnormal return (SCAR), test statistical significance levels inclusive of the nonparametric test (ordinary cross-sectional test) of the analysts' recommendation in the event windows around the announcement date. Fig. 1 and Fig. 2 plot the abnormal and cumulative abnormal returns for the analysts' recommendations respectively. Fig. 3 and Fig. 4 plot the standardized abnormal and standardized cumulative abnormal returns for the analysts' recommendations, respectively. The results show that a published recommendation has a significant reaction on the day of the listed electronic stocks on the event window around the announcement date. Prior to the announcement date of published recommendation events, the significance of the positive abnormal returns shows that the abnormal returns (AR) between the days -5 and -1 are all statistically significant at the 0.01 level , (based on a t-test), the statistically significant on the event day (day 0) is positive at the 0.05 level. The result is similar to Liu, Smith, and Syed (1990) and Benish (1991). The information is valuable before announcement date including the event day and the column news possibly beforehand the divulged. For days +2 and +3, the abnormal returns are negative statistically significant at the 0.05 level, thus investors could even face losses the day after the event day. Cumulative abnormal return (CAR) between the days -5 and +5 are all positive statistically significant at the 0.01 level. The results of Table 2 also show that the standardized abnormal return (SAR) between the days -5 and 0 are all statistically significant at the 0.01 level, and only on day +2 , SAR is negative statistically significant at the 0.05 level. The test result of SCAR is similar to SAR in Table 1. These findings demonstrate the value of information obtained by investors, the announcements of analysts' recommendations have information content, stock recommendations will impact the stock price, and an investor gains additional returns based on the information content. Security analysts may have a comparative advantage in the firm-specific information. The empirical evidence indicates that the market is not a "Semi-Strong Efficiency Market" because investors can obtain abnormal returns by researching public information.

Table 1: Abnormal return around the announcements of analysts' recommendations

Event window	AR	CAR
-5	0.1253***	0.1253***
-4	0.8148***	0.9401***
-3	0.6942***	1.6343***
-2	1.1032***	2.7375***
-1	1.2751***	4.0126***
0	0.4629**	4.4755***
1	0.0790	4.5545***
2	-0.2903**	4.2642***
3	-0.2378**	4.0264***
4	0.0298	4.0562***
5	0.1738	4.2300***

Note: *** denotes statistical significance at the 1%
** denotes statistical significance at the 5%
* denotes statistical significance at the 10%

Table 2: Standardized abnormal returns around the announcements of analysts' recommendations

Event window	SAR	SCAR
-5	0.3417***	0.3417***
-4	0.4227***	0.7644***
-3	0.3047***	1.0691***
-2	0.5737***	1.6428***
-1	0.6862***	2.329***
0	0.2847***	2.6137***
1	-0.0231	2.5906***
2	-0.1436**	2.447***
3	-0.0645	2.3825***
4	0.0297	2.4122***
5	0.1066	2.5188***

Note: *** denotes statistical significance at the 1%
** denotes statistical significance at the 5%
* denotes statistical significance at the 10%

