The analysis of efficiency of selected contrarian strategies on the Warsaw Stock Exchange in the years 2014–2018

Błażej Prusak [1]
Magdalena Kusowska

Gdańsk University
of Technology, Poland

Faculty of Management
and Economics

ORCID: [1] 0000-0002-6526-0407

Abstract: Capital multiplication is the main goal of investors and for many years they have been looking for methods and strategies that would enable them to achieve it to the greatest possible extent. Due to the fact that the expectations and characteristics of investors, including those concerning the investment period, are diverse, multiple strategies have emerged. One of such strategies, mainly long-term in nature, is the so-called contrarian investment, consisting in building the portfolio on the basis of selected shares with prices that have not been increasing recently, which has resulted in undervaluation in the context of otherwise relatively positive development prospects of the company. The aim of this article is to examine the efficiency of selected contrarian strategies on the Polish capital market in the years 2014–2018. The analysis was conducted for large companies, i.e. those included in the WIG30 index, and portfolios were constructed using 20% of companies with the lowest P/E and P/BV ratios. The efficiency of the strategy was examined on the basis of the value of portfolios and cumulative rates of return. It has been shown that investments made in accordance with contrarian strategies generate higher rates of return than the allocation of cash in the WIG30 index, which was the benchmark. Among the two investment strategies, much better results were achieved using the P/BV ratio.

Key words: financial investments, investing in value, contrarian strategies

1. Introduction

One of the key issues for investors is the possibility of outperforming the market, i.e. obtaining rates of return higher than those provided by market benchmarks. On the one hand, given the efficient market theory, this task is impossible in the long term. As a result, passive investment techniques have started to appear on the market, reflected i.a. by ETF funds, achieving rates of return similar to those of stock exchange indices. On the other hand, however, it appears that the markets fail to comply not only with the strong form of the efficiency hypothesis but also, fairly frequently, with its semi-strong version. As a consequence, within the framework of the behavioural

Correspondence to:
Błażej Prusak
Politechnika Gdańska
Wydział Zarządzania i Ekonomii
ul. Narutowicza 11/12
80-233 Gdańsk, Poland
Tel.: +48 58 347 11 06
E-mail: blaprusa@pg.edu.pl

finance trend, research has appeared on the occurrence of various anomalies (e.g. seasonal, fundamental or associated with overreactivity of the market) enabling the achievement of above--average rates of return (more information see: Zielonka, 2008; Szyszka, 2009; Czerwonka, Gorlewski, 2012). The discovery of these anomalies contributed to the development of appropriate investment strategies. One of them is the contrarian strategy. In the simplest terms, they consist in buying shares which have not been very popular among investors (and therefore are undervalued) and selling them when they find investors' recognition.

The main aim of this article was to examine the efficiency of contrarian strategies on the Polish capital market in the years 2014–2018. The analysis was conducted for large companies, i.e. those included in the WIG30 index, and portfolios were constructed using 20% of companies with the lowest P/E and P/BV ratios. The efficiency of the strategy was examined on the basis of the value of portfolio at the end of the period of analysis, as well as on the basis of the cumulative rates of return.

The study has been divided in the way described below. In addition to the introduction, a review of Polish and foreign literature on contrarian investment was presented. Then, the results of the author's own research, together with the methodology and conclusions, were presented. The final part is a summary.

2. Literature review

Contrarian investing can be short- and long-term in nature. The efficiency of the short-term contrarian strategies has been repeatedly verified both positively (Antoniou, Galariotis and Spyrou, 2006; Aspergen and Kahm, 2006, p. 26; Chou, Wei and Chung, 2007; Shi, Jiang and Zhou, 2015; Gharaibeh, Alown and Al Eitan, 2016) and negatively (Conrad, Gultekin and Kaul, 1997; Lee, Chan, Faff and Kalev, 2003). However, this paper focuses on long-term contrarian strategies that are consistent with the value investment trend. In the case of these concepts, investments are most often selected on the basis of the lowest values of market indicators showing the relation of market value to specific financial results and data. P/E and P/BV indicators or their reversals are used most frequently for these purposes. In more advanced, so-called eclectic contrarian strategies when selecting shares for a portfolio, apart from market indicators, other variables—reflecting the development prospects of companies—are also taken into account.

The first research on the effect of the P/E ratio on the American market known to the authors was carried out by S. F. Nicholson (1960). It showed that companies with lower values of this measure generate in the long run much higher rates of return than companies with high levels of P/E ratio. Other studies confirming the efficiency of contrarian strategies on the American market have been published i.a. by S. Basu (1977), E. Fama and K. French (1992), J. Lakonishok, A. Shleifer and R.W. Vishny (1994), and D. Dreman (1998), who also launched contrarian investment funds. The profitability of these strategies has been positively verified also in many other markets outside the USA (Brouwer, van der Put and Veld, 1996; Fama and French, 1998; Anderson and Brooks, 2006; Kadoya, Kuroko and Namatame, 2008; Truong, 2009; Sezgin, 2010; Aravind, 2016, pp. 103–106). Moreover, several Polish studies also confirmed the efficiency of contrarian strategies (Łętocha, 2001 as in: Zielonka, 2006; Kowerski, 2006; Prusak, 2008; Czechowski and Pochmara, 2014; Mościborska, 2015; Lewandowicz and Borowski,

2015).[1] Nevertheless, it should also be mentioned that both in Poland and abroad analyses were carried out which showed that these strategies did not work (Banz and Breen, 1986; Buczek, 2005; Tedeschi, Ribeiro and Eid Jr., 2009; Sekuła, 2015; Alajbeg, Bubaš and Švajhler, 2016).[2]

The above review of literature studies shows that the results obtained with contrarian strategies are not unambiguous, however in most cases the possibility of obtaining above-average rates of return using them has been positively verified.

