

The impact of capital structure on the market value of energy sector companies on the example of companies from Poland

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Abstract: The focus of this article is to analyse the impact of capital structure on the value of energy sector companies listed on the Warsaw Stock Exchange. The proposed study will cover the last four years, i.e. 2014-2017, in quarterly terms. In addition to the mentioned capital structure parameter, the analysis also covers such indicators as return on equity (ROE) and return on assets (ROA). The study will use multiple regression based on the deltas of the respective parameters describing their changes quarter-to-quarter. The author of this publication assumes that capital structure may have an impact on the value of energy sector companies. The assumption is based on the market phenomenon whereby capital structure seems to reflect to a certain extent the risk incurred by investors: on the one hand, the higher the share of borrowed capital in financing an enterprise's operations, the higher the risk; on the other hand, the higher the proportion of equity in the financing of corporate operations, the lower the chance for dividends to be paid to investors in the respective companies. Investigating the mentioned phenomenon will make it possible, to a certain extent, to answer the question of whether Polish investors are more willing to accept investment risk in exchange for a higher return on investment or whether they would rather limit investment risk and yield lower profit from the capital invested in a given enterprise.

1 Introduction

Corporate value can be determined in various ways [1,2,3]. One of them is the expression of a company's market value in its stock prices. This measurement seems the most accurate due to the fact that the market itself, i.e. the investors, determine how much they are prepared to pay for shares in a specific entity. Thus, the market value of a given enterprise is determined by the market and its investors. The impact on decisions made by them may vary and it is difficult to define the factors and variables considered by investors. This article focuses on leverage, i.e. the proportion of borrowed funds in corporate financing and also on such indicators as return on assets (ROA) and return on equity (ROE). The selection of these indicators was based on the following premises. In the case

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of the first factor, i.e. leverage, it was stated that this is one of the tools with which investors are able to determine investment risk associated with investing in a given entity; the higher the indicator, the greater the risk. This is associated with the fact that a higher debt rate may increase the probability that an enterprise finds itself in a difficult financial situation [4]. There are numerous borrowed capital sources, and the subject has already been discussed [5]. It should also be mentioned that the extent of relying on borrowed capital differs depending on the sector or company [6]. The selection of the remaining two indicators is related to the fact that investors who buy a specific company's stock expect profits. Therefore, two aspects were considered which may draw the attention of potential investors, i.e. risk and potential profit from a given investment.

The paper discusses 8 companies operating in the energy sector (producing and trading electricity), which are representative of the industry, and are listed on the Warsaw Stock Exchange (GPW). The discussed companies are included in the portfolios of such indices as WIG20, WIG-Energia (energy) or WIG-Górnictwo (mining). Given the fact that the paper deals with Polish energy sector companies, it was essential to include companies relying in their operations on hard coal or brown coal in the main part of the analysis. Due to this, not all the companies whose main business line is trading only electricity were taken into consideration. The study presents the market values of the companies and the share of foreign capital in them.

2 The capital structure and value of Polish energy sector companies

On the Polish market (the Warsaw Stock Exchange, GPW) nine companies producing electricity are listed. In terms of value, PGE Polska Grupa Energetyczna SA is the largest, with its value oscillating around PLN 20 bn. The smallest of them is Elektrociepłownia Będzin SA, with a market value of around PLN 70 m. Figure 1 presents the market value of all energy sector companies listed on GPW. It should be mentioned that there is one company from this sector listed on GPW which is not a Polish-capital company, i.e. the Lithuanian Inter Rao Lietuva AB.