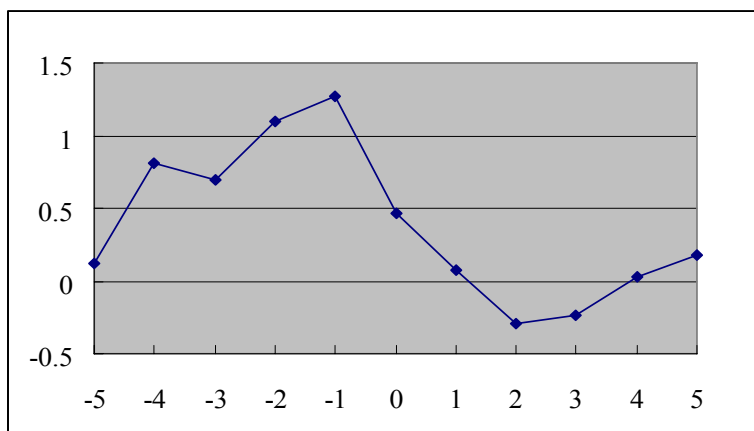**Figure 1:** Abnormal returns of analysts' recommendations
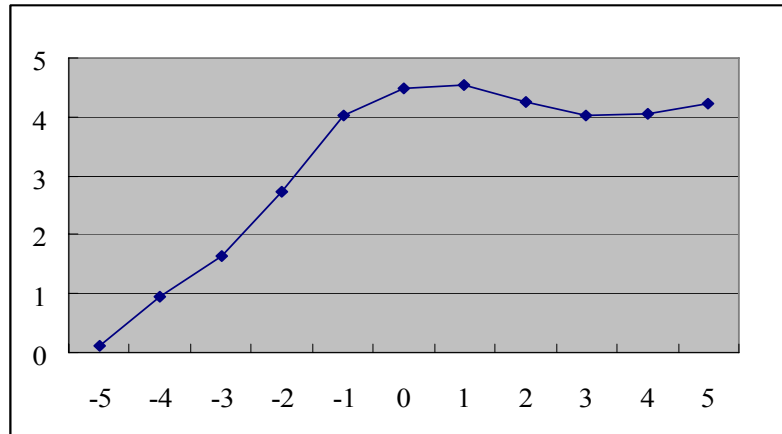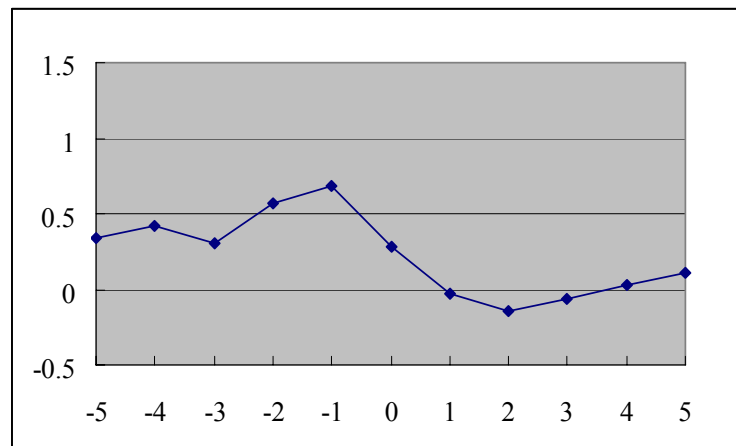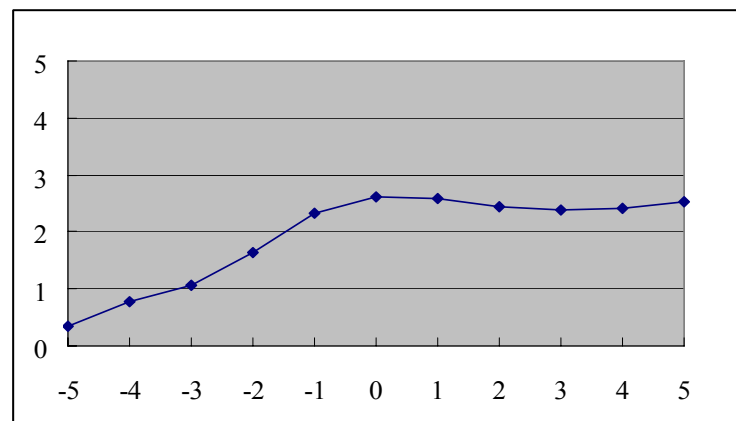
Figure 2: Cumulative abnormal return of analysts' recommendation

Figure 3: Standardized abnormal return of analysts' recommendation

Figure.4: Standardized cumulative abnormal return of analysts' recommendation

4. Conclusions

The current study investigated abnormal returns around the time of analysts' recommendations published in Weekly Well-Chose & Potential Stocks in the *Economic Daily News* every Sunday from January 1, 2006 to December 31, 2006 in Taiwan. The introduction of a recommended stock is found to lead to a price effect. We observe significant positive abnormal returns in the event period possibly

because analysts' recommendations in the media tend to have an effect well before the announcement day and investors earn abnormal returns only if they buy on the event day. Nevertheless, the abnormal returns decrease quickly and last for only one day before the abnormal returns disappear and investors could even face losses the day after the event. This study analyzes the importance of information content to investors and other stock market participants. The results show that positive abnormal returns are statistically significant for day 0 and -5 surrounding announcement dates. However, positive abnormal returns for stocks disappear following the announcement of recommendations. Investors decide to hold an active or conservative portfolio or reduce average holding costs following information disclosure of recommended stocks. The empirical evidence indicates that the market is not a "Semi-Strong Efficiency Market" because investors can obtain abnormal returns by researching public information and information leaked in the stock market also has an effect on returns.

References

[1]   Barber, B. M. and D. Loeffler, 1993. "The 'Dartboard' column: second-hand information and price pressure", *Journal of Financial and Quantitative Analysis* 28, pp. 273-284.

[2]   Barber, B., Lehavy, R., McNichols, M. and B. Trueman, 2001. "Can investors profit from the prophets? Security analyst recommendations and stock returns", *Journal of Finance* 56, pp. 531-563.

[3]   Barber, B., Lehavy, R., McNichols, M. and B. Trueman, 2003. "Reassessing the returns to analysts' stock recommendations", *Financial Analysts Journal* 59, pp. 88-96.

[4]   Beneish, M. D., 1991. "Stock prices and the dissemination of analysts' recommendations", *Journal of Business* 64, pp. 393-416.