3. The efficiency of selected contrarian strategies on the Warsaw Stock Exchange—own research

3.1. The methodology of research

The main objective of the study is to assess the efficiency of selected contrarian strategies in the Polish capital market. Efficiency is in this paper understood as the ability to obtain higher rates of return from the so-called benchmark, i.e. the reference base. Only large companies listed on the Warsaw Stock Exchange were taken into account in the research. Due to the fact that the WIG20 index covers a relatively small number of companies, attention has been focused on those included in a broader index, i.e. WIG30. Considering that the WIG30 index is quoted starting from 23 September 2013 and the analysis takes into account only annual time intervals, the years 2014–2018 were assumed as the research period (from 30 December 2013 to 28 December 2018). The rate of return on the WIG30 index was used as a benchmark to assess the efficiency of contrarian strategies. Taking into account the research conducted so far in Poland and abroad, the following research hypothesis has been proposed: "The application of selected contrarian strategies to investments in large listed companies generates a higher rate of return than the benchmark, i.e. the WIG30 index."

In the case of contrarian strategies, two variants have been used. They differed as regards the criterion of selecting companies for the portfolio. In the first variant, shares in companies with the lowest non-negative P/E ratio were selected, calculated as a relation of the closing price as at the last session day of a calendar year to the annual net profit (obtained in the period from the fourth quarter of the previous year to the third quarter of the given year) per share. The second variant assumed the selection of shares based on the lowest possible P/BV ratio, i.e. the ratio of the closing price as at the last session day of a calendar year to the company's book value as at the end of the third quarter. The survey takes into account data available at the end of the third rather than fourth quarter of a given year, as the latter are available only in the following calendar year. While applying the contrarian strategies, regardless of the variant, 20% of companies included in the WIG30 index, fulfilling the adopted selection criterion to the greatest extent, were invested in. Such analyses often

---

[1] The efficiency of contrarian strategies built on the basis of P/E and P/BV indicators was confirmed only for some periods in the paper entitled *Relationship between P/E ratio, P/BV ratio and market capitalization and common stock returns: The evidence for the Warsaw Stock Exchange* (Zarzecki, Byrka and Kozłowska--Nalewaj, 1998). The research conducted by Czekaj, Woś and Żarnowski (2001, pp. 116–131) showed the occurrence of above-average rates of return when using the P/E ratio to build a portfolio, while the use of the P/BV market measure failed to bring the expected positive results.

[2] A detailed description of the results of research on the efficiency of contrarian strategies in Poland and abroad was presented in the book entitled *Wskaźniki rynku kapitałowego – zastosowanie w wycenach przedsiębiorstw oraz strategiach inwestycyjnych* (Prusak, 2012, pp. 102–129).

assume the level of 10% but due to the limited number of companies included in the WIG30 index, a decision was made to increase it. Choosing the 10% threshold would result in the selection of only 3 companies for the portfolio, which would, on the one hand, involve high risk, and on the other hand, could be largely accidental in nature. The investment portfolio was rebalanced every year.

In both variants, both at the beginning of the investment and at each portfolio rebalancing, an equal distribution of free funds between the purchased assets was sought. The initial investment amount is 100,000 PLN. After the five-year investment period, the assets held were sold. A commission of 0.3% was taken into account for each purchase and sale transaction.

The analysis was based on the closing prices published on the WSE website and the BiznesRadar.pl portal, as well as on the information on the book value and net profit of companies provided by the Bankier.pl. and BiznesRadar.pl financial portals.

3.2. Results and conclusions

First of all, the analysis was carried out using the P/E ratio as the criterion for selecting companies for the portfolio. Its results are presented in Tables 1 to 5. Each table presents the value of the price/ earnings parameter, the number of shares of individual companies, the value of shares of a given entity at the beginning and at the end of the investment stage covering one year, as well as the total value of the entire portfolio and the financial result.

Table 1 presents the structure of the portfolio in the first year of investment. Shares of the following six companies were purchased: Tauron Polska Energia S.A., Polskie Górnictwo Naftowe i Gazownictwo S.A., KGHM Polska Miedź S.A., Grupa Azoty S.A., Enea S.A. and PGE Polska Grupa Energetyczna S.A. At the end of the investment stage, a profit of about 3,800 PLN was recorded.

