Financial Internet Quarterly „e-Finanse" 2015, vol.11 / nr 1, s. 22 - 31
DOI: 10.14636/1734-039X_11_1_003

THE PROFITABILITY OF FOLLOWING ANALYST RECOMMENDATIONS ON THE POLISH STOCK MARKET

Adam Zaremba[1], Przemysław Konieczka[2]

Abstract

The profitability of analysts' recommendations is documented in numerous studies from all over the world. However, the evidence from the Polish market is relatively modest. The primary aim of this study is to fill this gap. The paper contributes to the economic literature in four ways. First, it provides fresh out-of-sample evidence on return patterns following analysts' recommendations from Poland. Second, it examines the relations between these patterns and the size of the rated companies. Finally, it investigates whether it is possible to design profitable strategies based on the discovered patterns. We use monthly stock level data from Poland and the sample period is 2004-2013. In order to examine the profitability of analysts' reports, we build market-neutral portfolios and test their performance against CAPM, Fama-French three-factor and Carhart four-factor models. The principal findings can be summarized as follows. First, we document that the top rated companies deliver better returns than the bottom rated companies. Second, we find that the profitability is particularly impressive among the small companies. Third, the abnormal returns are partially explained by momentum and value based factors. Finally, we provide evidence that strategies based on information in recommendations deliver statistically significant positive abnormal rates of return.

JEL classification: G11, G12
Keywords: stock market, stock recommendations, analysts, Warsaw Stock Exchange

Received: 21.06.2015 Accepted: 19.05.2015

[1] Poznan University of Economics, e-mail: adam.zaremba@ue.poznan.pl.
1. [2] Warsaw School of Economics, e-mail: przemyslaw.konieczka@gmail.com.

Introduction

Information is a critical element of any investment process and underlies a well-functioning market. Accumulated information enables not only professional investors but also individual investors to make investment decisions and acquire assets at a more profitable price. In order to make better decisions, investors take advantage of the stock recommendations from intermediaries such as security analysts.

Equity analysts use all publicly available information and information provided by public companies about specific firm or industry characteristics to prepare 'buy', 'hold' or 'sell' recommendations. These recommendations include information about the industry, recent events, company characteristics, financials, stock valuation, and more importantly, a rating category ('buy', 'hold' or 'sell').

The profitability of analyst recommendations is documented in numerous studies from all over the world (for example: Barber et. al., 2001; Lin et. al., 2005; Green, 2006). However, the evidence from the Polish market is relatively modest (for example: Mielcarz, Podgórski & Weremczuk, 2007; Mielcarz & Podgórski, 2008; Biedrzyński, 2008; Czyżycki & Klóska, 2010; Konopko & Kokolus, 2012; Zaremba & Konieczka, 2014). The primary aim of this study is to fill this gap and investigate the profitability of investment strategies based on analysts' recommendations.

The paper contributes to the economic literature in four ways. First, it provides fresh out-of-sample evidence on return patterns following analysts' recommendations in Poland – the most liquid equity market in the CEE region. Second, it examines the relations between these patterns and the size of the rated companies. Finally, it investigates whether it is possible to design profitable strategies based on the discovered patterns.

We use monthly stock level data from Poland and the sample period is 2004-2013. In order to examine the profitability of analysts' reports, we build market-neutral portfolios and test their performance against CAPM, Fama-French three-factor model and Carhart four-factor model.

The principal findings can be summarized as follows. First, we document that the top rated companies deliver better returns than the bottom rated companies. Second, we find that the profitability is particularly impressive among the small companies. Third, the abnormal returns are partially explained by momentum and value based factors. Finally, we provide evidence that strategies based on information in recommendations deliver statistically significant positively abnormal rates of return.

The structure of the paper is as follows: in section 2 we review the existing research in the field. Next in section 3, we describe the data and the research methods. Our findings are the subject of section 4. Section 5 concludes our paper.

Theoretical Basis

As shown in prior literature, the majority of analysts prepare and issue optimistic recommendations. For example, Womack (1996) affirms that for the period 1989 - 1991 'buy' recommendations come about seven times more often than 'sell' recommendations, explaining that analysts are reluctant to issue 'sell' recommendations. Ertimur et. al. (2010) find that for the period 1994 - 2006 approximately 57% of recommendations - in his sample - fall in the 'buy' category. Compared, the 'sell' category constitutes only 6% of all surveyed recommendations. Papakroni (2012) for the period 1993 - 2011 finds that approximately 68% of total monthly mean recommendations for sample of U.S. firms fall in the 'buy' category, while only 1% fall into the 'sell' category. Similar findings are reported by Barber et. al. (2001), Jegadeesh et. al. (2004) and Loh and Mian (2006).

