EFFICIENCY OF INVESTMENTS IN THE SHARES OF THE POLISH ENERGY SECTOR COMPANIES AGAINST THE BACKDROP OF THE WORLD STOCK MARKET INDEXES

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Abstract

The present article is to assess the effectiveness of investments in the shares of the Polish energy sector. The tools used are rates of return and risk-sensitive profitability measures based on the Capital Asset Pricing Model - CAMP. The analysis is a statistical assessment of the assets management quality in relation to the results of the world stock market indexes under various market conditions. The results of the study show that regardless of the changing market conditions, the effectiveness of investing in the shares of the Polish energy sector in the analyzed period remained close the market portfolio results.

Key words: *Polish energy sector, Polish Stock Exchange, world stock market indexes, risk measurement*

1. INTRODUCTION

The year 2014 was marked by an increase in the geopolitical risk which echoed not only in newspaper headlines, but also in the real perils of local conflicts and turnovers, increased terrorist attacks frequency, and the events in Ukraine in the first place. The Russian annexation of the Crimea, fights on the country's eastern border, and the imposition of severe sanctions on the Russian Federation by the Western countries resulted in a big amount of diplomatic friction. It is worth pointing out, though, that despite the magnitude of these events, their influence on financial markets was not as powerful as in the past. But although they did not start a crisis on a global scale we cannot ignore their influence on the decisions of investors.

Under the conditions of raised variability, the global stock market last year saw slight increases on the level of 2%. But this result should be treated with caution as it is the aftermath of the strong increases on the American market of up to 11%. Now let us see how the investment competitiveness of the Polish capital market compares to that.

2014 was a year of many challenges and economic recovery. In Poland, the economic dip in 2013 (in the first quarter GDP increased by 0.5% year to year), was followed by a clearly fast economic growth through investments and private consumption which significantly helped our economy. Investments in 2014 constituted an important contribution to GDP. The observed real wage dynamics and also stably growing employment fueled the domestic demand. And what is important, GDP increased even though the price indexes dropped and the inflation recorded the lowest level since the 1980s. 2014 also brought an end to the former mode of the pension funds functioning. Unfortunately, the uncertainty concerning the future of the pension fund strengthened the variability level of the domestic indexes, and the Polish capital market was under a strong influence of the pension reform. What is more, the conflict in Ukraine, the growing geopolitical tension outside the eastern border, and the concern about the influence of the Russian sanctions on Polish GDP acted as a hindrance for domestic and foreign investors. The worsening economic situation on the Russian market resulted in the withdrawal of capital from East Central Europe markets. The country's geopolitical and economic situation in 2014 impacted the shares and bond market. Low inflation and the activities of the Monetary Policy Council supported bond prices which translated into high revenue on the debt securities market. But the equity securities market saw no considerable increases. The economic growth did not motivate investors to place capital in Polish shares which was visible in the results of the Warsaw Stock Exchange indexes. The broad shares market measured through WIG index gained only 0.3%, while at the same time the index of treasury bonds with maturity periods between 7 and 10 years ended 2014 with a profit of almost 18%. Such a disparity in the behavior of bonds and shares had a significant impact on the

allocation of capital in individual investment funds. Share funds recorded considerable outflows, and an especially negative influence was observed in the segment of small and medium sized companies. But the price to profit rate did not imply the overvaluation of Polish shares. The WIG index of companies reporting profit reached 11.3% which is about 7% below the median from the last 10 years. Comparing Poland to other countries from our region such as the Czech Republic or Hungary, pricing on our market was relatively attractive for investors looking for opportunities in the so called CE3 region (Central European Three). The energy sector aroused much interest among investors in 2014, also globally.

The aim of the article is to assess the effectiveness of investments on the Polish capital market on the example of the shares of big energy sector companies. The analysis uses rates of return as well as takes into account the profitability measures risk based on the Capital Asset Pricing Model - CAMP. The analysis consists in a statistical assessment of the assets management quality in relation to the results of the world stock market indexes in 2014. The results of the study show that regardless of the changing market conditions, the effectiveness of investing in the shares of the Polish energy sector in the analyzed period remained close the market portfolio results.