Table 1. Investment results according to the contrarian strategy using the P/E ratio
in the first year of the analysis (2014)

Company	P/E	Volume [pcs.]	Price [PLN/piece] 30.12.2013	Value [PLN] 30.12.2013	Price [PLN/piece] 30.12.2014	Value [PLN] 30.12.2014	Result [PLN]
TAURONPE	5.46	3,802	4.37	16,614.74	5.05	19,200.10	2,585.36
PGNIG	7.15	3,225	5.15	16,608.75	4.45	14,351.25	–2,257.50
KGHM	7.38	141	118.00	16,638.00	108.85	15,347.85	–1,290.15
ENEA	7.77	1,221	13.60	16,605.60	15.20	18,559.20	1,953.60
GRUPA AZOTY	8.20	266	62.50	16,625.00	63.30	16,837.80	212.80
PGE	8.90	1,020	16.28	16,605.60	18.89	19,267.80	2,662.20
			Free funds [PLN]	3.22	—	3.22	—
			Total [PLN]	99,700.91	—	103,567.22	3,866.31

S o u r c e: Authors' own elaboration.

Table 2 presents the structure of the portfolio in the second year of investment. Shares in Polskie Górnictwo Naftowe i Gazownictwo S.A., Grupa Azoty S.A. and PGE Polska Grupa Energetyczna S.A. were sold, and shares in Energa S.A., Asseco Poland S.A. and Kernel Holding S.A. were purchased. The value of Kernel Holding S.A. shares increased by approximately 11,500 PLN, however at the end of this investment stage a total loss of approximately 13,500 PLN was observed. The portfolio's rate of return was at the level of –10.25%.

Table 2. Investment results according to the contrarian strategy using the P/E ratio
in the second year of the analysis (2015)

Company	P/E	Volume [pcs.]	Price [PLN/piece] 30.12.2014	Value [PLN] 30.12.2014	Price [PLN/piece] 30.12.2015	Value [PLN] 30.12.2015	Result [PLN]
ENEA	7.60	1,221	15.20	18,559.20	11.30	13,797.30	–4,761.90
TAURONPE	7.77	3,802	5.05	19,200.10	2.88	10,949.76	–8,250.34
KGHM	8.79	141	108.85	15,347.85	63.49	8,952.09	–6,395.76
ENERGA	9.93	726	23.03	16,719.78	12.64	9,176.64	–7,543.14
ASSECOPOL	10.58	328	51.00	16,728.00	56.80	18,630.40	1,902.40
KERNEL	11.07	587	28.46	16,706.02	48.10	28,234.70	11,528.68
			Free funds [PLN]	4.44	—	4.44	—
			Total [PLN]	103,265.39	—	89,745.33	–13,520.06

S o u r c e: Authors' own elaboration.

Table 3 presents the structure of the portfolio in the third year of investment. Shares in Asseco Poland S.A. were sold and shares in Lubelski Węgiel Bogdanka S.A. were included in the portfolio. At the end of this investment stage, a profit of about 28,600 PLN was observed, and the value of the portfolio amounted to almost 118,300 PLN. Among the six companies comprising the portfolio, the most significant price increase was observed in the case of Lubelski Węgiel Bogdanka S.A.

Table 3. Investment results according to the contrarian strategy using the P/E ratio
in the third year of the analysis (2016)

Company	P/E	Volume [pcs.]	Price [PLN/piece] 30.12.2015	Value [PLN] 30.12.2015	Price [PLN/piece] 30.12.2016	Value [PLN] 30.12.2016	Result [PLN]
KERNEL	3.94	587	48.10	28,234.70	63.85	37,479.95	9,245.25
TAURONPE	4.17	3,802	2.88	10,949.76	2.85	10,835.70	–114.06
BOGDANKA	4.84	557	33.21	18,497.97	69.50	38,711.50	20,213.53

ENEA	5.49	1,221	11.30	13,797.30	9.50	11,599.50	–2,197.80
ENERGA	6.02	726	12.64	9,176.64	9.10	6,606.60	–2,570.04
KGHM	6.69	141	63.49	8,952.09	92.48	13,039.68	4,087.59
			Free funds [PLN]	25.48	—	25.48	—
			Total [PLN]	89,633.94	—	118,298.41	28,664.47

S o u r c e: Authors' own elaboration.

Table 4 presents the structure of the portfolio in the fourth year of investment. Shares in Lubelski Węgiel Bogdanka S.A., Tauron Polska Energia S.A., Enea S.A., Energa S.A. and KGHM Polska Miedź S.A. were sold. Subsequently, the portfolio was updated to include shares in Globe Trade Centre S.A., PGE Polska Grupa Energetyczna S.A., Bank Millennium S.A., Polski Koncern Naftowy Orlen S.A. and mBank S.A. At the end of this investment stage, a return rate of 35.55% was recorded. The annual profit was about 17,700 PLN. The most advantageous was the investment in Bank Millennium shares, which increased the value of the portfolio by about 11,600 PLN. In this year, Kernel Holding S.A. was the only company to bring a loss. It amounted to less than 9,600 PLN.