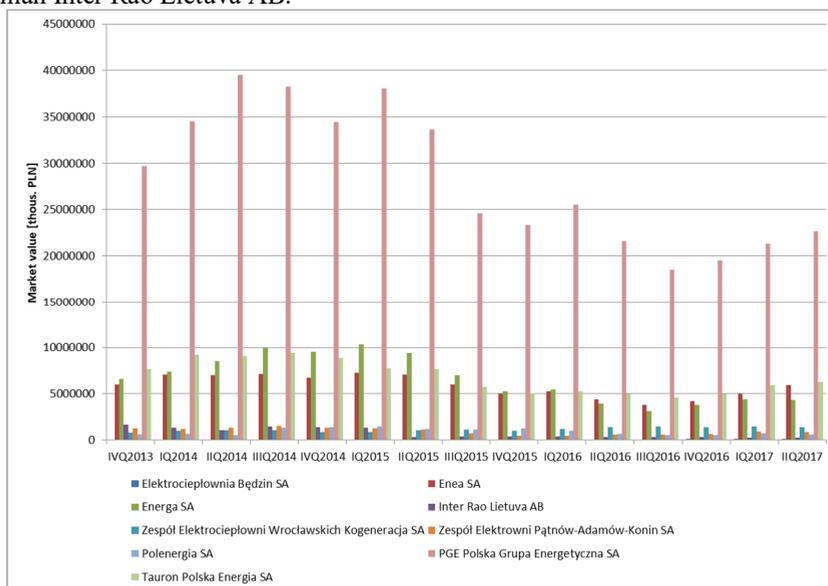


Fig. 1. The market value of the respective Polish energy sector enterprises in the respective quarters

The value of companies presented in Figure 1 changes over time. To better illustrate the changes, their relative value is presented, with Q4 of 2013 as the point of departure (Figure 2). As shown in Figure 2, some companies from the energy sector decreased and others gained in value. A number of factors could contribute to such results. This article focuses on such variables as capital structure, return on assets and return on equity.

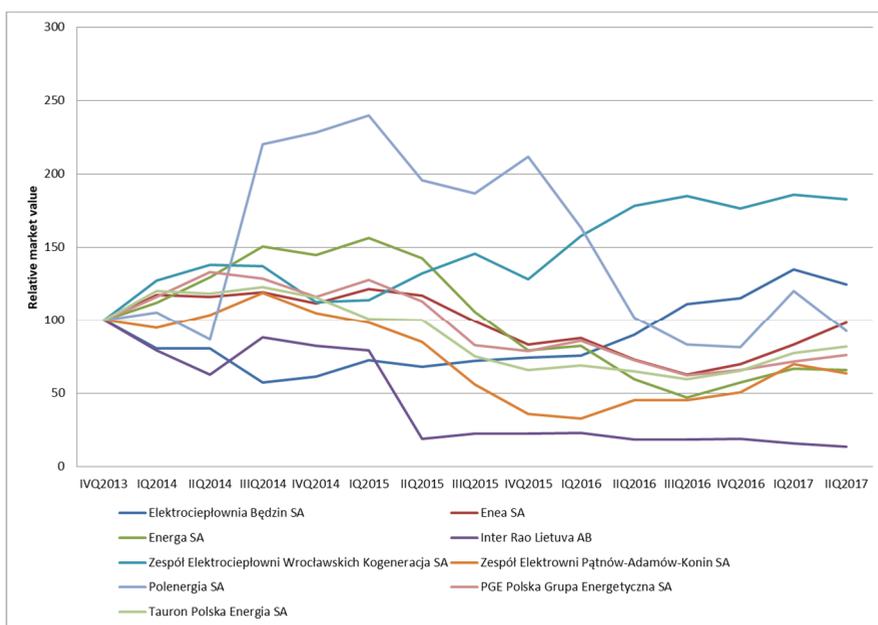


Fig. 2. Relative market value of energy sector companies (value from Q4 2013 = 100%)

The analysis of changes in the value of energy sector companies demonstrates that the highest increase in value was recorded by Zespół Elektrociepłowni Wrocławskich Kogeneracja SA (a rise of 82%) and Elektrociepłownia Będzin SA (a growth of 24%). When analysing the two enterprises, it should also be emphasised that these are the smallest among the GPW energy sector companies. The greatest loss in value was observed for Inter Rao Lietuva AB, which is also one of the smallest on the market. As far as larger companies are concerned, their market value was not subject to any major fluctuations. Based on the analysis of Figure 2, it can be confirmed that the smallest companies report the most considerable stock price fluctuations.

Another aspect under analysis in the context of energy sector companies was their capital structure. Figure 3 shows the percentage of borrowed capital in financing these enterprises' operations.

