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Profitability of investment strategies developed on the basis of buy and sell recommendations

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Abstract

Aim/purpose – The paper has two objectives. The first is to examine the profitability of applying investment strategies based on “buy” and “sell” recommendations issued by stock market analysts. The second objective is to validate that analysts who issue a recommendation may not be impartial (not supporting any of the sides involved in an argument) because the largest group of recommendations issued is “buy” recommendations.

Design/methodology/approach – This study was conducted based on all the “buy” and “sell” recommendations issued during the period between January 1, 2004 and December 31, 2016 for companies listed on the Warsaw Stock Exchange, using data from www.bankier.pl. The annual forecast rates of return were determined for all the recommendations included in the survey. The expected rates of return were determined for each recommendation based on the information collated from the Bloomberg database. The regression analysis enabled the exploration of the relationship between the actual rates of return and the rates of return predicted in recommendations.

Findings – It was determined that investing on the basis of the information included in “sell” recommendations might make it possible to avoid unprofitable investments. At the same time, the study shows that an investment strategy compliant with “buy” recommendations does not let the investor achieve the expected rates of return on an investment in the capital market in the long term.

Research implications/limitations – The conducted research could be an important source of information for stock market investors’ decision-making regarding investments.

Originality/value/contribution – Despite the topic of recommendation effectiveness being very important from the perspective of capital market theory and practice, it is still unclear whether investing based on information provided in stock market recommendations can be a profitable strategy in the long run. The study offers a bridge to fill the existing research gap.

Keywords: recommendations, stock exchange, investment.

JEL Classification: G140.

1. Introduction

Stock exchange recommendations are one of the most important instruments that define the investment policies of investors in capital markets, and thus, should guide investors into making the right investment decisions (Jegadeesh & Kim, 2006; Michaely & Womack, 1999). The effectiveness of the application of stock market recommendations is ambiguous. Although research on the effectiveness of stock market recommendations has been conducted for decades (Diefenbach, 1972; Park & Park, 2019) determining the legitimacy of building investment portfolios based on stock market recommendations is difficult in both the long- and short-time horizons.

Womack (1996) analyzed the price reactions to recommendations and found significant positive (negative) price reactions to buy (sell) recommendations, with this trend holding for one month for “buy” and six months for “sell” recommendations. Jegadeesh and Kim (2006) demonstrated that stock prices on the day of publication of a recommendation and subsequent days reacted per the recommendations. Stock prices generally change in line with recommendations, in a period of up to six months a result that was especially evident for most developed countries, such as the United States (US) and Japan. Ryan and Taffler (2006) confirmed that stock price exchanges in the United Kingdom followed the direction presented in the recommendations from both the date of issue and in the next few months. Several studies have found that an investment strategy consistent with the consensus presented in a recommendation generates a significant abnormal rate of return (Barber, Lehavy, McNichols, & Trueman, 2001, 2010; Cornett, Tehranian, & Yalcin, 2007; Michaely & Womack, 1999). Park and Park (2019) examined whether investors could benefit from consensus recommendations of stock market analysts in the US. They found that the strategy of purchasing “strong buy” stocks and shorting “strong sell” stocks generated an abnormal rate of return of 4.7-5.8% per year during the 2001-2016 period. To summarize, several studies have found a positive price stock reaction in situa-

tions where an updated recommendation changes toward strong buy and vice versa for downgraded revisions (Barber et al., 2001; Bjerring, Lakonishok, & Vermaelen, 1983; Groth, Lewellen, Schlarbaum, & Lease, 1979; Stickel, 1995).

However, other studies indicated a lack of correlation between recommendations and share prices. Bidwell (1977) and Logue and Tuttle (1973) did not find a significant price reaction to recommendation changes. Other studies have illustrated that an investment strategy applied in line with recommendations is not effective. For example, Barber, Lehavy, McNichols, and Trueman (2003) and Woolridge (2004) pointed to negative abnormal returns based on data from 2000 and 2001. Su, Zhang, Bangassa, and Joseph (2019) demonstrated that upgrades of recommendations do not yield any significant positive abnormal returns in any period. Moulya and Mallikarjunappa (2020) found a significant price change delay following “buy” recommendations. The findings may indicate that recommendations fail to impact stock prices. Moreover, the literature indicates the reluctance of analysts to issue negative recommendations (Gadomska, Izbrandt, & Włosik, 2017). The largest group of recommendations issued is “buy” recommendations (Barber et al., 2001; Diefenbach, 1972). Therefore, the said literature commonly discusses a potential lack of objectivity of analysts issuing recommendations, which may serve as an additional argument considering recommendations to be an inappropriate source of investment information.