Table 4. Investment results according to the contrarian strategy using the P/E ratio
in the fourth year of the analysis (2017)

Company	P/E	Volume [pcs.]	Price [PLN/piece] 30.12.2016	Value [PLN] 30.12.2016	Price [PLN/piece] 29.12.2017	Value [PLN] 29.12.2017	Result [PLN]
GTC	6.46	1,959	8.20	16,063.80	9.80	19,198.20	3,134.40
KERNEL	6.81	587	63.85	37,479.95	47.52	27,894.24	–9,585.71
PGE	8.93	1,538	10.45	16,072.10	12.05	18,532.90	2,460.80
MILLENNIUM	10.18	3,096	5.19	16,068.24	8.94	27,678.24	11,610.00
PKNORLEN	10.76	188	85.30	16,036.40	106.00	19,928.00	3,891.60
MBANK	11.47	48	335.25	16,092.00	465.00	22,320.00	6,228.00
			Free funds [PLN]	2.54	—	2.54	—
			Total [PLN]	117,815.03	—	135,554.12	17,739.09

S o u r c e: Authors' own elaboration.

Table 5 presents the portfolio structure in the fifth, i.e. last, year of the investment. The shares in Kernel Holding S.A., Bank Millennium S.A. and mBank S.A. were sold. Tauron Polska Energia S.A., Jastrzębska Spółka Węglowa S.A. and Enea S.A. were qualified for the portfolio. At this stage of investment, a loss of more than 24,500 PLN was incurred. At the end of the last year of investment, the value of the portfolio amounted to approximately 110,500 PLN.

Table 5. Investment results according to the contrarian strategy using the P/E ratio
in the fifth year of the analysis (2018)

Company	P/E	Volume [pcs.]	Price [PLN/piece] 29.12.2017	Value [PLN] 29.12.2017	Price [PLN/piece] 28.12.2018	Value [PLN] 28.12.2018	Result [PLN]
TAURONPE	4.18	8,462	3.05	25,809.10	2.19	18,531.78	–7,277.32
PGE	5.22	1,538	12.05	18,532.90	10.00	15,380.00	–3,152.90
JSW	5.42	268	96.27	25,800.36	67.26	18,025.68	–7,774.68
ENEA	5.67	2,245	11.50	25,817.50	9.90	22,225.50	–3,592.00
GTC	6.53	1,959	9.80	19,198.20	8.19	16,044.21	–3,153.99
PKNORLEN	6.62	188	106.00	19,928.00	108.15	20,332.20	404.20
			Free funds [PLN]	2.10	—	2.10	—
			Total [PLN]	135,88.16	—	110,541.47	–24,546.69

S o u r c e: Authors' own elaboration.

After the five-year investment period, all the shares were sold. The value of the portfolio constructed according to the contrarian strategy using the P/E ratio amounted to 110,209.85 PLN. The rate of return on investment was 10.21%. The total amount of the commissions was 1993.26 PLN.

In the next stage, an analysis was carried out assuming the selection of companies using the P/BV ratio. Its results are shown in Tables 6 to 10. Each table presents the price/ book value ratio for each company, the number of shares, the value of shares of individual entities at the beginning and at the end of the investment stage covering one year, as well as the total value of the entire portfolio and the financial result.

Table 6 presents the structure of the portfolio in the first year of investment. Shares of the following six companies were purchased: Tauron Polska Energia S.A., Grupa Lotos S.A., Enea S.A., Polski Koncern Naftowy Orlen S.A., PGE Polska Grupa Energetyczna S.A. and Asseco Poland S.A. At the end of this investment stage, a profit of about 7,500 PLN was observed.

Table 6. Investment results according to the contrarian strategy using the P/BV ratio
in the first year of the analysis (2014)

Company	P/BV	Volume [pcs.]	Price [PLN/piece] 30.12.2013	Value [PLN] 30.12.2013	Price [PLN/piece] 30.12.2014	Value [PLN] 30.12.2014	Result [PLN]
TAURONPE	0.45	3,803	4.37	16,619.11	5.05	19,205.15	2,586.04
LOTOS	0.51	469	35.45	16,626.05	25.50	11,959.50	–4,666.55
ENEA	0.53	1,223	13.60	16,632.80	15.20	18,589.60	1,956.80
PKNORLEN	0.66	405	41.00	16,605.00	48.92	19,812.60	3,207.60

PGE	0.70	1,021	16.28	16,621.88	18.89	19,286.69	2,664.81
ASSECOPOL	0.73	361	45.97	16,595.17	51.00	18,411.00	1,815.83
			Free funds [PLN]	0.89	—	0.89	—
			Total [PLN]	99,700.90	—	107,265.43	7,564.53

S o u r c e: Authors' own elaboration.

Table 7 presents the structure of the portfolio in the second year of investment. The shares in Asseco Poland S.A., PGE Polska Grupa Energetyczna S.A. and Polski Koncern Naftowy Orlen S.A. were sold and the proceeds from such sale were allocated for the purchase of shares in Kernel Holding S.A., Jastrzębska Spółka Węglowa S.A. and Globe Trade Centre S.A. The annual profit was about 100 PLN. At the end of this investment stage, the rate of return at the level of 7.03% was achieved.