2. POLISH ENERGY SECTOR

In every country, producing energy is the lifeblood of the economy which, along with the transport system, conditions the functioning of the economy. Energetic safety is a priority for every country. The Polish energy sector has come up against major challenges set by the European Union whose requirements, instructions and indicative targets determine changes, especially structural. The sustainable development plan, aiming at the improvement of energetic efficiency and the increase of social awareness as well as technological advancement, is highly dependent on the legislature organs of both Poland and the EU because in recent years it was legal acts that stimulated the energy sector (Pytel & Strzelecka, 2009). The main currently developed field in energy production is renewable sources. Other priorities are the rationalization of the electric energy use and the reduction of the energy intensity of the economies. All these activities are obviously motivated by the environmental protection (Zasuń, 2015). In the process of designing the framework of the system functioning, especially with reference to the reduction of greenhouse gases emission, the EU energy and environmental protection policy takes into account the disproportions in the economic development of the member countries (Włodarczyk, 2014). The individualization of the energy policy helps obtain resources for investments modernizing the energy sector through the creation of modern carbon power plants, nuclear power plants or the broader utilization of renewable energy. Such an approach brings benefits for Polish companies as well which is visible in the good WIG-Energia index results compared to the rest of the market. Furthermore, the energy sector companies which are aware of the needed volume of resources on replacement investments in the energy sector, and which consider the increased caution of financial institutions when it comes to financing energy investments, seek to diversify the sources of their activities financing through the emission of bonds. For this reason it is desirable to analyze the energy sector for the investment attractiveness.

The research concentrates on the analysis of four main energy sector companies with Treasury shareholding: PGE Polska Grupa Energetyczna SA, Tauron Polska Energia SA, ENERGA SA, ENEA SA. They have the biggest share on the Polish energy production market. These four capital groups together produce 67% of electricity and their joint share in the energy distribution in Poland is 87%. The companies are also part of the WIG-ENERGIA index which is a sector index including companies participating in the WIG index and belonging to the power sector at the same time. The sub-index portfolio contains packages identical with the ones in the WIG index portfolio. The index base date is 31 December 2009, and its value on that day was 3998.60. The sub-index methodology is identical with the WIG index which means it is a profitable index and the calculation of it takes into consideration both the prices of shares it contains as well as the dividend yield and pre-emptive rights. The biggest entities in this sector are the already mentioned Polish energy groups: PGE Polska Grupa Energetyczna SA (50.5%), Tauron Polska Energia SA (15.5%), ENERGA SA (15.5%), ENEA SA (11.2%). Foreign companies are represented by the Czech energy group CEZ (2.8%) which in 70% is

controlled by the Czech Ministry of Finance, and the Lithuanian company Inter RAO Lietuva AB (0,24%) controlled by the Russian state energy group RAO. Apart from the mentioned ones, the index also includes companies: Elektrociepłownia Będzin SA, Zespół Elektrociepłowni Wrocławskich KOGENERACJA SA, Zespół Elektrowni Pątnów-Adamów-Konin SA, Polenergia SA.

The biggest Polish energy sector company in terms of revenue and profit is Grupa Kapitałowa PGE. The company generated around 40% of electricity in Poland in 2014, and its share in the energy distribution was about 26%. The total power of its installed capacity in 2014 was 12.86 GW, and the energy output was 54.8 TWh. The consolidated operating profit increased by depreciation (EBITDA) in 2014 was about PLN 8.1 billion, and the net profit attributed to the shareholders of the parent entity was about PLN 3.6 billion, i.e. PLN 1.95 per share. In 2014 the group was realizing its key projects until 2020, such as building new blocks in Opole and Tarnów, the program of the existing power plants modernization, and the development of the renewable energy segment as well as the modernization and development of the distribution segment to improve the reliability of energy supplies.

The biggest electric energy distributor and seller in Poland is the group Tauron Polska Energia SA. It extracts coal, produces, distributes and trades electricity and heat. It is also one of the biggest economic subjects in the country. In terms of the electricity production it is ranked on the second place. It is the main heat provider in Upper Silesia. The group produces around 15.37 TWh of net electric energy a year. It also has four wind farms with the joint capacity of 183 MW, 35 hydro power plants with the joint capacity of 133 MW, and produces 1.79 TWh of energy from wind and water sources. In 2014 the group produced 5.4 million tons of coal. The volume of the electricity distribution in 2014 hovered around 48 TWh, and the number of clients connected to the distribution network increased by about 44 thousand during the year. Sales revenue was PLN 18.4 billion, and EBITDA was PLN 3.6 billion. The Distribution and Sales segments had the greatest influence on the shape of group's EBITDA (76% jointly). The net profit attributed to the shareholders of the parent entity in 2014 was almost PLN 1.2 billion. The investment outlay of Grupa Tauron in 2014 exceeded PLN 3 billion. The group is realizing a broad investment program. Building a 910 MW coal block in Jaworzno III power plant, which will start functioning in 2019 and will produce around 6 TWh of electric power a year, is the Group's chief project. Considering the planned and realized investments, TAURON is successful in obtaining external financing. In October, the Group gained PLN 1.75 billion from the issue of bonds.