Cowles (1933) initiated researches within the scope of the objective of this study. Cowels shows that analysts' recommendations do not reflect achievement of abnormal returns. Later researches document abnormal price and return movements for very short horizons, following analyst recommendations, with the stronger reaction for 'sell' recommendations (Papakroni, 2012). Liu et. al. (1990) and Beneish (1991) examine the stock movements caused by the publication of the recommendations in The Wall Street Journal's for the years 1982 - 1985 and 1978 - 1979. Barber and Loeffler (1993) and Liang (1999) study the 2-day announcement effect in the case of the publishing of recommendations. They show substantial mean reversion of stock returns after 10 - 15 days following the stock recommendations. Womack (1996) documents significant positive stock returns after the 'buy' recommendation and negative returns after the 'sell' recommendation. Barber et. al. (2001) document that the investment strategy based on buying stocks with strong consensus recommendations gives an

annualized abnormal returns of 9,4%. However, after taking into account the transaction costs, the objective investment strategy gives abnormal returns of -3,1%. Lin et. al. (2005) examines an investment strategy based on buying (selling) stocks with a strong 'buy' ('sell') rating. He shows that abnormal returns for the buying strategies equal to 3,1% and for the selling strategies amount to 2,2%. Green (2006) shows that the investment strategies based on trading on recommendations that are available for subscribing investors before they become widely disseminated, give an annualized abnormal return of 30%.

Evidence on the profitability of analysts' recommendations in the case of the Polish market is very modest and suggests rather poor performance. Gurgul (2006) study the 5-day announcement effect in the case of the recommendations published for the period of 1995 - 2003. Gurgul observes that the impact of new recommendations on stock prices up to 5 days after the announcement is not statistically significant. Mielcarz, Podgórski and Weremczuk (2007) examine the impact of positive recommendations on stocks' abnormal returns for the recommendations issued between January 2005 and December 2006. They show that 'buy' recommendations result in statistically significant abnormal returns. Mielcarz and Podgórski (2008) study the impact of negative and neutral recommendations issued for public companies listed on the WSE on the abnormal returns. They analyze recommendation announcements between January 2005 and December 2006. Mielcarz and Podgórski find that the negative recommendations have a statistically significant impact on the occurrence of negative abnormal returns. Biedrzyński (2008) observes that generally prices of only 57% of stocks rated between January 2006 and February 2008 changed in the direction forecasted by the recommendation. Not very impressive forecasting abilities of stock recommendations are also confirmed by regressions performed by Czyżycki and Klóska (2010). Konopko and Kokolus (2012) find out that in the years 2010-2011 only 47% of recommended stocks reached target prices during 6 months following a report publication. Zaremba and Konieczka (2014) based on annual returns find evidence of the profitability of issued brokerage recommendations. However these results are not statistically significant.

Data and research design

Our primary data source is Bloomberg. We use stock level data on all the companies on the Polish market available in Bloomberg. We use both listed and unlisted companies so as to avoid any form of survivorship bias. Our primary sample period is April 2004 to December 2013. In order to include a company in the sample in a given time, we have to be able to find the company's price, size (stock market capitalization) and an indicator of stock market optimism (described later). The number of companies in the sample grows from 29 to 158 and the average number is 91. We do not use earlier data as there are too few companies to form reasonable portfolios. In most of the computations we split the full research period into two sub-periods with the breakpoint of 12/31/2008 in order to test the robustness of the results. Finally, in all the computations we do not account for the impact of market frictions like transaction costs and confined liquidity. These issues are beyond the scope of this paper.

We use two distinct indicators of analyst optimism related to a certain stock. The first is the relation of the average target price in recommendations issued during the three months preceding the portfolio formation to the actual market price of the stock. The second indicator is the average analyst rating computed assuming that buy/strong buy=5, overweight/accumulate = 4, neutral/hold = 3, reduce/underweight = 2 and sell/strong sell = 1. In each case, the higher the indicator, the bigger the analyst's optimism. In all the calculations we use both described measures. In other words all the research is actually done twice – based on target prices and based on ratings. It is important to point out that in both approaches we intentionally use data that may be even three months old in order to avoid any form of look-ahead bias.