It is worth noting that the research on this issue focused mainly on how changes in stock recommendations influence returns (Barber et al., 2001; Goff, Hulburt, Keasler, & Walsh, 2008; Hobbs, Keasler, & McNeil, 2012; Keasler & McNeil, 2010; Loh & Stulz 2011; Sant & Zaman, 1996; Womack, 1996). Research on the effectiveness of stock market recommendations based on the target price accuracy approach has been much less common, although, as indicated in the literature, it may provide better results in terms of assessing the effectiveness of recommendations (Asquith, Mikhail, & Au, 2005). As for the accuracy of target price forecasts, Asquith et al. (2005) investigated whether the current stock price reached or exceeded the target price within a 12-month period. They found that price forecasts proved correct in 54.28% of all cases. Bradshaw, Brown, and Huang (2013) found that only 38% of target price predictions were correct at the end of a 12-month period. Bonini, Zanetti, Bianchini, and Salvi (2010) developed inaccuracy measures and illustrated that the target price accuracy level for the total sample amounted to 73.64% after 12 months.

The above analysis demonstrated that the results of the studies on the effectiveness of stock exchange recommendations are ambiguous. Most of the prior studies investigate the effects of stock recommendation changes on common

stock prices (Barber et al., 2001; Goff et al., 2008; Hobbs et al., 2012). These analyses are not based on the target price accuracy approach, which seems to be useful in explaining the effectiveness of a recommendation. In addition, most of the studies to date have focused on the short-term impact of recommendations on stock prices. Considering the above arguments, especially the ambiguity of the results presented in other studies, the long-term effectiveness of stock exchange recommendations for companies listed on the Warsaw Stock Exchange has been analyzed, applying techniques based on target price accuracy. An additional argument justifying the need for this type of research is its rarity concerning the developing markets as much of this type of research concerns developed markets, such as the US or Japan.

The paper has two objectives. The first one is to examine the profitability of applying investment strategies based on “buy” and “sell” recommendations issued by stock market analysts. Two research questions have been formulated to support achieving the aforementioned goal. The answer to the first question aims to ascertain if investing in companies for which “buy” recommendations have been issued enables achieving the returns expected by investors. The response to the second question seeks to analyze the financial profitability from the sale of shares for which a “sell” recommendation has been issued.

The second objective is to validate that analysts who issue a recommendation may not be impartial because the largest group of recommendations issued is “buy” recommendations. In this context, the study aims to find whether the difference between the average prices on the day of issue of a recommendation and the target price indicated in a recommendation is greater for “buy” recommendations.

The remainder of the paper is structured as follows. In the first section, an overview of the existing research is provided, while in the second section, the proposed research hypotheses are elaborated on and the method applied to verify them is presented. The final section presents the empirical results and conclusions of the study.

2. Literature review on the effectiveness of stock market recommendations

The extant literature addressing the matter of stock market recommendations predominantly analyzes the impact of such recommendations on changes in share prices and their ability to predict the vector and the magnitude of such changes. The first of the perspectives focusing on the impact of recommenda-

tions on company value assumes that the very fact of a recommendation being issued may have a short-term impact on share prices (Jegadeesh & Kim, 2006, Park & Park, 2019). In this context, “short-term” usually implies an event window of up to three weeks from the date a recommendation is issued (Mielcarz, 2016). The other perspective concerning the phenomenon of issuance of recommendations pertains to the effectiveness of stock market recommendations (Barber et al., 2010; Jegadeesh, Kim, Krische, & Lee, 2004; Zaremba & Konieczka 2015), which means that it aims to verify the hypothesis positing that the act of following the strategy presented in a recommendation may yield abnormal rates of return. From this, it appears that the effectiveness of an investment strategy provided in a recommendation can be analyzed only from a long-term perspective (over three weeks from the date a recommendation is issued). In a shorter time frame, the changes that occur in share prices after a recommendation is issued may actually be, to a large extent, market reactions to the recommendation being issued. In this context, it is important to interpret the findings of research discussing the effectiveness of recommendations in a short-term perspective with great caution.

