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**INVESTMENT VALUE OF ANALYSTS'
RECOMMENDATIONS IN RELATION
TO EFFICIENT MARKETS
HYPOTHESIS**

Doctoral dissertation summary

Summary of doctoral dissertation
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1. Reason for problem selection

Since ages investors have been trying to predict future prices of financial instruments in order to make a profit. They make investment decisions on the basis of historical and current information, as well as their own predictions. However, the mentioned actions are not always correct. The investors lacking sufficient knowledge or being under time pressure are given advice from professionals - securities analysts. The analysts issue recommendations that suggest investment decisions against financial instruments.

Provided the market is efficient, such a detailed analysis does not guarantee a positive rate of return due to the fact that prices on such a market reflect full information available at a given moment. That means that prices already reflect historical, current and expected information. Thus the price behaviour follow a random walk, i.e. probability ending up with a gain will be the same as to lose.

The daily observation of economy gives us many examples where the market reacts after recommendation declassification. The press note *Rekomendacja podbiła kurs*¹ can serve as a good example. On the other hand, there are articles published in the same newspaper, the titles of which speak for themselves: *Inwestorzy sprzedają wbrew rekomendacjom*² or *Co druga rekomendacja jest nietrafiona*³.

2. Research goal

The aim of the dissertation was to examine the impact of 'sell-side' analysts' recommendations on price formation process. The research section of the dissertation was aimed at proving the hypothesis according to which the investors make an abnormal profit, following the recommendations issued for the Warsaw Stock Exchange (the WSE) companies. In case of the observed abnormal market reaction it was aimed to reveal to which factor(s) this profitability was related to. The theoretical part of the dissertation discusses the concept of efficient market hypothesis (EMH) according to which as long as the stock market is at least semi-strong informationally efficient prices already reflect full information available and to gain from making investments based on new public information is highly unlikely.

¹ <http://archiwum.parkiet.com>, *Parkiet* from 11.10.2006 r., accessed on 16.12.2012 r.

² <http://archiwum.parkiet.com>, *Parkiet* from 09.06.2006 r., accessed on 16.12.2012 r.

³ <http://archiwum.parkiet.com>, *Parkiet* from 17.11.2012 r., accessed on 16.12.2012 r.

Theoretical and research sections of the dissertation match the JEL (Journal of Economic Literature) classifications: G11 (Portfolio Choice • Investment Decisions) and G14 (Information and Market Efficiency • Event Studies • Insider Trading).

3. Dissertation theses

Based on the theoretical background and empirical observations author set the following thesis:

Analysts' recommendations influence stock prices. Investors who are making decisions based on analysts' recommendations are able to earn an abnormal profit.

Moreover, the following hypotheses were formulated with respect to the recommendations of the Warsaw Stock Exchange listed companies issued in the years 2008-2011:

- market reaction to analysts' recommendations was coherent with the direction of suggested investment action,
- the magnitude of price reaction was higher in the first days from private and public disclosure and then price drift disappeared,
- investors who were customers of financial institutions (i.e. those with early access) were given better profit opportunities,
- there was a differentiation in profitability of analysts' recommendations, which was related to characteristics of research reports as well as recommended companies and their shares.

4. Dissertation structure

The dissertation has both theoretical and empirical character. In the first chapter theoretical groundings of efficient market hypothesis were explained, evolution of efficient market term was presented as well as methods used to test chosen EMH forms were discussed. The focus was put on the event studies methodology as a primary tool used to test semi-strong form of EMH. In the second chapter alternative hypotheses formed on the basis of observed capital market anomalies were presented. Behavioural factors influencing investment decisions were discussed and their impact on price formation process was shown. Fractal markets hypothesis related to technical analysis and market microstructure theory as a complementary item to EMH were explained. Moreover, the comparison of presented anomalies was analysed in the light of neoclassical and behavioural finance. In the third

chapter not only regulations concerning investment recommendations but also the issue and disclosure process were described. Polish and American legislation was compared and main methods applied in stock appraisal process were discussed. Fourth chapter attempted to define the investment (information) value of analysts' recommendations under different market efficiency forms. The concept of investment value was presented in the summary of the chapter. In the next, fifth chapter, chosen empirical results of investment value on foreign and Polish markets were discussed. This chapter was enriched with the review of studies over market efficiency of the WSE starting from mid 90s' of XX century till the end of the first decade of 2000s'. In the last two chapters empirical findings from the WSE were presented. In the sixth chapter, price reaction analysis in a 'buy and hold' strategy based on analysts' advice was covered. In the seventh chapter, an attempt to analyse the differences in abnormal profits noted in relation to characteristics of information dispatches, characteristics of quoted companies and their shares, as well as perceived quality of financial institutions issuing investment advice was made. The chapter was ended with the investment value analysis under the conditions of transactional costs and income taxes. In the final part of the dissertation one can find the conclusions that were based on literature review and author's own empirical results.

5. Data sources and research methods

The main source of data with regard to recommendations, and stock and indices quotes was the Polish Press Agency portal *GPWInfoStrefa* provided with the cooperation of the WSE. Moreover, raw data (official quotation, and stock and indices parameters provided by the WSE) and web pages: the WSE, chosen investments firms, and portals were used.