First, we calculate returns on recommendations-sorted portfolios. We divide the stocks into 5 independent quintiles based on analyst optimism. Each month, we calculate the 20, 40, 60, and 80 percentiles for optimism indicators. Based on them, we form 5 distinct quintile portfolios in the case of each characteristic. We use two different weighting methodologies: equal-weighting and value weighting. For presentational purposes, we first aggregate cross-sectional arithmetic returns and then compute time-series' means and standard deviation of quintile portfolios using log-returns.

Next, we examine if the return patterns related to analyst optimism are similar among large and small companies. Therefore, we form 6 portfolios double-sorted on size and recommendations. Initially, we divide the stocks into two size portfolios based on their stock capitalization. We define the size breakpoint as the median size of all the stocks in the sample in a given month. We classify the stocks above median as the large stocks, and the remaining ones as the small stocks.

In other words, the number of stocks in both portfolios is usually equal. Second, again for all the stocks we determine standard top 30% (top rated), middle 40% (neutral), and bottom 30% (bottom rated) breakpoints. In other words, the stocks with the highest ratings or target prices are regarded as top rated stocks and the stocks with the lowest ratings or target prices ratios as bottom rated stocks. The computed breakpoints are applied to the big and small stocks, so, we create 6 groups of stocks which emerge from the double-sorts on size and recommendations. Next, based on the described division, we form six portfolios, which we denote by BT, BN, BB, ST, SN and SB, where B and S refer to big or small, and T, N and B refer to top, neutral and bottom rated. We use both asset and equal weighting schemes.

Finally, we test the profitability of the strategies based on analysts' ratings. We test two distinct strategies: based on target prices and based on ratings (according to the descriptions above). In order to do that, we construct long/short market neutral portfolios which take long positions in the top rated stocks and short positions in the bottom rated stocks. In other words, each portfolio is fully invested:

1) 100% long in the quintile of top rated/top target price stocks,

2) 100% short in the quintile of bottom rated/top target price stocks,

3) 100% long in the risk-free asset (the 1-month Warsaw Interbank Bid Rate – WIBID).

Again, to check the robustness of the results we use both asset and equal weighted portfolios.

We test the performance of the portfolios against three distinct pricing models. The first one is the classical Capital Asset Pricing Model (Sharpe, 1964, 1966; Lintner, 1965; Mossin, 1966). The model assumes that asset returns depend only on the market portfolio and is described by the regression equation below.

$$R_{(i,t)}=\alpha_i+R_{(f,t)}+\beta_{(rm,i)}\cdot(R_{mt}-R_{(f,t)})+\varepsilon_{(i,t)}, \quad (1)$$

where $R_{i,t}$, $R_{m,t}$ and $R_{f,t}$ are returns on the analyzed asset i, market portfolio and risk-free returns at time t, and α_i and $\beta_{(rm,i)}$ are regression parameters. The α_i intercept measures the average abnormal return (so called Jensen-alpha). The R_m-R_f is the difference between the return on the WIG Index (the broadest Polish equity market total returns index, which encompass almost the entire market universe) and the 1-month Warsaw Interbank Bid Rate (WIBID). Furthermore, all the excess returns in the study are calculated over the 1-month WIBID rate.

The second model is the Fama-French three factor model (Fama & French, 1993):

$$R_{(i,t)}=\alpha_i+R_{(f,t)}+\beta_{(rm,i)}\cdot(R_{(m,t)}-R_{(f,t)})+\beta_{SMB}\cdot SMB_t+\beta_{HML}\cdot HML_t+\varepsilon_{(i,t)}, \quad (2)$$

where $\beta_{(rm,i)}$, $\beta_{(SMB,i)}$, $\beta_{(HML,i)}$, and α_i are the estimated parameters of the model. $\beta_{(rm,i)}$ is analogical to the CAPM beta, but it is not equal to it. The $\beta_{(SMB,i)}$, $\beta_{(HML,i)}$ are exposed to SMB_t and HML_t risk factors, which denote returns from zero-cost arbitrage portfolios. SMB_t is the difference in returns on diversified portfolios of small and large caps at time t, while HML_t is in general difference in returns on portfolios of diversified value (high B/V) and growth (low B/V) stocks. In other words, SMB and HML are returns on zero-cost market-neutral long/short portfolios formed based on size and value characteristics.