[5]   Bidwell, C., 1977. "How good is institutional brokerage research", *Journal of Portfolio Management*, 3, pp. 26-31.

[6]   Bjerring, J. H., Lakonishok, J. and T., Vermaelen, 1983. "Stock price and financial analysts' recommendations", *Journal of Finance* 38, pp. 187-204.

[7]   Brennan, M. and C., Tamarowski, 2000. "Investor relations, liquidity and stock price", *Journal of Applied Corporate Finance* 12, pp. 26-37.

[8]   Brennan, M. and P. Hughes, 1991. "Stock prices and the supply of information", *Journal of Finance*, 46, pp. 1665-1691.

[9]   Boehmer, E., Musumeci, J. and A., Poulsen, 1991. "Event study methodology under conditions of event-induced variance", *Journal of Financial Economics* 30, pp. 253-272.

[10]   Bollerslev, T., 1986. "Generalized autoregressive conditional heteroskedasticity", *Journal of Econometrics* 31, pp. 307-327.

[11]   Chan, H. W. H., Brown, R. and Y. K., Ho, 2006. "Initiation of brokers' recommendations, market predictors and stock returns", *Journal of Multinational Financial Management* 16, pp. 213-231.

[12]   Chen, Carl R., Chan Kam C. and T. L., Steiner 2002. "Are all security analysts equal?", *Journal of Financial Research* 25, pp. 415-430.

[13]   Chung, K. H. and H. Jo, 1996. "The impact of security analysts' monitoring and marketing Functions on the market value of firms", *Journal of Financial and Quantitative Analysis*, 31, pp. 493-512.

[14]   Cowles, A., 1993. "Can stock market forecasters forecast?", *Econometrica* 1, pp. 309-324.

[15]   Davies, P. L. and M., Canes, 1978. "Stock prices and the publication of second-hand information", *Journal of Business* 51, pp. 43-55.

[16]   Dhiensiri, N., Mandelker, G. and A., Sayrak, 2005. "The information content of analysts recommendations", Information *Content of Analysts Recommendations, FMA conference paper, Chicago.*

[17]   Dimson, E. and P., Marsh, 1984. "An analysis of brokers' and analyst's unpublished forecasts of UK stock returns", *Journal of Finance 39*, pp. 1257-1291.

[18] D'Mello, Ranjan and Ferris, Stephen P., 2000. "The information effects of analyst activity at the announcement of new equity issues", *Financial Management*, 29, pp.78-95.

[19] Elton, E., Gruber, M. and S., Grossman, 1986. "Discrete expectational date and portfolio performance", *Journal of Finance* 41, pp. 699-713.

[20] Fama, E. F., 1970. "Efficient capital markets: a review of theory and empirical work", *Journal of Finance* 25, pp. 383-417.

[21] Hussain, S., 2007. "Prophets of future corporate profits: a role for leading indicators in the information sets of security analysts?", *Applied Financial Economics Letters* 3, pp. 187-190.

[22] Irvine, P. A., 2003. "The incremental impact of analyst initiation of coverage", *Journal of Corporate Finance* 9, pp. 431-451.

[23] Jegadeesh, N., Kim, J., Krische, S. D. and C., Lee, 2004. "Analyzing the analysts: when do recommendations add value?", Journal of Finance 59, pp. 1083-1124.

[24] Jensen, M. and W. Meckling, 1976. "Theory of the firm: Managerial behavior, agency costs and ownership structure," Journal of Financial Economics 3(4), 305-360.

[25] Lee, C. W., 1986. "Information content of financial column", Journal of Economics and *Business* 38, pp. 27-39

[26] Liu, P., Smith, S. D. and A. A., Syed, 1990. "Stock price reactions to the wall street journal's securities recommendations", *Journal of Financial and Quantitative Analysis* 25, pp. 399-410.

[27] Longue, D. and D., Tuttle, 1973. "Brokerage house investment advice", *Financial Review* 8, pp. 38-54.

[28] Morgan, J. and P., Stocken, 2003. "An analysis of stock recommendations", *Rand Journal of Economics* 34, pp. 183-203.

[29] Saleh, W., 2007. "Investors reaction to dividend announcements: parametric versus nonparametric approach", *Applied Financial Economics Letters* 3, pp. 169-179.

[30] Sayrak, A. and N., Dhiensiri, 2002. "The effects of analysts coverage initiations", *FMA Conference Paper, San Antonio*.

[31] Stickel, S., 1995. "The anatomy of the performance of buy and sell recommendations", *Financial Analyst Journal* 51, pp. 25-39.

[32] Womack, K. L., 1996. "Do brokerage analysts' recommendation have investment value?", *Journal of Finance* 51, pp. 137-167.