Energa SA is the leader among the four main energy groups on the Polish market in terms of the share of renewable energy in the total of generated energy. The group produces, distributes and sells electric energy. Its total installed capacity is 1.36 GW, out of which as much as 41% is renewable energy sources. In 2014 the group produced 5.1 TWh of electric energy. The volume of the supplied energy was 20.9 TWh. Energa's assets include 46 hydro power plants, 3 wind farms and a plant co-burning biomass. The net profit of the group in 2014 was PLN 1006 million and the EBIDTA value was PLN 2307 million. In 2014 Energa realized investments in the Distribution Sector with total value of PLN 1148 million Their goal was to develop and modernize the network.

Grupa Kapitałowa Enea SA is another Polish group in the energy sector holding a strong market position. The basic scope of its activity is the electric energy production, distribution and trade. In 2014 the group produced 12.812 TWh of electric energy. The net sales revenue was PLN 9.855 billion, the EBIDTA was PLN 1.915 billion and the profit attributed to the shareholders of the parent entity was PLN 908.5 million. The investment outlay of the group in 2014 reached PLN 2.75 billion.

2014 was a year full of events important for the whole capital market as well as directly connected with the energy sector. Unfavorable state of the market was observable in the drop in the electric energy production in Poland by 3.7%, and by as much as 5% in the case of generating resources based on coal. Also, the level of the national electricity consumption increased by as little as 0.5%. Although the stabilization of the electric energy prices on the level of PLN 180 a MWh was a positive sign. Regardless of the state of the market, the analyzed companies consistently continued their investment strategies and generated good financial results.

3. METHODS OF INVESTMENT EFFICIENCY ASSESSMENT

The subject literature sees the evaluation of the investment efficiency of financial instruments as a comparison of achieved results with the results calculated for a specific benchmark which can be an economy success index such as a stock index or a specially designed investment portfolio. Investors optimize their investment portfolios according to the benchmark (Dawidowicz, 2008). Basic methods of investment analysis are the commonly known statistical methods: the historical rate of return, the standard deviation, the coefficient of variation and the beta coefficient. From the investor's standpoint, measuring the risk is not the only significant issue. Calculating the measures of its diversification is another. The measures we can highlight are the DR measure, which is the relationship between the market and total risk and the determination coefficient. Other methods are: the Tracking Error rate and the Information Ratio.

The Tracking Error rate is a standard deviation between the rate of return achieved by a given financial instrument and the rate of return obtained on the benchmark. It is calculated through the following formula:

$$TE = \sqrt{\frac{\sum_{i=1}^{n}(R_p - R_m)^2}{n}} \quad (1)$$

where: TE - Tracking Error, R_p - financial instrument rate of return, R_m- market portfolio (benchmark) rate of return, n - the number of return periods. The Information Ratio (IR) determines the volume of the additional rate of return per a relative risk unit. It also tells us if the risk caused by the deviation from the accurate index representation is compensated by an increased rate of return. It is calculated on the basis of the following formula:

$$IR = \frac{R_p - R_m}{TE} \quad (2)$$

where: the Information Ratio, R_p - the financial instrument rate of return, R_m- the market portfolio (benchmark) rate of return, TE - Tracking Error (standard deviation of the active rate of return). Both the Tracking Error index and the Information Ratio are used to asses the investment efficiency of different financial instruments.

The effectiveness analysis is usually based on the Capital Assets Pricing Model (CAMP) or its developments (Sharpe, 1964, Lintner, 1965). The CAMP results can be complemented by the commonly used indexes of investment efficiency which present the results of a financial instrument in the light of the risk involved in achieving them. We can specify the following measures: the Sharpe ratio, the Treynor ratio, the Jensen's Alpha, the Sharpe Alpha and the Modigliani and Modigliani index (Skrodzka, 2014).