The last model is the four-factor model, which was originally introduced by Carhart (1997) and its corresponding regression equation is:

$$R_{(i,t)}=\alpha_i+R_{(f,t)}+\beta_{(rm,i)}\cdot(R_{(m,t)}-R_{(f,t)})+\beta_{(SMB,i)}\cdot SMB_t+\beta_{(HML,i)}\cdot HML_t+\beta_{(WML,i)}\cdot WML_t+\varepsilon_{(i,t)} \quad (3)$$

The model additionally incorporates the momentum returns measured by returns on so-called winner and loser portfolios, which were used in the initial studies of this anomaly (Jegadeesh & Titman, 1993). The WML_t denotes the difference between returns on diversified winner and loser portfolios over the previous year.
The pricing factors come from Adam's Zaremba website (http://adamzaremba.pl/downloadable-data/) and are computed according to the methodology described in the paper by Zaremba (2014).

In both models, our zero hypothesis is that the alpha intercept is not statistically different from zero, and the alternative hypothesis states that it is actually different from zero. We find the equation parameters using OLS and test their statistically significant using parametric tests.

Results and interpretation

Tables 1 and 2 report excess returns for portfolios sorted according to the analysts' optimism. Starting with the target price-based portfolios (Table 1), in the entire research period the top target-price stocks have larger returns than the low target price stocks. This observation is true in both equal and value weighting schemes, although the cross-sectional variation seems to be larger in the case of equal weighed portfolios. The top target price

portfolios' means that excess log-returns are 0,5% (equal weighted) and 0,51% (value weighted), while the low target price means are -0,54% (equal weighted) and -0,02% (value weighted). What is interesting is that the riskiness of all the portfolios (measured with a standard deviations) is generally similar across all the quintiles. Although the top target-price stocks appear to perform better than the low target price stocks, the exact size of this dominance seems to be slightly time-variant. Focusing on the value weighted portfolios, the difference in average excess log-returns between the top and bottom quintile portfolios is 0,49 percentage points in years 2004-08, while in years 2009-13 it grows to 0,58 percentage points. Finally, the results of portfolios based on ratings (Table 2) generally resembles those based on target prices.

Table 1: Excess returns on 5 portfolios sorted on target prices

Panel A: equal weighted portfolios

	Min R	2	3	4	Max R
04/30/2004-12/31/2013					
Average	-0,75	-0,07	0,13	0,57	0,54
St. dev.	8,15	7,37	6,83	7,46	6,98
04/30/2004-12/31/2008					
Average	-1,42	-0,40	-0,60	-0,77	-0,29
St. dev.	8,23	7,21	7,39	7,99	7,73
01/31/2009-12/31/2013					
Average	-0,13	0,24	0,81	1,82	1,32
St. dev.	8,08	7,57	6,24	6,75	6,16

Panel B: capitalisation weighted portfolios

	Min R	2	3	4	Max R
04/30/2004-12/31/2013					
Average	0,03	-0,22	0,10	0,25	0,46
St. dev.	8,21	8,80	6,42	7,02	7,53
04/30/2004-12/31/2008					
Average	-0,47	-0,36	-0,01	-0,42	0,12
St. dev.	8,58	7,84	7,30	8,22	8,95
01/31/2009-12/31/2013					
Average	0,49	-0,09	0,19	0,89	0,78
St. dev.	7,89	9,67	5,53	5,68	5,97

Table 2 reports the means and standard deviations of excess log-returns on 5 portfolios formed on analysts' ratings. "Min R" denotes the portfolio with the lowest rated stocks and "Max R" is the portfolio with the top rated stocks. The exact portfolio formation procedure is described in the data section. The computations are based on monthly time-series. All the returns are calculated using stock level data from Bloomberg. The data period is 04/30/2004-12/31/2013. Panel A depicts equal weighted portfolios, while Panel B refers to capitalisation weighted portfolios.

The return patterns related to recommendations are particularly strong among the small companies (Tables 3 and 4). For the value weighted portfolios, the small top rated stocks earned 0,81% excess log-returns monthly, while the bottom rated stocks lost on average -0,90%. In the case of the large-caps this amounts to 0,55% and -0,34 %, so the difference is much smaller. The domination of the effectiveness of recommendations across the small firms is more or less time-variant, however in both analysis sub-periods the small-caps prevail.