Table 7. Investment results according to the contrarian strategy using the P/BV ratio
in the second year of the analysis (2015)

Company	P/BV	Volume [pcs.]	Price [PLN/piece] 30.12.2014	Value [PLN] 30.12.2014	Price [PLN/ piece] 30.12.2015	Value [PLN] 30.12.2015	Result [PLN]
JSW	0.25	1,138	16.75	19,061.50	10.65	12,119.70	–6,941.80
LOTOS	0.38	469	25.50	11,959.50	27.00	12,663.00	703.50
TAURONPE	0.49	3,803	5.05	19,205.15	2.88	10,952.64	–8,252.51
ENEA	0.56	1,223	15.20	18,589.60	11.30	13,819.90	–4,769.70
KERNEL	0.69	670	28.46	19,068.20	48.10	32,227.00	13,158.80
GTC	0.74	3,531	5.39	19,032.09	7.15	25,246.65	6,214.56
			Free funds [PLN]	5.37	—	5.37	—
			Total [PLN]	106,921.41	—	107,034.26	112.85

S o u r c e: Authors' own elaboration.

Table 8 presents the structure of the portfolio in the third year of investment. Shares in Kernel Holding S.A., Grupa Lotos S.A. and Globe Trade Centre S.A. were sold. On the other hand, shares in Lubelski Węgiel Bogdanka S.A., KGHM Polska Miedź S.A. and PGE Polska Grupa Energetyczna S.A. were qualified for the portfolio. The annual profit amounted to approximately 93,400 PLN, and the entity that brought the best result was Jastrzębska Spółka Węglowa S.A., the shares of which increased their value by slightly more than 64,000 PLN during this stage of investment.

Table 8. Investment results according to the contrarian strategy using the P/BV ratio
in the third year of the analysis (2016)

Company	P/BV	Volume [pcs.]	Price [PLN/piece] 30.12.2015	Value [PLN] 30.12.2015	Price [PLN/piece] 30.12.2016	Value [PLN] 30.12.2016	Result [PLN]
JSW	0.19	1,138	10.65	12,119.70	66.90	76,132.20	64,012.50
TAURONPE	0.27	3,803	2.88	10,952.64	2.85	10,838.55	–114.09
ENEA	0.39	1,223	11.30	13,819.90	9.50	11,618.50	–2,201.40
BOGDANKA	0.45	700	33.21	23,247.00	69.50	48,650.00	25,403.00
KGHM	0.49	366	63.49	23,237.34	92.48	33,847.68	10,610.34
PGE	0.59	1,816	12.79	23,226.64	10.45	18,977.20	–4,249.44
			Free funds [PLN]	11.50	—	11.50	—
			Total [PLN]	106,614.72	—	200,075.63	93,460.91

S o u r c e: Authors' own elaboration.

Table 9 contains the structure of the portfolio in the fourth year of investment. Shares in Jastrzębska Spółka Węglowa S.A., Lubelski Węgiel Bogdanka S.A. and KGHM Polska Miedź S.A. were sold, while shares in Energa S.A., Orange Polska S.A. and PKP Cargo S.A. were purchased. The shares in all the companies increased their value, which resulted in an annual profit of about 38,800 PLN.

Table 9. Investment results according to the contrarian strategy using the P/BV ratio
in the fourth year of the analysis (2017)

Company	P/BV	Volume [pcs.]	Price [PLN/piece] 30.12.2016	Value [PLN] 30.12.2016	Price [PLN/piece] 29.12.2017	Value [PLN] 29.12.2017	Result [PLN]
TAURONPE	0.31	3,803	2.85	10,838.55	3.05	11,599.15	760.60
ENEA	0.35	1,223	9.50	11,618.50	11.50	14,064.50	2,446.00
ENERGA	0.43	5,778	9.10	52,579.80	12.73	73,553.94	20,974.14
PGE	0.47	1,816	10.45	18,977.20	12.05	21,882.80	2,905.60
ORANGEPL	0.61	9,540	5.51	52,565.40	5.79	55,236.60	2,671.20
PKPCARGO	0.67	1,118	47.00	52,546.00	55.10	61,601.80	9,055.80
			Free funds [PLN]	1.22	—	1.22	—
			Total [PLN]	199,126.67	—	237,940.01	38,813.34

S o u r c e: Authors' own elaboration.

Table 10 presents the portfolio structure in the fifth, i.e. last, year of the investment. Shares in Orange Polska S.A. were sold. Asseco Poland S.A. took its place in the portfolio and these were the only securities that brought a profit at this stage of investment. The total annual loss amounted to less than 41,000 PLN. At the end of the fifth year, the value of the portfolio was approximately 196,700 PLN.

Table 10. Investment results according to the contrarian strategy using the P/BV ratio
in the fifth year of the analysis (2018)

Company	P/BV	Volume [pcs.]	Price [PLN/piece] 29.12.2017	Value [PLN] 29.12.2017	Price [PLN] 28.12.2018	Value [PLN] 28.12.2018	Result [PLN]
TAURONPE	0.30	3,803	3.05	11,599.15	2.19	8,328.57	–3,270.58
ENEA	0.40	1,223	11.50	14,064.50	9.90	12,107.70	–1,956.80
PGE	0.49	1,816	12.05	21,882.80	10.00	18,160.00	–3,722.80
ENERGA	0.57	5,778	12.73	73,553.94	8.91	51,481.98	–22,071.96
ASSECOPOL	0.65	1,248	43.98	54,887.04	46.12	57,557.76	2,670.72
PKPCARGO	0.75	1,118	55.10	61,601.80	43.90	49,080.20	–12,521.60
			Free funds [PLN]	20.41	—	20.41	—
			Total [PLN]	237,609.64	—	196,736.62	–40,873.02

S o u r c e: Authors' own elaboration.