The Sharpe ratio determines the relationship between the risk premium and the standard deviation from the financial instrument rates of return. It is calculated through the following formula:

$$S_p = \frac{R_p - R_f}{S_p} \quad (3)$$

where: S_p- Sharpe ratio, R_p – rate of return of a financial instrument in a given time, R_f – average rate of return of risk-free instruments in the same time, S_p – standard deviation of the financial instrument rate of return in a given time. The index values of the examined financial instrument higher than the benchmark's indicate an efficient investment.

The structure of the Treynor ratio is similar to the Sharpe ratio. It is calculated on the basis of the following formula:

$$T_p = \frac{R_p - R_f}{\beta_p} \quad (4)$$

where: T_p- Treynor ratio, R_p – average rate of return of a financial instrument in a given time, R_f – average rate of return of risk-free instruments in the same time, β - beta factor - the systematic risk of a financial instrument rate of return in a given time. The Treynor ratio determines the size of the premium, and the size of the difference between the instrument rate of return and the risk-free instrument rate of return per a unit of the taken systematic risk (Ostrowska, 2003). A comparison of the Treynor ratio for a given asset with the benchmark index allows for a complete assessment of the analyzed financial instrument (Reilly & Brown, 2001). The bigger the positive difference between these indexes the higher the efficiency.

Another measure used in the efficiency assessment is the Jensen's Alpha. It is calculated through the following formula:

$$J = (R_p - R_f) - (R_m - R_f)\beta_p \quad (5)$$

where: J - Jensen's Alpha, R_p - rate of return of the financial instrument, R_m- rate of return from the market portfolio, R_f – rate of return of the risk-free financial instrument.

β_p- beta coefficient of the financial instrument. Positive index values express how much the asset's results exceeded the expectations. Negative index values mean that the results of the financial instrument are worse than expected, and that it figures below the SML line (Dawidowicz, 2008).

Sharpe ratio is yet another measure. Its structure resembles the Jensen's Alpha. In order to calculate it we use the formula:

$$AS = (R_p - R_f) - (R_m - R_f)\frac{S_p}{S_m} \quad (6)$$

where: AS - Sharpe Alpha, R_p - rate of return of the financial instrument, R_m- rate of return on the market portfolio, R_f – rate of return of the risk-free financial instrument, s - standard deviation of the rate of return on the market portfolio, s_p - standard deviation of the financial instrument rate of return. Sharpe Alpha determines the difference between the financial instrument rate of return and the model portfolio rate of return whose investment risk is measured through the total risk of the financial instrument. A positive index value suggests an efficient investment, whereas a negative one means the asset is inefficient.

The M^2 measure, i.e. the Modigliani & Modigliani index measures the rate of return achieved by a given asset on the basis of the total risk of the benchmark. In order to calculate it we use the formula:

$$M^2 = \frac{S_m}{S_p}(R_p - R_f) + R_f \quad (7)$$

where: M^2- Modigliani & Modigliani measure, s_m- standard deviation of the benchmark rate of return, s_p - standard deviation of the financial instrument rate of return, R_p - financial instrument rate of return, R_f – risk-free financial instrument rate of return. The calculation of M^2 assumes that the portfolio built-up from a given financial instrument will be increased or decreased by risk-free assets with the help of a "leverage" which is a quotient of the standard deviation of the asset and the standard deviation of the benchmark. In this way a new portfolio is created - RAP. Its rate of return resembles the benchmark's rate of return (Czekaj, Woś & Żarnowski, 2001). The analyzed financial instrument can be described as efficient if the RAP rate of return is higher than the benchmark's rate of return, or inefficient if the rate of return on this portfolio is lower than the benchmark's rate of return.

4. ANALYSIS OF INVESTMENTS IN THE SELECTED COMPANIES OF THE POLISH ENERGY SECTOR

The measures presented in the previous sub-chapter served the efficiency assessment of investments in the chosen group of four biggest capital companies of the energy sector listed on the Warsaw Stock Exchange and being part of the WIG-ENERGIA index in 2014. The analysis used the monthly rates of return of the discussed qualities. The efficiency assessment was carried out on the basis of different benchmarks: WIG index, DJ Euro Stoxx 50, S&P 500, DAX. The relationship between the benchmarks represented by indexes of different markets and the WIG-ENERGIA sector index was analyzed through the Pearson correlation coefficients determined for the series of rates of return.

Table 1. Pearson correlation coefficient for the rates of returns of the benchmarks and the WIG-ENERGIA sector index in 2014.