Table 3: Excess returns on portfolios from 2x3 sorts on target prices and size

Panel A: equal weighted portfolios

	Average			Standard deviation		
	Min TP	Mid TP	Max TP	Min TP	Mid TP	Max TP
			04/30/2004-12/31/2013			
Small	-0,79	-0,04	0,77	8,31	7,23	8,01
Big	-0,08	0,53	0,51	7,34	6,84	7,35
			04/30/2004-12/31/2008			
Small	-0,82	-0,96	-0,17	8,31	7,47	7,42
Big	-0,06	0,21	-0,81	8,59	7,44	8,12
			01/31/2009-12/31/2013			
Small	-0,76	0,77	1,59	8,38	6,97	8,46
Big	-0,09	0,82	1,65	6,12	6,30	6,44

Panel B: capitalisation weighted portfolios

	Average			Standard deviation		
	Min TP	Mid TP	Max TP	Min TP	Mid TP	Max TP
			04/30/2004-12/31/2013			
Small	-0,90	0,02	0,81	8,39	7,30	8,18
Big	-0,34	0,25	0,55	7,60	7,13	7,34
			04/30/2004-12/31/2008			
Small	-0,98	-0,83	0,00	8,77	7,54	8,27
Big	-0,48	-0,17	0,24	9,29	7,28	7,84
			01/31/2009-12/31/2013			
Small	-0,83	0,75	1,51	8,10	7,06	8,09
Big	-0,22	0,62	0,81	5,83	7,03	6,92

Table 3 reports the means and standard deviations of excess log-returns on 6 portfolios formed on target prices (relation to actual prices) and size (market capitalization). All the firms are sorted into two size groups and three target prices groups. We intersect the two sorts on size and three on value, and equal or value weight to obtain six portfolios. The exact portfolio formation procedure is described in the data section. The computations are based on monthly time-series. All the returns are calculated using stock level data from Bloomberg. The data period is 04/30/2004-12/31/2013. Panel A depicts equal weighted portfolios, while Panel B refers to capitalisation weighted portfolios.

Table 4: Excess returns on portfolios from 2x3 sorts on ratings and size

Panel A: equal weighted portfolios

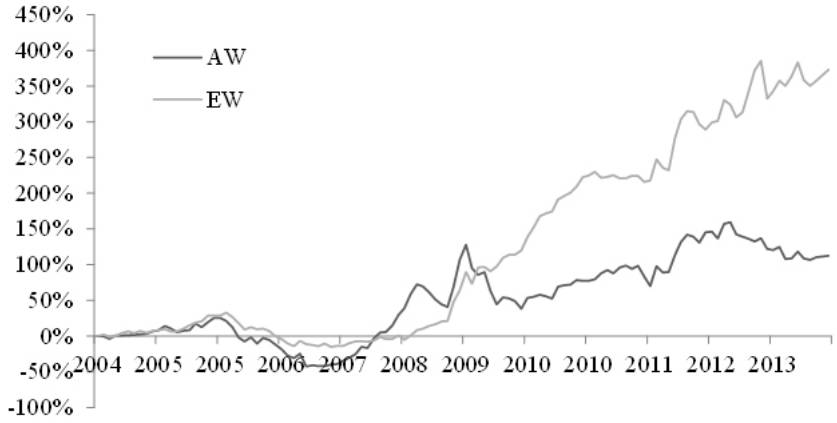
	Average			Standard deviation		
	Min TP	Mid TP	Max TP	Min TP	Mid TP	Max TP
			04/30/2004-12/31/2013			
Small	-1,13	0,65	0,45	8,73	8,75	7,41
Big	0,04	0,21	0,65	7,67	6,41	7,29
			04/30/2004-12/31/2008			
Small	-1,78	0,85	-0,45	8,40	8,33	7,76
Big	0,11	-0,37	-0,25	7,66	7,33	8,91
			01/31/2009-12/31/2013			
Small	-0,57	0,47	1,23	9,03	9,17	7,05
Big	-0,01	0,72	1,44	7,75	5,51	5,47

Panel B: capitalisation weighted portfolios

	Average			Standard deviation		
	Min TP	Mid TP	Max TP	Min TP	Mid TP	Max TP
04/30/2004-12/31/2013						
Small	-0,99	0,80	0,39	8,70	8,57	7,35
Big	-0,05	0,02	0,28	7,81	7,20	7,18
04/30/2004-12/31/2008						
Small	-1,63	1,11	-0,42	8,96	8,85	7,93
Big	-0,08	-0,21	-0,18	8,14	7,60	8,86
01/31/2009-12/31/2013						
Small	-0,43	0,53	1,10	8,50	8,38	6,78
Big	-0,02	0,22	0,67	7,58	6,89	5,35

Table 4 reports the means and standard deviations of excess log-returns on 6 portfolios formed on ratings and size (market capitalization). All the firms are sorted into two size groups and three ratings groups. We intersect the two sorts on size and three on value, and equal or value weight to obtain six portfolios. The exact portfolio formation procedure is described in the data section. The computations are based on monthly time-series. All the returns are calculated using stock level data from Bloomberg. The data period is 04/30/2004-12/31/2013. Panel A depicts equal weighted portfolios, while Panel B refers to capitalisation weighted portfolios.