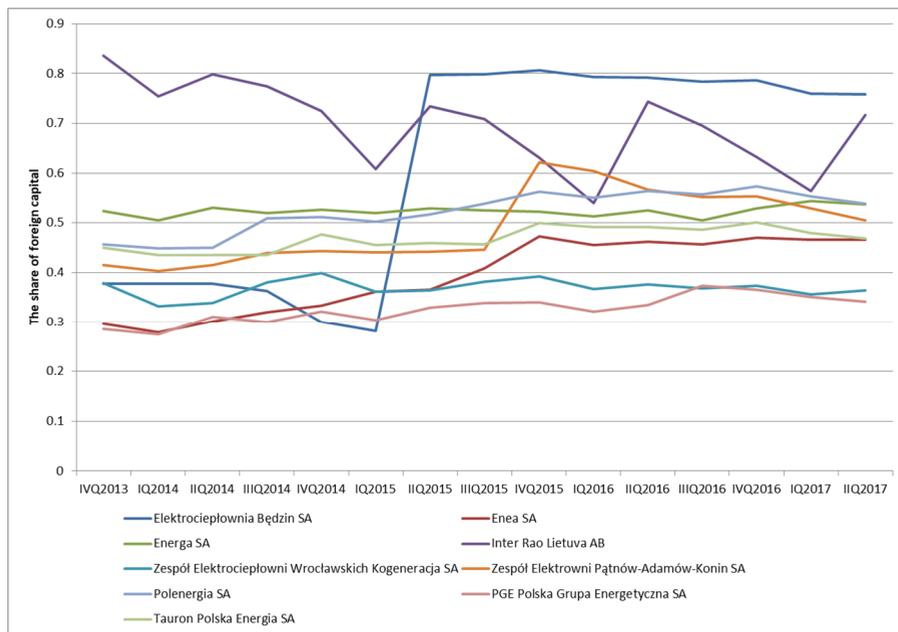


Fig. 3. The percentage of borrowed capital in financing the operations of energy sector companies

In terms of capital structure, there is one entity which reported exceptional values, i.e. Elektrociepłownia Będzin SA. As shown in Figure 3, in Q1 2015 the company made significant investments, funded primarily with borrowed capital. This investment could be one of the reasons for an increase in the company's market value, as shown in Figure 2. Another aspect to be considered is the extent of using borrowed capital. Two companies are distinguished here, i.e. the previously mentioned Elektrociepłownia Będzin SA with a borrowed capital share exceeding 70% and Inter Rao Lietuva AB, with a similar level of borrowed capital.

3 Determinants of the capital structure and the market value of energy sector companies

The value of companies listed on GPW depends on a number of factors. For the present article the author selected three indicators: leverage, return on equity (ROE) and return on assets (ROA). It should be emphasised that the analysis did not take into consideration absolute values but changes in the values of particular figures. Thus, the article analysed the impact of the variability of the respective parameters on the variability of values obtained by specific energy sector enterprises. The study covered 8 energy companies listed on GPW; Table 1 shows variables used for multiple regression analysis. All the financial data were found on the website notoria.pl [7]. The objective of the analysis was to investigate whether the variability of the value of Polish enterprises from the sector in question is influenced by the variability of their capital structure. The analysis also considered the variability of ROE and ROA.