After the five-year investment period, all the shares were sold. The value of the portfolio constructed according to the contrarian strategy using the P/BV ratio amounted to 196,146.47 PLN. The rate of return on investment amounted to 96.15%. The total amount of commissions was 2932.14 PLN.

Figure 1 shows the comparison of the values of portfolios constructed according to two variants of the contrarian strategy and the WIG30 index as a benchmark. During the first two years of the period under examination, the values of the two contrarian portfolios were close to the initial amount and the return on variant P/BV, unlike the return on variant P/E, remained positive. In 2016 and 2017, there was a rapid increase in the value of the portfolio constructed according to the variant taking into account the P/BV ratio, resulting mainly from approximately 64,000 PLN of profit on the shares of Jastrzębska Spółka Węglowa S.A., over 25,000 PLN of profit on the shares of Lubelski Węgiel Bogdanka S.A. and almost 21,000 PLN of profit on the shares of Energa S.A. During this period, the value of the portfolio taking into account the P/E ratio was also characterized by an upward trend, although weaker than in the case of the P/BV variant—it was caused primarily by the allocation of capital in the shares of Lubelski Węgiel Bogdanka S.A. and Bank Millennium S.A. Both portfolios reached their maximum value at the end of 2017. For the first variant it amounted to about 135,500 PLN, and for the second variant it amounted to almost 238,000 PLN. In 2018

there was a decrease in the value of portfolios, as a result of which, at the end of the investment period and upon the sale of the securities, the value in the variant assuming the selection of companies using the P/BV ratio amounted to approximately 196,000 PLN, while the value in the variant taking into account the P/E ratio amounted to approximately 110,000 PLN. At the end of the five-year investment period both portfolios were characterized by a positive rate of return, while the variant using the P/BV ratio as a criterion for selecting companies generated a much higher profit than the variant taking into account the P/E ratio.
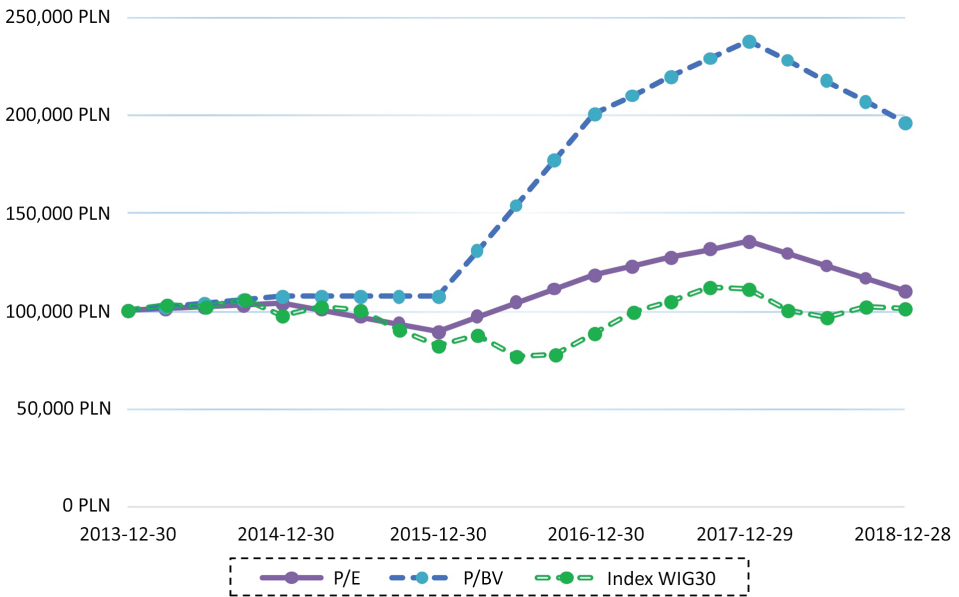
Figure 1. The comparison of the value of portfolios constructed according to selected contrarian strategies and the WIG30 index

S o u r c e: Authors' own elaboration.

While comparing the contrarian strategies developed on the basis of P/E and P/BV indicators to the benchmark, it can be noticed that the results obtained using the former are only slightly better than the rate of return brought by the WIG30 index. Significantly higher rates of return were generated using the strategy based on the P/BV ratio. It may also be noted that none of the readings of the cumulated annual rates of return in the case of the contrarian strategies was lower than the rate of return from the benchmark.