Panel A: target price-based strategies



Panel B: rating-based strategies

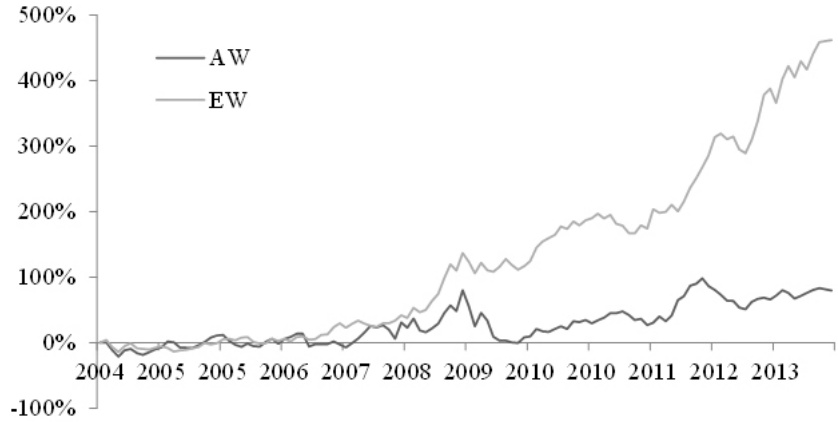


Figure 1: Cumulative returns of strategies based on recommendations

TThe figure depicts cumulative returns to strategies based on recommendations. All the returns are calculated using stock level data from Bloomberg. The data period is 04/30/2003-12/31/2013. "AW" refers to asset weighted portfolios and "EW" refers to equal weighted portfolios. Panels A and B depict consecutively the results of strategies based on target prices and ratings.

The long/short investment strategy delivered negative excess returns in the analyzed periods. However, the excess returns are not statistically significant. We suppose that it may be due to the relatively short time of series available.

Figure 1 depicts the cumulative returns to strategies based on analysts' recommendations. It can be clearly seen that both strategies – based on target prices and on ratings – deliver positive rate of returns. Nonetheless, it should be noted, that the returns are much higher in the case of the equal weighting. This observation is probably due to the higher return spread between top- and bottom-rated companies among the small-caps.

Table 5 provides additional insights into the performance of recommendation-based strategies. Panel A presents results of strategies based on target prices. First, it is important to notice that abnormal returns on both the long-only or short-only strategies are not statistically significant. For the market neural equal weighted portfolios (MN), the observed intercept is positive and statistically significant. The CAPM alpha of the market neutral asset weighted portfolios is equal to 0,60%, however the t-stat is only 0,91. The MN portfolios are slightly negatively correlated with the market risks. Additionally, the application of the three- and four-factor models reveals some information about the source of returns. It appears that some of the income may be explained by the HML factor, which suggests that analysts usually ascribe higher target prices to high book-to-market companies. The momentum and size factors remain insignificant. Finally, it is important to point out that the abnormal returns to MN equal weighted portfolios remain significant after applying all three models and the alphas vary from 0,88% (Carhart's model) to 1,09% (CAPM).

The performance of strategy based on ratings (Panel B) is even more impressive, however only in case of equal weighting. The intercepts from MN asset weighted portfolios vary from 0,57% (CAPM) to -0,11 (four-factor model) and are not statistically significant. On the other hand, the MN equally weighted portfolios earn significant alphas of 0,99%-1,34%. The returns to both strategies are also partially countercyclical, as the beta to the market factor is negative. However, the inherent source of the returns to MN portfolios seems to be different, as neither SMB or HML are not statistically significant. Instead of that, there is a positive and statistically significant beta to the WML factor. It appears that about 1/4 of the CAPM abnormal returns is derived from the fact that analysts usually rate higher these stocks which performed better in the past. In other words, at least some of the positive returns may be explained by market momentum.