The extant literature regarding the effectiveness of stock market recommendations is not explicit. In the 1970s, research on the effectiveness of stock market recommendations was conducted by Diefenbach (1972) and Groth et al. (1979). Groth et al. (1979) suggested a possibility of achieving positive returns on investments recommended by analysts in a short period of time. However, the results of the analyses carried out by Diefenbach (1972) make it difficult to arrive at an unequivocal assessment of the verifiability of recommendations issued by stock market analysts.

In subsequent years, the effectiveness of stock market recommendations was examined by Womack (1996), Jegadeesh et al. (2004), and Barber et al. (2003), among others. The results of research conducted by Womack (1996), Jegadeesh et al. (2004) suggested that in the short term, following the recommendations issued by analysts could be an effective investment strategy. However, Barber et al. (2003) obtained ambiguous results, which proved that in 1996 to 1999, investing in shares of companies for which “buy” recommendations were issued made it possible to achieve abnormal average returns. Nevertheless, a similar analysis carried out for data from 2000 to 2001 did not confirm the above relationship to be true.

Ryan and Taffler’s (2006) analysis of short-and long-term effectiveness suggested a short-term verifiability of stock market recommendations. The analysis of the rates of return on shares within a few months after issuing a recom-

mentation did not confirm the possibility of obtaining above-average rates of return by following the strategies presented in the recommendations.

Polish research on stock market recommendations' effectiveness focuses on their short-term impact on share prices (Gurgul, 2006; Mielcarz, 2016; Mielcarz, Podgórski, & Waremczuk, 2007). Gurgul's (2006) research suggested no statistically significant short-term impact of "buy" recommendations on stock prices. However, Mielcarz et al. (2007) pointed to the occurrence of short-term effects of negative recommendations on the formation of above-average negative rates of return on investment in shares of companies listed on the Warsaw Stock Exchange. The literature also includes research on the impact of the economic situation on the effectiveness of stock market recommendations (Wnuczak, 2015).

The long-term effectiveness of recommendations issued in Poland was studied by Biedrzyński (2008) and by Konopko and Kokolus (Konopko, 2012). Both surveys pointed to the low long-term effectiveness of stock market recommendations.

Analyzing the literature, we observe that the results of research on the effectiveness of recommendations issued by stock market analysts were not clear. In addition, most research predominantly focused on the short-term effectiveness of recommendations – and much less frequently on the long-term verifiability of stock market recommendations.

As research on the effectiveness of recommendations issued by stock market analysts is ambiguous, further investigation is warranted. Moreover, the long-term effectiveness of recommendations requires special attention as it is an issue discussed in the literature to a much smaller extent than the short-term effectiveness of recommendations.

In light of the above, the first objective of the paper is to examine the effectiveness of investment strategies based on "buy" and "sell" recommendations. In relation to the main objective of the study, two research hypotheses have been formulated:

- H1: Compliance with "buy" recommendations can be the basis for building a profitable investment strategy,
- H2: By applying "sell" stock market recommendations, investors can avoid unprofitable investments.

The second objective concerns the bias of analysts issuing recommendations as discussed in the literature; the largest group of the recommendations issued is "buy" recommendations (Barber et al., 2001; Diefenbach, 1972; Jegadeesha & Kim, 2006). In this context, the study aims to ascertain whether the difference between the average prices on the day of issue of a recommenda-

tion and the target price indicated in the recommendations is greater for “buy” recommendations. In other words, the stud verifies the hypotheses according to which “buy” recommendations are more “optimistic” than “sell” recommendations. The above statement may be true if stock market analysts are not, in fact, impartial. In this regard, the following research hypothesis has been formulated:

- H3: The difference between the prices on the day the recommendation is issued and the target price is greater for a “buy” than for a “sell” recommendation.