4. Conclusion

Investing in value over a longer period of time using contrarian strategies usually generates higher rates of return than market benchmarks. The research carried out and presented in this article allowed us to confirm the research hypothesis presented in this paper. Both selected

contrarian strategies generated higher rates of return in the period considered in relation to the WIG30 benchmark. However, the P/BV strategy proved to be more efficient, as it resulted in a much higher rate of return. It should also be noted that contrarian investment usually works well in longer periods, whereas in short intervals it can generate rates of return lower than those of the relevant benchmark. It is therefore a strategy that requires from the investor patience and high resilience, as well as readiness to accept losses in short periods of time. It is worth noting that most studies assume the application of contrarian strategies based on taking long positions (betting on the increase in stock prices). In the future, consideration could also be given to studies in which the opposite strategy is assumed, i.e. profiting from falling stock prices (taking a short position). Then, instead of shares in undervalued companies, one should look for those that are overvalued, i.e. characterized by high values of P/E and P/BV ratios and at the same time not very favourable growth forecasts. Other issues requiring in-depth research include: determination of the time interval of portfolio rebalancing; the problem of portfolio diversification and taking into account the growth forecasts of the analyzed companies (low or high values of market indicators may result from the fact that the growth prospects of companies are different and not from the fact that some companies are undervalued and others overvalued).

References

Alajbeg, D., Bubaš, Z., Švajhler, I. (2016). The P/E effect on the Croatian stock market. *Economy and Business Journal, International Scientific Publications, Bulgaria*, *10*(1), 84–93.

Anderson, K., Brooks, Ch. (2006). The long-term price-earnings ratio. *Journal of Business Finance and Accounting*, *33*(7–8), 1063–1086.

Antoniou, A., Galariotis, E. C., Spyrou, S. I. (2006). Short-term contrarian strategies in the London Stock Exchange: are they profitable? Which factors affect them? *Journal of Business Finance and Accounting*, *33*(5–6), 839–867.

Aravind, M. (2016). Contrarian and momentum strategies: An investigation with reference to sectoral portfolios in NSE. *NMIMS Management Review*, *29*, 102–117.

Aspergen, G., Kahm, H. (2006). *A short term contrarian strategy in the Swedish Stock Exchange* [online, accessed: 2019-07-23]. Lund: Lund University, Department of Economics. Retrieved from: http://lup.lub.lu.se/luur/download?func=downloadFile&recordOId=1335194&fileOId=1646074.

Bankier.pl. (2019). Internet service. Available at: www.bankier.pl.

Banz, R. W., Breen, W. J. (1986). Sample-dependent results using accounting and market data: Some evidence. *The Journal of Finance*, *41*(4), 779–793.

Basu, S. (1977). Investment performance of common stocks in relation to their price-earnings ratios: A test of the efficient market hypothesis. *The Journal of Finance*, *32*(3), 663–682.

Biznes Radar. (2019). Internet service. Available at: www.biznesradar.pl.

Brouwer, I., van der Put, J., Veld, C. (1996). Contrarian investment strategies in a European context [online, accessed: 2019-07-23]. Retrieved from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=41003.

Buczek, S. (2005). *Efektywność informacyjna rynków akcji: teoria a rzeczywistość*. Warszawa: Szkoła Główna Handlowa. ISBN 8373781935.

Chou, P. H., Wei, K. C. J., Chung, H. (2007). Sources of contrarian profits in the Japanese stock market. *Journal of Empirical Finance*, *14*(3), 261–286.

Conrad, J., Gultekin, M. N., Kaul, G. (1997). Profitability of short-term contrarian strategies: Implications for market efficiency. *Journal of Business and Economic Statistics*, *15*(3), 379–386.

Czechowski, L., Pochmara, A. M. (2014). Weryfikacja efektywności wybranych strategii inwestycyjnych rynku akcji Giełdy Papierów Wartościowych S.A. w Warszawie. *Zarządzanie i Finanse*, *1*, 19–39.

Czekaj, J., Woś, M., Żarnowski, J. (2001). *Efektywność giełdowego rynku akcji w Polsce*. Warszawa: Wydawnictwo Naukowe PWN. ISBN 8301134704.

Czerwonka, M., Gorlewski, B. (2012). *Finanse behawioralne. Zachowania inwestorów i rynku*. 2nd ed. Warszawa: Oficyna Wydawnicza SGH. ISBN 9788373787056.

Dreman, D. (1998). *Contrarian investment strategies: The next generation. Beat the market by going against the crowd.* New York. Simon & Schuster Inc. ISBN 0684813505.

Fama, E. F., French, K. R. (1992). The cross-section of expected stock returns. *Journal of Finance*, *47*(2), 427–465.

Fama, E. F., French, K. R. (1998). Value versus growth: The international evidence. *The Journal of Finance*, *53*(6), 1975–1999.

Gharaibeh, O., Alown, B., Al Eitan, G. N. (2016). Evidence of short-term contrarian effect in Abu Dhabi firms. *Global Journal of Management and Business Research: C Finance*, *16*(9), 17–24.

GPW. (2019). Internet service. Warszawa: Giełda Papierów Wartościowych w Warszawie S.A. Available at: www.gpw.pl.

Kadoya, S., Kuroko, T., Namatame, T. (2008). Contrarian investment strategy with data envelopment analysis concept. *European Journal of Operational Research*, *189*(1), 120–131.