Table 5: Performance of strategies based on recommendations

Panel A: target price-based strategies

	CAPM		Three-factor model				Four-factor model				
	Mkt-RF	α	HML	SMB	Mkt-RF	α	WML	HML	SMB	Mkt-RF	α
EW	-0,09	1,09	0,33	0,05	-0,13	0,87	-0,01	0,32	0,05	-0,13	0,88
	(-1,27)	*(2,43)*	*(3,84)*	*(0,62)*	*(-1,94)*	*(2,02)*	*(-0,06)*	*(2,97)*	*(0,60)*	*(-1,92)*	*(1,92)*
AW	-0,17	0,60	0,37	-0,14	-0,22	0,40	0,01	0,38	-0,14	-0,22	0,38
	(-1,67)	*(0,91)*	*(2,93)*	*(-1,10)*	*(-2,19)*	*(0,64)*	*(0,10)*	*(2,36)*	*(-1,06)*	*(-2,14)*	*(0,56)*

Panel B: rating-based strategies

	CAPM		Three-factor model				Four-factor model				
	Mkt-RF	α	HML	SMB	Mkt-RF	α	WML	HML	SMB	Mkt-RF	α
EW	-0,25	1,34	-0,08	0,11	-0,24	1,36	0,20	0,08	0,15	-0,21	0,99
	(-3,65)	*(3,12)*	*(-0,91)*	*(1,23)*	*(-3,48)*	*(3,15)*	*(2,47)*	*(0,79)*	*(1,68)*	*(-3,14)*	*(2,21)*
AW	-0,35	0,57	0,09	-0,05	-0,36	0,54	0,36	0,37	0,02	-0,32	-0,11
	(-3,42)	*(0,89)*	*(0,65)*	*(-0,36)*	*(-3,47)*	*(0,82)*	*(2,86)*	*(2,29)*	*(0,14)*	*(-3,10)*	*(-0,17)*

The regression models for recommendations based portfolios are estimated for monthly returns. The portfolios are tested against the Polish CAPM, Fama-French three-factor model and Carhart four factor model. Mkt-RF is the return on the WIG Index minus 1-month WIBID rate. SMB is the small minus big factor, HML is the high minus low factor, WML is the momentum factor. All the returns are calculated using stock level data from Bloomberg. The data period is 04/30/2003-12/31/2013. The table also reports the t-statistics (t-stat). Factors for Poland are obtained from Adam Zaremba's website. "AW" refers to asset weighted portfolios and "EW" refers to equal weighted portfolios. Panels A and B depict consecutively the results of strategies based on target prices and ratings.

Conclusions and areas for further research

The study investigates the profitability of analysts' recommendation in the Polish market. Similarly to studies in developed markets, recommendations in Poland provide some important information for investors. The top rated stocks generally deliver higher returns than the bottom rated stocks. This effect is particularly strong among small companies. As a result, it is possible to build profitable strategies based on analysts' recommendations. However, performance is highly dependent on the portfolio-construction methodology. Our computations show that only the equally weighted portfolios deliver statistically significant positive abnormal returns. The positive abnormal returns on asset weighted portfolios are not statistically significant. Finally, it is important to note that at least some of the abnormal returns may be explained by value and momentum effects.

In other words, it seems that analysts usually rate better low B/M stocks with good past performance. Nonetheless, the equally weighted portfolios deliver abnormal returns even after accounting for these factors. Some further research should focus on a few issues. First, interactions between the profitability of recommendations and various market factors and dimensions (size, value, momentum), should be investigated more precisely. Second, the impact of transaction costs and liquidity should be examined. Third, the sample could be expanded into other markets from the EU region. Finally, it would be interesting to test whether some recommendation-specific characteristics (for example underwriting relation, type of issuer, etc.) have material influence on the recommendation profitability.

References

Barber, B. M., Loeffler, D. (1993). T*he' Dartboard' Column: Second-hand Information and Price Pressure*. Journal of Financial and Quantitative Analysis, vol. 28, no. 2, 273-284.

Barber, B., Lehavy, R., McNichols, M., & Trueman, B. (2001). *Can Investors Profit from the Prophets? Security Analyst Recommendations and Stock Returns.* The Journal of Finance, 56 (2), 531–563.

Beneish, M. D. (1991). *Stock Prices and the Dissemination of Analysts' Recommendation. Journal of Business*, 64, no. 3, 393–416.

Biedrzyński, R. (2008). W*ycena w rekomendacjach sporządzanych przez biura maklerskie a cena rynkowa spółek notowanych na Giełdzie Papierów Wartościowych w Warszawie* (Valuation in the recommendation provided by brokerage houses and the market price of public companies listed on Warsaw Stock Exchange). MA Thesis. Szczecin: Szczecin University of Economics.

Cambell, J. Y., Lo, A. W., MacKinlay, A. C. (1997). *The Econometrics of Financial Markets.* Princeton, New Jersey: Princeton University Press.

Carhart, M. M. (1997). *On Persistence in Mutual Fund Performance. Journal of Finance*, 52, no. 1, 57–82.