3. Methods

To verify the set research hypotheses, all the “buy” and “sell” recommendations issued in the period between January 1, 2004 and December 31, 2016 for companies listed on the Warsaw Stock Exchange were collected. Initially, 6,537 observations were obtained, including 4,976 “buy” recommendations and 1,561 “sell” recommendations. Each recommendation included the company’s share price on the date of issue and the target price indicated in the recommendation. It was assumed that the target price indicated would be reached after one year. Such a time horizon is often provided in the literature (Buzala, 2013) and in recommendations themselves, in the context of the period in which the target price indicated in a given recommendation should be arrived at. Based on this information, annual forecast rates of return have been determined for all the recommendations included in the survey. The forecast rate of return is the relationship of the difference between the target price of the share and its price on the date of issue of the recommendation in relation to the price of the share on the date of issue of the recommendation.

Then, expected rates of return were determined for each recommendation covered by the study. For this purpose, the CAPM (Capital Asset Pricing Model) concept was used and the expected rate of return was determined in accordance with the following formula (Wnuczak, 2011):

$$r_e = r_f + \beta^*(r_m - r_f)$$

where:

re – cost of equity (expected rate of return by the owners),

rf – risk-free rate,

rm – expected market rate of return on investment in capital assets,

β – measure of market risk involved in investing in a given company.

The application of the CAPM model required the determination of the following parameters for each observation:

1. The risk-free rate, determined as the yield on Polish 10-year government bonds (2020). For all the recommendations issued in a given year, the bond yields from the last day of a given year were used.
2. The expected market rate of return on investment in capital assets, calculated based on changes in WIG from the year 1993 to the year in which the analyzed recommendation was issued (WIG, 2020). In this manner, various rates of return on investment in capital assets were obtained for recommendations issued in different years. The first three years of operation of the Warsaw Stock Exchange (1991-1993) were omitted due to the immaturity of the Polish capital market and its nascent development in this period (Flotyński, 2015). According to many authors, the WIG index meets the criteria of the market portfolio (Czapkiewicz & Masłoń, 2009; Markowski, 2003; Olbryś, 2010).
3. The measure of the market risk involved in investing in a given company (β). Beta at level 1 was used for all observations, which implies that investing in individual companies carried the same risk as investing in the market portfolio. This simplification regarding the beta parameter calibration is in line with the approach presented in the literature; it is also shown that the adoption of such an approach may be more justified than beta calculation for individual companies (Carvalho & Barajas, 2013; Fernandez & Bermejo, 2009).

The next stage of the study was to determine the share price of the company named in the recommendation one year after it was issued. Based on these prices and the share price as on the date the recommendation was issued, the actual rates of return on individual shares were calculated. The comparison of the actual annual rates of return on shares for which “buy” recommendations were issued with the expected annual rates of return made it possible to determine the recommendations for which investors’ expectations were met. By examining the share of such recommendations in the entire population of “buy” recommendations, we could verify the first research hypothesis (H1). The second hypothesis (H2) was verified in a similar way. As previously noted, the application of an annual period to analyze the profitability of investments covered by recommendations is consistent with the literature (Buzala, 2013) and with the information presented in the recommendations themselves.

To obtain reliable results, the research sample was purified from observations marked by extreme values of the actual and the forecast rates of return.

Extreme values were eliminated using the z-score method, which uses both mean and standard deviations. Using the following formula, the z-score was determined for each observation covered by the analysis (Songwon, 2006):

$$Z_i = \frac{x_i - \bar{x}}{SD},$$

where:

Z_i – z-score value,

X_i – value of the examined variable (in this case, the value of the actual and forecast rate of return),

\bar{x} – average value of the examined variable,

SD – standard deviation of the examined variable.

In accordance with the literature, all observations for which the z-score parameter was below -3 and above 3 were rejected (Songwon, 2006). This way, 6,468 observations were finally obtained, including 4,912 “buy” and 1,556 “sell” recommendations.

To summarize, the application of the above research procedure made it possible to determine the following data for each recommendation:

- the projected rate of return after 12 months from the date of issue of the recommendation;
- the expected rate of return after 12 months from the date of issue of the recommendation;
- the actual rate of return yielded on the investment in given shares after 12 months from the date of issue of the recommendation;
- the annual risk-free rate.