INDEX	DAX	DJ Euro Stoxx 50	S&P500	WIG	WIG-ENERGIA
DAX	**1**	**0,858177**	**0,618657**	0,233041	-0,02784
DJ Euro Stoxx 50	**0,858177**	**1**	**0,611149**	0,448618	0,218883
S&P500	**0,618657**	**0,611149**	**1**	0,292815	0,353566
WIG	0,233041	0,448618	0,292815	**1**	**0,647086**
WIG-ENERGIA	-0,02784	0,218883	0,353566	**0,647086**	1

Source: Own work. The results significant on the level of 5% are in bold.

The analysis of the coefficients correlation of the monthly benchmark rates of return and the WIG-ENERGIA sector index reveals significant positive correlations between turns on the main global markets. However, there are no significant correlations between the WIG index and the WIG-ENERGIA sub-index rates of return with the other benchmarks.

For thus defined benchmarks and the chosen group of shares listed in 2014 the following measures were calculated: R_p- simple annual rate of return, s_p- standard deviation of the monthly rates of return, RP - premium for risk, DR - relation of the market risk to total risk index, J - Jensen's Alpha, S_p- Sharpe ratio, beta- beta coefficient, AS - Sharpe Alpha, T_p- Treynor ratio, M^2- Modigliani & Modigliani index, TE - Tracking Error, IR - Information Ratio. The results of the individual benchmarks, companies and the WIG-ENERGIA sub-index are shown in the tables 2-9. Column one contains the abbreviated names of the listed companies according to the Warsaw Stock Exchange classification. Presented in bold are the results of shares of companies which according to the calculated measures achieved better results than the benchmark which means the investments in the given quality were efficient.

Table 2. The basic indexes for the WIG benchmark, the selected group of shares and the WIG-ENERGIA sub-index in 2014.

Financial instrument	**R_p**	**s_p**	**RP**	**DR**	**TE**	**IR**
PGE	**17,03841**	6,411655	**12,57**	0,223686	6,497933	**2,755595**
ENERGA	**44,38871**	4,888428	**39,92**	0,557997	5,232652	**8,648764**
TAURONPE	**14,25339**	4,94134	**9,78**	0,59934	4,215163	**3,587204**
ENEA	**6,071179**	8,558295	**1,60**	0,572631	7,549241	**0,919091**
WIG-ENERGIA	**23,10381**	4,15458	**18,63**	0,647086	3,70739	**6,465754**
Benchmark	-0,86726	2,267219	-5,34			

Source: Own work.

Table 3. Efficiency measures adjusted for the risk of the WIG benchmark, the chosen group of shares and the WIG-ENERGIA sub-index in 2014

Financial instrument	**J**	**S_p**	**Beta**	**AS**	**T_p**	**M^2**
PGE	**1,419646**	**0,180024**	0,632581	**2,340707**	**1,82467**	**0,780654**
ENERGA	**3,358188**	**0,583711**	1,203116	**3,758018**	**2,371701**	**1,695902**
TAURONPE	**1,408876**	**0,174214**	1,306244	**1,775231**	**0,659029**	**0,767482**
ENEA	**1,39752**	**0,057331**	2,161565	**2,074338**	**0,22699**	**0,502482**
WIG-ENERGIA	**1,958**	**0,351515**	1,185757	**2,229**	**1,231617**	**1,169**
Benchmark		-0,18505	1		-0,41954	-0,047

Source: Own work.

Table 4. The basic indexes for the DJ Euro Stoxx 50 benchmark, the selected group of shares and the WIG-ENERGIA sub-index in 2014.

Financial instrument	**R_p**	**s_p**	**RP**	**DR**	**TE**	**IR**
PGE	**17,03841**	6,411655	**12,57**	-0,08568	7,227692	**2,120254**
ENERGA	**44,38871**	4,888428	**39,92**	-0,06651	6,441474	**6,625012**
TAURONPE	**14,25339**	4,94134	**9,78**	0,585621	4,122768	**3,04153**
ENEA	**6,071179**	8,558295	**1,60**	0,717769	6,964394	**0,625655**
WIG-ENERGIA	**23,10381**	4,15458	**18,63**	0,214939	4,678104	**4,572353**
Benchmark	1,713869	2,552645	-2,76			

Source: Own work.