Information dispatches concerning investment recommendations disclosed in *GPWInfoStrefa* in the years 2008-2011 were analysed. The primary research sample consisted of 2171 recommendations for which the information about their current and previous rating, their first issue date and public disclosure date were available. In addition 340 recommendations with only target price changes disclosure were analysed.

In order to verify the stated hypotheses the event study methodology was applied. Daily logarithmic rates of returns were computed in order to determine the abnormal return and cumulative abnormal return. The estimation window of 120 days was used for expected return computation with Sharpe model (from $t = -130$ to $t = -10$). The estimation window closed 10 days before the event date. Event window consisted of 5 days before the event and 10 days

after. The session at which recommendation was disclosed to public as well as the session of first issue date to private customers were used as event dates. Statistical verification of results was tested with t-Student statistic:

$$t = \frac{\overline{AR}_t}{s(AR_t)}\sqrt{N} \text{ and } t = \frac{\overline{CAR}_T}{s(CAR_T)}\sqrt{N},$$

where (C)AR_{t(T)} means an abnormal (cumulative) rate of return, $\bar{}$ means an average symbol, s - standard deviation, and N - sample size.

The standard deviation was computed based on the data from the estimation window:

$$s(AR_t) = \frac{1}{N} \sqrt{\frac{1}{T_1 - T_0} \sum_{t=T_0}^{T_1-10} \sum_{j=1}^N (AR_{jt} - \frac{1}{T_1} \sum_{t=T_0}^{T_1-10} \sum_{j=1}^N AR_{jt})} \text{ and}$$

$$s(CAR_T) = \frac{1}{N} \sqrt{\frac{1}{T_1 - T_0} \sum_{T=T_0}^{T_1-10} \sum_{j=1}^N (CAR_{jT} - \frac{1}{T_1} \sum_{T=T_0}^{T_1-10} \sum_{j=1}^N CAR_{jT})},$$

where N means the similar events sample size, T₀ - the oldest observation in the estimation window, T₁-10 stands for the length of the estimation window. Moreover, results of chosen AR and CAR were additionally tested with the modified Corrado rang test in the version proposed by Ataulloh, Song and Tippett⁴:

$$T_{AR} = \frac{\frac{1}{N} \sum_{j=1}^N (K_{jt} - \frac{T+1}{2})}{\sqrt{(T^2 - 1) / 12N}} \text{ and}$$

$$T_{CAR} = \frac{\frac{1}{N} \sum_{j=1}^N (K_{jt} - \frac{M(T+1)}{2})}{\sqrt{M(T+1)(T-M) / 12N}},$$

where T means the length of event window, N - sample size, K_{jt} - the respective (cumulative) rang of abnormal (cumulative) rate of return on stock j (in case of T_{CAR} computed from session t = 0 to M).

In the dissertation legislation as of 28th February 2013 was applied.

⁴ Ataulloh A., Song X., Tippett M.: *A Modified Corrado Test for Assessing Abnormal Security Returns*. "The European Journal of Finance", 2011, Vol. 17, No 7, pp. 589-601.

6. Findings and cognitive results

Most of the empirical findings from foreign markets as well as from the Warsaw Stock Exchange confirm a short term investment value of sell-side analysts' advice. Security recommendations from the years 2008-2011 issued for the WSE companies were informationally valuable, mostly on the day of issue and the day after the issue or on the day of their public disclosure. In addition, the investment value was decreasing with a passage of time. Moreover, negative recommendations had a higher investment value compared to positive ones.

Investment firm clients were able to realize higher abnormal returns due to fact that they possessed a given piece of information earlier. The magnitude of the market reaction to new public information was similar to the reaction to the same information in the case where it was distributed to the clients only. As opposed to the first distribution, the value of publicly disclosed recommendations was decreasing more rapidly.

The dissertation confirms the differentiation in the investment value conditioned on market sentiment and market volatility. Additionally, a type of disclosed information had an impact on the scale of the investment value. Moreover, a company size and the level of analysts' coverage and the composition in portfolio of national or industry indices impacted the price formation process after recommendation release in a different manner. The dependence between the recommendations investment value and the investment firm reputation was not confirmed. Transaction costs reduced a theoretical 'buy and hold' strategy by 2 pp., however, it was still inevitably adding value for a typical investor.

The Polish capital market turned out to be similarly efficient (i.e. given the speed of information incorporation into prices) with regard to new positive as well as negative information (both private and public). Despite a few examples of the 'sell' recommendation, the insider trading phenomenon was not confirmed. Empirical results do not directly suggest existing form of the WSE market efficiency. A short term reaction to a public disclosure seems to prove that the Polish capital market was in between a weak and a semi-strong form.

The author's research results reveal that the analysis of recommendations as information gives the possibility to determine one of the three market efficiency forms, dependent on the information status and the price formation after a new information release. An event studies may be used to test semi-strong EMH form. However, it is possible to apply this method in a strong form test as well, taking into account the fact that moment when a certain group of investors have come into possession of the private information is known. Moreover, the

observed price drift after a public disclosure justifies a trend formation process, which proves that markets are not weak form informationally efficient.