After obtaining the above set of data, to verify H1 and H2, in which:

- the dependent variable is the actual rate of return on a given share after 12 months from the date of the recommendation;
- the independent variable is the forecast rate of return on a given share after 12 months from the date of the recommendation.

The regression analysis made it possible to explore the relationship between the actual and the predicted rates of return, which enabled the verification of the first two hypotheses. Additionally, to verify H1, the share of “buy” recommendations in the entire population of “buy” recommendations was calculated for shares, which can be characterized as follows:

- the actual rate of return one year after the recommendation was issued was equal to or higher than the one indicated in the recommendation;

- the actual rate of return after one year of issuing the recommendation was equal to or higher than that expected.

To verify H2, the share of “sell” recommendations in the entire population of “sell” recommendations was determined for shares, which can be characterized as follows:

- the price recorded one year after issuing the recommendation fell in relation to the price on the day of issue of the recommendation;
- the purchase of the shares indicated in the recommendation did not yield the risk-free rate during the year;
- the purchase of the shares indicated in the recommendation did not yield the expected rate of return during the year.

Comparing the actual annual rates of return on the shares for which “buy” recommendations were issued with the expected rate of return and the rate of return projected in the recommendations, the recommendations for which investors’ expectations had been met could be specified. By examining the share of such recommendations in the entire population of “buy” recommendations, H1 was verified and supported; H2 was verified in a similar manner.

To verify H3 based on the collected data for all “buy” recommendations, the average difference between the forecast rate of return after 12 months from the date of issue of the recommendation and the actual rate of return yielded by the investment in the given shares after 12 months from the date of issue was determined. A similar calculation was constructed for the “sell” recommendation.

Additionally, to verify H3, the accuracy of each recommendation was estimated on the basis of relative deviations of the target prices indicated therein, from the share price one year after a given recommendation was issued (Kerl, 2011, p. 83):

$$TPA = 1 - \left| \frac{P_{it}}{TP} - 1 \right|,$$

where:

TPA – target price accuracy factor,

P_{it} – closing price for “i” company’s shares and on day “t” (the closing prices were estimated for one year after the date of issue of the recommendation),

TP – target price indicated in a given recommendation.

Following this, the average accuracy was calculated for all “buy” and “sell” recommendations for each year and for the entire period covered by the analysis.

4. Results

The results of the study suggest that in the case of “buy” recommendations, there is a positive and statistically significant (i.e., reaching a 1% level of significance) relationship between the actual rates of return and the forecasts provided by analysts. For the estimated least squares model, the forecast rate of return coefficient amounted to 0.45. The results suggest that the actual rates of return are lower than the forecast rates of return, and the investors’ expectations are not fully satisfied when investors follow a “buy” recommendation. The detailed results of the analysis are presented in Table 1.

Table 1. Results of the estimation of the relationship between the actual rates of return and the forecasts prepared by analysts for the “buy” recommendations

Parameters	Coefficient	Standard error	Student’s t	p-value
const	-0.0126539	0.0179998	-0.703	0.4821
Forecast rate of return	0.454394	0.055762	8.149	4.62e – 016 ***

Note:

*** – statistical significance at the level of 1%;

** – statistical significance at the level of 5%;

* – statistical significance at the level of 10%.

Source: Author’s own study.

Therefore, the results obtained may support H1, according to which adherence to “buy” recommendations can act as the basis for building a profitable investment strategy.

To verify H1 more accurately, an analysis of the actual rates of return one year after the date of issue of recommendations compared to the rates indicated in the recommendations and in relation to the expected rates of return was performed. The obtained results are presented in Table 2.