Table 5. Efficiency measures adjusted for the risk of the DJ Euro Stoxx 50 benchmark, the chosen group of shares and the WIG-ENERGIA sub-index in 2014

Financial instrument	**J**	**S_p**	**Beta**	**AS**	**T_p**	**M^2**
PGE	**1,111612**	**0,180024**	-0,21521	**1,651908**	-5,36327	**0,832038**
ENERGA	**2,828196**	**0,583711**	-0,12737	**3,232858**	-22,4032	**1,862508**
TAURONPE	**1,085458**	**0,174214**	1,133629	**1,244386**	**0,759378**	**0,817207**
ENEA	**0,967449**	**0,057331**	2,406477	**1,154927**	**0,203889**	**0,518845**
WIG-ENERGIA	**1,530**	**0,351515**	0,349826	**1,783**	**4,174639**	**1,270**
Benchmark		-0,07762	1		-0,19813	0,174

Source: Own work.

Table 6. The basic indexes for the S&P 500 benchmark, the selected group of shares and the WIG-ENERGIA sub-index in 2014.

Financial instrument	**R_p**	**s_p**	**RP**	**DR**	**TE**	**IR**
PGE	**17,03841**	6,411655	**12,57**	0,240739	6,074538	**0,90491**
ENERGA	**44,38871**	4,888428	**39,92**	0,00883	5,842593	**5,622026**
TAURONPE	**14,25339**	4,94134	**9,78**	0,17695	4,982173	**0,544319**
ENEA	**6,071179**	8,558295	1,60	0,439659	7,622557	-0,71765
WIG-ENERGIA	**23,10381**	4,15458	**18,63**	0,274263	4,060033	**2,847836**
Benchmark	11,5415	2,232047	7,07			

Source: Own work.

Table 7. Efficiency measures adjusted for the risk of the S&P 500 benchmark, the chosen group of shares and the WIG-ENERGIA sub-index in 2014

Financial instrument	**J**	**S_p**	**Beta**	**AS**	**T_p**	**M^2**
PGE	**0,762356**	0,180024	0,691535	-0,47363	**1,669116**	0,774322
ENERGA	**2,842472**	**0,583711**	0,019339	**1,612284**	**147,5505**	**1,675371**
TAURONPE	**0,638854**	0,174214	0,391736	-0,39373	**2,197535**	0,761355
ENEA	-0,46468	0,057331	1,685775	-1,68225	0,291056	0,500465
WIG-ENERGIA	**1,171**	**0,351515**	0,510495	**0,406**	**2,860749**	**1,157**
Benchmark		0,253895	1		0,566706	0,939

Source: Own work.

Table 8. The basic indexes for the DAX benchmark, the selected group of shares and the WIG-ENERGIA sub-index in 2014.

Financial instrument	**R_p**	**s_p**	**RP**	**DR**	**TE**	**IR**
PGE	**17,03841**	6,411655	**12,57**	-0,17814	7,604665	**1,869409**
ENERGA	**44,38871**	4,888428	**39,92**	-0,30965	7,086542	**5,865559**
TAURONPE	**14,25339**	4,94134	**9,78**	0,361096	4,821686	**2,370791**
ENEA	**6,071179**	8,558295	**1,60**	0,587813	7,250024	**0,448136**
WIG-ENERGIA	**23,10381**	4,15458	**18,63**	-0,02475	5,367139	**3,778853**
Benchmark	2,822181	2,905737	-1,65			

Source: Own work.

Table 9. Efficiency measures adjusted for the risk of the DAX benchmark, the chosen group of shares and the WIG-ENERGIA sub-index in 2014.

Financial instrument	**J**	**S_p**	**Beta**	**AS**	**T_p**	**M^2**
PGE	**1,115523**	**0,180024**	-0,39307	**1,371661**	-2,93647	**0,895603**
ENERGA	**2,802103**	**0,583711**	-0,52094	**3,01919**	-5,47748	**2,068612**
TAURON	**0,921355**	**0,174214**	0,61406	**1,028406**	**1,401903**	**0,878721**
ENEA	**0,661237**	**0,057331**	1,731291	**0,780853**	**0,283404**	**0,539088**
WIG-ENERGIA	**1,457**	**0,351515**	-0,03538	**1,601**	-41,2747	**1,394**
Benchmark		-0,03391	1		-0,09853	0,274

Source: Own work.

The Fitch rating agency did not rate the prospects of the energy sector in Central Europe high in 2014. But the majority of the discussed Polish companies were classified as safe by rating agencies, with a rating on the investment level of BB+ or higher. Only TAURON was placed in the insecure sphere with a BB- rating.