Cochrane, J. C. (2005). *Asset Pricing. Princeton,* New Jersey: Princeton University Press.

Cowles, A. (1933). *Can Stock Market Forecasters Forecast?* Econometrica, Volume 1, Issue 3, 309 – 324.

Czyżycki, R., Klóska, R. (2010). *Rekomendacje giełdowe jako źródło wiedzy dla inwestora indywidualnego* (The stock recommendations as a source of knowledge for the individual investor) . MEK 2010 Company Processes and Market Requirements, 2371-2378.

Ertimur, Y., Zhang, F., Muslu, V. (2010). *Why Are Recommendations Optimistic? Evidence from Analysts' Coverage Initiations.* Review of Accounting Studies, 16, 679-718.

Fama, E. F., French, K. R., (1993). *Common Risk Factors in the Returns on Stocks and Bonds.* Journal of Financial Economics, 33, no. 1, 3–56.

Green, C. (2006). *The Value of Client Access to Analyst Recommendations.* Journal of Financial and Quantitative Analysis, 41, 1 -24.

Gurgul, H. (2006). *Analiza zdarzeń na rynkach akcji. Wpływ informacji na ceny papierów wartościowych.* Kraków: Oficyna Ekonomiczna.

Jegadeesh, N. Titman S. (1993). *Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency.* The Journal of Finance, 48(1), 65-91.

Jegadeesh, N., Kim, J., Krische, S.D., Lee, C. (2004). *Analyzing the Analysts: When Do Recommendations Add Value?* The Journal of Finance, 59 (no. 3), 1083–1124.

Konopko, Ł., Kokolus, E. (2012). *Sprawdzalność rekomendacji domów maklerskich (Verifiability of the brokerage houses' recommendations). XVII Międzynarodowa Konferencja Studenckich Kół Naukowych w Opolu,* (Retrieved from: http://wiadomosci.stockwatch.pl/raport-sprawdzalnosc-rekomendacji-domow-maklerskich,strategie-inwestycyjne,23802, access: 13/10/2013).

Liang, B. (1999). *Price Pressure: Evidence from the 'Dartboard' Column.* The Journal of Business, 72, no. 1, 119–134.

Lin, H., McNichols, M., O'Brien, P. (2005). *Analyst Impartiality and Investment Banking Relationships.* Journal of Accounting Research, 43, no. 4, 623–650.

Lintner, J. (1965). *The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets.* Review of Economics and Statistics, 47, 13-37.

Liu, P., Smith, S. D., Syed, A. A. (1990). *Stock Price Reactions to the Wall Street Journal's Securities Recommendations.* Journal of Financial and Quantitative Analysis, 25, no. 3, 399–410.

Loh, R. K., Mian, G. M. (2006). *Do Accurate Earnings Forecasts Facilitate Superior Investment Recommendations?* Journal of Financial Economics, 80, no. 2, 455–483.

Mielcarz, P., Podgórski, B. (2008). *Wpływ negatywnych i neutralnych rekomendacji na osiąganie ponadprzeciętnych stóp zwrotu na GPW w latach 2005-2006.* Studia i Prace. Wydziału Nauk Ekonomicznych i Zarządzania, no. 7, pp. 533-544.

Mielcarz, P., Podgórski, B., Weremczuk, P. (2007). *Positive Recommendations and Abnormal Returns on Warsaw Stock Exchange in 2005 - 2006.* In: Urbańczyk, E. (ed.). The Problem of Company Value Management. Szczecin: Wydział Nauk Ekonomicznych i Zarządzania, pp. 181-190.

Mossin, J. (1966). *Equilibrium in a Capital Asset Market.* Econometrica, 34, 768-783.

Papakroni, J. (2012). *The Dispersion Anomaly and Analyst Recommendations.* SSRN.

Sharpe, W. F. (1964). *Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk.* Journal of Finance, 19, 425-442.

Sharpe, W. F. (1966). *Mutual Fund Performance.* Journal of Business, 39, 119-138.

Womack, K. L. (1996). *Do Brokerage Analysts' Recommendations Have Investment Value?* Journal of Finance, 51, 137–167.

Zaremba, A., Konieczka, P. (2014). *Skuteczność rekomendacji maklerskich na polskim rynku akcji.* Finanse, Rynki Finansowe, Ubezpieczenia, 66, 573–581.

Zaremba, A. (2014). *Cross-Sectional Asset Pricing Models for the Polish Market.* SSRN working paper: http://dx.doi.org/10.2139/ssrn.2396884.