The analysis of the data presented in Table 2 implies that out of 4,912 “buy” recommendations issued in the period between January 1, 2004 and December 31, 2016, compliance with 1,458 (30%) of recommendations would make it possible to achieve annual rates of return equal to or higher than those indicated in the recommendations. For individual years, this percentage ranges from 8% to 60%. A similar analysis conducted for the expected rates of return shows that compliance with 2,098 (43%) of “buy” recommendations would have resulted in the expected rates of return being achieved. In this case, the percentage of such recommendations for individual years ranges from 10% to 76%. Considering the above data, H1 cannot be verified positively in a conclusive manner. The analy-

sis showed that there were periods in which compliance with “buy” recommendations could be an effective investment strategy (e.g., in 2005, 2009, and 2016 – in each of these periods, the percentage of recommendations for which the actual rate of return after one year from issuing the recommendation was equal to or higher than that expected, exceeding 50% of the recommendations); however, on average, and in a majority of periods throughout the entire period, complying with “buy” recommendation in less than 50% of cases would have resulted in the expected rates of return being realized.

Table 2. Analysis of the effectiveness of “buy” recommendations

Year	Number of “buy” recommendations issued	Number of “buy” recommendations – the actual rate of return after one year, equal to or higher than that indicated in the recommendation	Share of “buy” recommendations – the actual rate of return after one year, equal to or higher than that indicated in the recommendation	Number of “buy” recommendations – the actual rate of return after one year, equal to or higher than that expected	Share of “buy” recommendations – the actual rate of return after one year, equal to or higher than that expected
2004	120	46	38%	54	45%
2005	161	95	59%	103	64%
2006	223	114	51%	122	55%
2007	261	21	8%	27	10%
2008	648	80	12%	171	26%
2009	448	270	60%	342	76%
2010	438	117	27%	154	35%
2011	487	49	10%	116	24%
2012	345	138	40%	181	52%
2013	349	113	32%	156	45%
2014	444	120	27%	192	43%
2015	505	106	21%	184	36%
2016	483	189	39%	296	61%
Total	4,912	1,458	30%	2,098	43%

Source: Author’s own study.

The analysis of the regression model between real rates of return and forecasts prepared by analysts for the “sell” recommendations were negative and statistically significant at the 1% level. For the estimated model, the coefficient of forecast rates was equal to (minus) 0.58. The detailed results of the analysis are presented in Table 3.

Table 3. Results of the estimation of the relationship between the actual rates of return and the forecasts prepared by analysts for “sell” recommendations

Parameters	Coefficient	Standard error	Student's t	p-value
const	0.0189045	0.0340654	0.5549	0.579
Forecast rate of return	-0.587512	0.189748	-3.096	0.0020***

Note:

*** – statistical significance at the level of 1%;

** – statistical significance at the level of 5%;

* – statistical significance at the level of 10%.

Source: Author's own study.

Therefore, the obtained results could support H2. According to H2, compliance with “sell” market recommendations allows investors to avoid unprofitable investments. A more detailed analysis of H2 showed that for the 1,556 examined “sell” type recommendations, in the case of:

- 766 recommendations (49%), the price recorded one year after issue of the recommendation fell in relation to the price on the day the recommendation was issued; for individual years, the percentage of such recommendations ranges between 25% and 95%;
- 851 recommendations (55%), the purchase did not make it possible to yield the risk-free rate during the year; for individual years, the percentage of such recommendations ranges between 25% and 98%;
- 949 recommendations (61%), the purchase did not result in meeting the expected rate of return; for individual years, the percentage of such recommendations ranges between 35% and 100%.

Detailed results in terms of the effectiveness of “sell” recommendations are presented in Table 4.

Table 4. Analysis of the effectiveness of “sell” recommendations

Year	Number of “sell” recommendations issued	Number of “sell” recommendations – after one year, the price fell compared to the price on the day of issue of the recommendation	Share of “sell” recommendations – after one year, the price fell compared to the price on the day of issue of the recommendation	Number of “sell” recommendations – in one year, the investment in the shares did not make it possible to yield the risk-free rate	Share of “sell” recommendations – in one year, the investment in the shares did not make it possible to yield the risk-free rate	Number of “sell” recommendations – throughout the year, the investment in the shares did not make it possible to reach the expected rate	Share of “sell” recommendations – throughout the year, the investment in the shares did not make it possible to reach the expected rate
2004	44	13	30%	16	36%	18	41%
2005	24	6	25%	6	25%	8	33%
2006	77	22	29%	23	30%	28	36%
2007	59	56	95%	58	98%	59	100%
2008	121	78	64%	85	70%	87	72%
2009	217	44	20%	64	29%	77	35%
2010	126	62	49%	74	59%	87	69%
2011	96	76	79%	79	82%	81	84%
2012	137	61	45%	69	50%	82	60%
2013	161	96	60%	105	65%	117	73%
2014	158	100	63%	108	68%	116	73%
2015	181	112	62%	121	67%	134	74%
2016	155	40	26%	43	28%	55	35%
Total	1,556	766	49%	851	55%	949	61%

Source: Author’s own study.