The rates of return of the analyzed shares were changeable which was reflected in the values of the standard deviation of the monthly rates of return. It was mainly due to the exchange value variability on the Warsaw Stock Exchange. The yearly rates of return in 2014 hovered around the level of 20.4% In 2014, the shares of all companies from the discussed group and the WIG-ENERGIA sub-index achieved the rate of return lower than the benchmarks' rate of return. The values of the premium for the market risk index of the discussed companies were positive for the WIG and S&P 500 benchmarks, but in the case of two companies they were negative for the DJ Euro, Stoxx 50 and DAX indexes. The shares of all 4 companies achieved a better RP result than WIG, DJ Euro Stoxx 50 and DAX benchmarks. In the case of the S&P 500 benchmark, ENEA achieved a worse result. The values of the systematic risk measured through the beta coefficient in relation to WIG, show that except PGE, all rates of return of the companies in 2014 reacted to changes on the market, but in relation to S&P 500 index only TAURON behaved aggressively. The negative index values of PGE and ENERGA in relation to DJ Euro Stoxx 50 and DAX mean they reacted conversely to the changes in the market portfolio rates of return. And high values of the Tracking Error index suggest that all discussed companies were conducting a proactive management strategy in 2014. The obtained values of the Information Ratio lead to the conclusion that the application of a proactive management strategy in 2014 brought the expected results in the form of an additional rate of return. The shares of TAURON

achieved the highest Information Ratio results in relation to all benchmarks. The results analysis in terms of the WIG benchmark carried out on the basis of all discussed measures showed that in 2014 the investments in all discussed shares and in the portfolio based on WIG-ENERGIA were effective. Whereas measures like the simple rate of return, risk premium or Information Ratio determined the discussed group as efficient in 2014 for all benchmarks. Only the shares of ENEA in relation to S&P 500 achieved low premium for risk and Information Ratio values. The comparison of only rates of return does not allow to fully assess the results of investments. What is needed is the measurement of the investment risk connected with the rate of return achieved by a given investment. Considering the measures: Jensen's Alpha, Sharpe ratio, Sahrpe Alpha, Modigliani & Modigliani index, all investments in the shares of companies and investments in the portfolio based on WIG-ENERGIA are efficient in relation to the WIG, DJ Euro Stoxx 50 and DAX benchmarks. The S&P 500 benchmark determined the ENEA shares as definitely inefficient. The assessment of the other shares on the basis of different measures varied. The analysis of the investment efficiency based on a benchmark does not allow to determine if the companies achieve the best or the worst economic results, but enables us to state if the investment in their shares was efficient in terms of the assumed benchmarks.

5. CONCLUSIONS

The energy industry is one of the most innovative economic sectors of the economy. Property is not its biggest asset. It is the people, experience and solutions whose value is hard to express on the balance sheet. In the energy sector, 2014 was a year of hope for the improvement of results and the continuation of the investment projects implemented by the biggest Polish energy companies, as well as initiating new ones, largely supported by the EU funds. Nevertheless, the negative signals around the world call for the analysis of the influence of the geopolitical crisis on individual segments of the Polish financial market, including the energy sector. The goal of the analysis was to asses the effectiveness of investments in the selected group of Polish companies form the energy sector in 2014. The carried out analysis in terms of different world indexes showed that despite the market downturn, the majority of indexes adjusted to the investment risk deemed the investments in the chosen shares and the portfolio based on the WIG-ENERGIA sub-index effective. Only when it comes to the S&P 500 benchmark, the shares of the Polish energy companies did not turn out eligible for investment.

The biggest increases in 2014 were observed in shares listed on Wall Street. The S&P 500 index gained over 12% last year. Most of the western European indexes performed well as they grew on the wave of activities of the European Central Bank. The most significant drops (more than 40%) occurred on the oil market. Also the ruble market weakened in relation to dollar by over 70%, and the Russian RTS index was overpriced by 43%. In Poland, the end of the year brought a strong weakening of zloty. The year was not the best for the investors on the Warsaw Stock Exchange either where the WIG index lost almost 1% . It is partially connected with the conflict in Ukraine, the lack of shares demand form the pension fund and deflation. In such geopolitical circumstances, global investors perceive Poland as a risky market. But looking at the pricing, the Polish shares market is an appealing place to locate capital in Europe and there are grounds to believe that 2015 will bring even higher rates of return in the Polish energy sector shares market than 2014.

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