Kowerski, M. (2006). Efekt wartości księgowej do rynkowej na Giełdzie Papierów Wartościowych w Warszawie. *e-Finanse*, *1*, 1–11.

Lee, D. D., Chan, H., Faff, R. W., Kalev, P. S. (2003). Short-term contrarian investing—is it profitable?… Yes and no. *Journal of Multinational Financial Management*, *13*(4–5), 385–404.

Lewandowicz, M., Borowski, K. (2015). Analiza zjawiska nadreakcji rynku na GPW w Warszawie w okresie 1992–2014. *Studia i Prace Kolegium Zarządzania i Finansów SGH*, *145*, 75–95.

Mościbrodzka, M. (2015). Efekt wartości księgowej do wartości rynkowej na NewConnect. *Zeszyty Naukowe Uniwersytetu Szczecińskiego. Finanse. Rynki Finansowe, Ubezpieczenia*, *73*, 303–311.

Nicholson, S. F. (1960). Price-earnings ratios. *Financial Analysts Journal*, *16*(4), 43–45.

Prusak, B. (2008). Stopy zwrotu z akcji a wskaźniki rynkowe, *Ekonomika i Organizacja Przedsiębiorstw*, *2*, 53–60.

Prusak, B. (2012). *Wskaźniki rynku kapitałowego – zastosowanie w wycenach przedsiębiorstw oraz w strategiach inwestycyjnych.* Warszawa: CeDeWu. ISBN 9788375564945.

Sekuła, P. (2015). Nadreaktywność GPW w Warszawie – analiza empiryczna. *Zeszyty Naukowe Uniwersytetu Szczecińskiego. Finanse. Rynki Finansowe, Ubezpieczenia*, *74*(1), 171–180.

Sezgin, F. H. (2010). An empirical investigation of the relationship among P/E ratio, stock return and dividend yields for Istanbul Stock Exchange. *International Journal of Economics and Finance Studies*, *2*(1), 15–23.

Shi, H. L., Jiang, Z. Q., Zhou, W. X. (2015). Profitability of contrarian strategies in the Chinese Stock Market. *PLoS ONE*, *10*(9), e0137892.

Szyszka, A. (2009). *Finanse behawioralne. Nowe podejście do inwestowania na rynku.* Poznań: Wydawnictwo Uniwersytetu Ekonomicznego. ISBN 9788374174145.

Tedeschi, P., Ribeiro, F. G., Eid, W. Jr. (2009). *An evaluation of the investment strategy based on book-to--market ratio and other financial indicators* [online, accessed: 2019-07-24]. Retrieved from: http://ssrn.com/abstract=1481910.

Truong, C. (2009). Value investing using price earnings ratio in New Zealand. *Business Review*, *11*(1), 1–7.

Zarzecki, D., Byrka, K., Kozłowska-Nalewaj, K. (1998). *Relationship between P/E ratio, P/BV ratio and market capitalization and common stock returns. The Evidence for the Warsaw Stock Exchange* [online, accessed: 2011-08-04]. Retrieved from: http://www.sba.muohio.edu/abas/1998/finalenglishversionofthe-paper.pdf.

Zielonka, P. (2006). *Behawioralne aspekty inwestowania na rynku papierów wartościowych*. Warszawa. CeDeWu. ISBN 8360089057.

Zielonka, P. (2008). *Behawioralne aspekty inwestowania na rynku papierów wartościowych*. 2nd ed. Warszawa. CeDeWu. ISBN 9788375560695.

Analiza skuteczności wybranych strategii kontrariańskich na warszawskiej GPW w latach 2014–2018

Abstrakt: Pomnażanie kapitału jest głównym celem inwestorów i od wielu lat poszukują oni metod oraz strategii, które w jak największym stopniu pozwolą im zrealizować ten cel. W związku z tym, iż oczekiwania oraz charakterystyki inwestorów, między innymi co do okresu inwestycji, są zróżnicowane, pojawiło się wiele strategii. Jedną z takich strategii, głównie długookresowych, jest inwestowanie przeciwstawne, czyli kontrariańskie, polegające na wyborze do portfela takich akcji, których ceny w ostatnim okresie nie wzrastały i są one niedowartościowane, a z drugiej strony perspektywy ich rozwoju są względnie pozytywne. W niniejszym artykule za cel postawiono sobie zbadanie skuteczności strategii kontrariańskich na polskim rynku kapitałowym w latach 2014–2018. Analiza została przeprowadzona dla dużych spółek, tj. wchodzących w skład indeksu WIG30, a portfele były konstruowane przy wykorzystaniu 20% przedsiębiorstw o najniższych wskaźnikach P/E i P/BV. Skuteczność strategii została zbadana na podstawie wartości portfeli oraz skumulowanych stóp zwrotu. Wykazano, że inwestycje dokonywane według strategii kontrariańskich generują wyższe stopy zwrotu niż alokacja środków pieniężnych w indeks WIG30, który stanowił benchmark. Spośród dwóch strategii inwestycyjnych znacznie lepsze wyniki uzyskano przy wykorzystaniu wskaźnika P/BV.

Słowa kluczowe: inwestycje finansowe, inwestowanie w wartość, strategie kontrariańskie