Based on the above analysis, it can be assumed that H2 is supported – in most of the analyzed periods and on average throughout the entire period, compliance with “sell” recommendations in over 50% of cases would have resulted in avoiding unprofitable investments. The results of the linear regression analysis also support H2. Despite the results of the analysis regarding the effectiveness of “sell” recommendations not being clear, it should be taken into account that the effectiveness of “sell” recommendations is much higher than that of “buy” recommendations.

To verify H3, according to which the difference between the prices recorded on the day of issue of recommendations and the target price is greater for “buy” than for “sell” recommendations, the following have been estimated:

- the average deviation between the forecast annual rate of return and the actual one for both “buy” and “sell” recommendations,
- the target price accuracy factor (TPA) for both “buy” and “sell” recommendations.

The analysis of the average deviation between the forecast and the actual annual rates of return for “buy” recommendations was 16.5% – which implies that analysts’ recommendations suggested that the target price after one year would be 16.5% higher than it was in reality after one year. In the case of “sell” recommendations, the above deviation was (minus) 25.1% – so the prices of shares presented in “sell” recommendations were, on average, 25.1% lower than those forecast by analysts. The obtained results thus do not support H3. The fallacy of H3 has also been confirmed through the analysis of the average values of the target price accuracy factor (TPA). A value equaling one would imply that the share price forecast by an analyst equals the actual share price. Therefore, the closer the obtained value of the TPA factor gets to 0 and the further it gets from 1, the greater the difference between the forecast price and the actual price. If H3 was to prove positive, it would have to be assumed that the value of the TPA factor is lower for “buy” recommendations. According to the obtained results, the average value of the TPA for the entire analyzed period for “buy” recommendations was 0.66, and was 0.48 in the case of “sell” recommendations. Detailed data on the average deviation between the forecast and the actual return rates as well as the TPA values for particular years and the average for the entire period are presented in Tables 5 and 6.

Table 5. Average deviation between the forecast annual rate of return and the actual rate

Year	Average deviation between forecast annual rate of return and the actual rate – “buy” recommendations	Average deviation between the forecast annual rate of return and the actual rate – “sell” recommendations
2004	11.2%	-31.4%
2005	-34.5%	-7.0%
2006	-23.2%	-42.3%
2007	55.7%	21.0%
2008	48.2%	-4.2%
2009	-22.4%	-54.8%
2010	17.4%	-15.7%
2011	39.2%	11.8%
2012	5.4%	-21.9%
2013	9.4%	-12.8%
2014	17.7%	-41.5%
2015	25.7%	-15.8%
2016	3.7%	-40.3%
Total	16.5%	-25.1%

Source: Author’s own study.

Table 6. Average value of the target price accuracy factor (TPA)

Year	Average value of the TPA factor – “buy” recommendations	Average value of the TPA factor – “sell” recommendations
2004	0.69	0.51
2005	0.46	0.09
2006	0.52	0.27
2007	0.51	0.70
2008	0.55	0.50
2009	0.70	0.29
2010	0.71	0.64
2011	0.64	0.65
2012	0.67	0.54
2013	0.72	0.71
2014	0.72	0.25
2015	0.73	0.57
2016	0.74	0.39
Total	0.66	0.48

Source: Author’s own study.

The obtained results make it difficult to positively verify H3, according to which the difference between prices on the day of issue of recommendations and the target price is greater for “buy” recommendations than for “sell” recommendations. Therefore, stock market analysts should not be biased, which is manifested in the tendency to overestimate the growth potential of shares for which “buy” recommendations have been issued in relation to the potential for the decline in the prices of shares which have had “sell” recommendations issued.

5. Conclusions

The analysis of the extant literature makes it difficult to confirm whether investing in line with the suggestions provided in stock market recommendations can be an effective investment strategy. Some studies indicate that investment strategies based on recommendations can be profitable (Jegadeesh & Kim, 2006; Park & Park, 2019), whereas others illustrate that investing in accordance with recommendations does not yield abnormal rates. This study’s results contribute to the body of knowledge that aims to explain this ambiguity. First, it was established that compliance with “buy” stock market recommendations cannot be a basis for building a profitable investment strategy. Less than 50% of the analyzed recommendations enable the achievement of the expected rates of return. Second, the results of the study suggested that compliance with “sell” market

recommendations may help investors avoid unprofitable investments. In other words, the findings indicated that only “sell” recommendations may contain information useful for stock investors. The research findings provide an added insight into the understanding of the effectiveness of investment strategies based on information included in the issued stock market recommendations. They can be valuable to stock market investors making their investment decisions based on, among others, the information provided in stock market recommendations.

From a practical point of view, the results of the study indicate that making decisions based on information provided in stock exchange recommendations is not a profitable investment strategy. In only 43% of the analyzed cases, the actual rate of return after one year was equal to or higher than that expected rate indicated in the “buy” recommendation. It can therefore be assumed that analysts were wrong in 57% of cases. As for “sell” recommendations, 60% of the analyzed cases showed – as predicted by analysts throughout the year – that the investment in shares did not make it possible to reach the expected rate. Despite the higher effectiveness of the “sell” recommendations, the results of the study prove that stock market investors should not be guided by stock market recommendations as the only source of information regarding future price behavior. Recommendations can be treated as one of the tools for assessing the growth potential of companies listed on the stock exchange. Investment decisions should be preceded by investors’ own – thorough – analyses, which may be conducted, among others, on the basis of recommendations issued by stock market analysts.

The literature reveals a bias among analysts issuing recommendations; the largest group of recommendations issued is “buy” recommendations (Barber et al., 2001; Diefenbach, 1972; Jegadeesh & Kim, 2006). In this context, part of the results of the research presented in this paper aimed to verify the hypotheses according to which the differences between the average prices on the day of issue of recommendations and the target prices were greater for “buy” than “sell” recommendations. The analysis proves that there is no such correlation, and thus, it cannot be assumed that analysts generally observe a greater growth potential in “buy” recommendations than the possibility of a decline in the share prices included in “sell” recommendations. Therefore, the results of this study do not confirm the bias of analysts in terms of the optimistic perception of the potential of the analyzed shares.

This study discussed the effectiveness of recommendations using the target pricing accuracy approach. In the literature, this approach is used less frequently; however, as emphasized by the authors who use this technique, one can assume

that this method enables a better assessment of the effectiveness of stock market recommendations (Asquith et al., 2005). In this context, the study can be considered interesting from both academic and practical perspectives. Moreover, most prior literature concerns the short-term impact of recommendations on share prices. Therefore, a research exploring the long-term effectiveness of recommendations should be considered valuable. In addition, relatively few studies are based on data from the Polish market, which should also be considered as an advantage of the presented analysis.

The results of this study will sensitize stock exchange investors globally about using the information included in stock market recommendations more cautiously, which could translate into better investment decisions (Ocieszak & Wnuk, 2019). Although the presented research findings contribute to the existing body of literature addressing the effectiveness of stock market recommendations, further research in this domain is needed. Analyzing the impact of business cycles on the effectiveness of stock market recommendations seems particularly important. This effectiveness may be different for the bear and bull market periods. Additionally, this study can be extended to include an analysis of the impact of control variables on the effectiveness of stock exchange recommendations. In this context, the following variables should be included: the current economic situation or the financial condition of a company, repatriation of the brokerage house and analyst issuing the recommendation, liquidity of the shares of the recommended company, and the impact of transaction costs on the profitability of the investment. The inclusion of these variables would allow for a better assessment of the effectiveness of stock market recommendations and enable a possible identification of determinants of the effectiveness of recommendations issued by analysts.

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