Table 1. Description of variables used to perform multiple regression

var. 1	CORPORATE MARKET VALUE	Elektrociepłownia Będzin SA
var. 2	CORPORATE MARKET VALUE	Enea SA
var. 3	CORPORATE MARKET VALUE	Energa SA
var. 4	CORPORATE MARKET VALUE	Inter Rao Lietuva AB
var. 5	CORPORATE MARKET VALUE	Zespół Elektrociepłowni Wrocławskich Kogeneracja SA
var. 6	CORPORATE MARKET VALUE	Zespół Elektrowni Pątnów-Adamów-Konin SA
var. 7	CORPORATE MARKET VALUE	PGE Polska Grupa Energetyczna SA
var. 8	CORPORATE MARKET VALUE	Tauron Polska Energia SA
var. 9	LEVERAGE	Elektrociepłownia Będzin SA
var. 10	LEVERAGE	Enea SA
var. 11	LEVERAGE	Energa SA
var. 12	LEVERAGE	Inter Rao Lietuva AB
var. 13	LEVERAGE	Zespół Elektrociepłowni Wrocławskich Kogeneracja SA
var. 14	LEVERAGE	Zespół Elektrowni Pątnów-Adamów-Konin SA
var. 15	LEVERAGE	PGE Polska Grupa Energetyczna SA
var. 16	LEVERAGE	Tauron Polska Energia SA
var. 17	ROE	Elektrociepłownia Będzin SA
var. 18	ROE	Enea SA
var. 19	ROE	Energa SA
var. 20	ROE	Inter Rao Lietuva AB
var. 21	ROE	Zespół Elektrociepłowni Wrocławskich Kogeneracja SA
var. 22	ROE	Zespół Elektrowni Pątnów-Adamów-Konin SA
var. 23	ROE	PGE Polska Grupa Energetyczna SA
var. 24	ROE	Tauron Polska Energia SA
var. 25	ROA	Elektrociepłownia Będzin SA
var. 26	ROA	Enea SA
var. 27	ROA	Energa SA
var. 28	ROA	Inter Rao Lietuva AB
var. 29	ROA	Zespół Elektrociepłowni Wrocławskich Kogeneracja SA
var. 30	ROA	Zespół Elektrowni Pątnów-Adamów-Konin SA
var. 31	ROA	PGE Polska Grupa Energetyczna SA
var. 32	ROA	Tauron Polska Energia SA

Source: self-designed

The first of the analysed companies was Elektrociepłownia Będzin SA. The results of multiple regression analysis are shown in Table 2.

Table 2. Multiple regression results for Elektrociepłownia Będzin SA.

	Summary of the regression of dependent variable: var. 1 (Sheet 33) R= .89582180 R ² = .80249670 Adjusted R ² = .67905714 F(5.8)=6.5011 p<.01061 standard estimation error: .08420					
	b*	Standard error	b	Standard error	t(8)	p
Absolute term			0.032194	0.025590	1.25804	0.243852
var. 28	0.830892	0.163993	0.096785	0.019102	5.06664	0.000969
var. 9	-0.767467	0.235225	-0.227921	0.069857	-3.26270	0.011481
var. 23	-0.946865	0.290100	-0.192499	0.058978	-3.26393	0.011460
var. 12	-0.577206	0.234137	-0.513726	0.208388	-2.46524	0.038999
var. 32	0.306576	0.175906	0.054287	0.031149	1.74284	0.119528

As shown in the study, selected variables demonstrated in Table 1 are significant for shaping the market value of the enterprise. These were variables with $p < 0.05$, i.e. Var. 28 (ROA Inter Rao Lietuva AB), Var. 9 (LEVERAGE Elektrociepłownia Będzin SA), Var. 23 (ROE PGE Polska Grupa Energetyczna SA) and Var. 12 (LEVERAGE Inter Rao Lietuva AB). On the basis of the obtained results it can be concluded that the variability of the market value of the said enterprise, in addition to the variability of its capital structure, is influenced by the leverage of Inter Rao Lietuva AB. It is worth pointing out that the two enterprises are the smallest among the companies listed on GPW in terms of value and are characterised by the highest share of borrowed capital (high financial risk). ROE of PGE Polska Grupa Energetyczna SA, the largest Polish energy company, is also crucial for the discussed company. In conclusion, it was demonstrated that the enterprise's capital structure was one of the determinants of the variability of its market value.

The next investigated company was Enea SA. The results of multiple regression analysis are shown in Table 3.

Table 3. Multiple regression results for Enea SA.

	Summary of the regression of dependent variable: var. 2 (Sheet 33) R= .95100881 R ² = .90441775 Adjusted R ² = .79290512 F(7.6)=8.1105 p<.01048 standard estimation error: .06029					
	b*	Standard error	b	Standard error	t(6)	p
Absolute term			0.07681	0.022525	3.40987	0.014321
var. 15	-0.538180	0.146716	-1.10932	0.302417	-3.66818	0.010477
var. 10	-0.464105	0.137679	-1.02496	0.304059	-3.37093	0.015025
var. 19	0.151258	0.142822	0.03187	0.030089	1.05907	0.330330
var. 11	0.267161	0.140013	1.24566	0.652822	1.90811	0.104982
var. 31	0.749823	0.235681	0.13724	0.043138	3.18152	0.019039
var. 9	0.467130	0.191233	0.12366	0.050625	2.44272	0.050285
var. 12	0.189482	0.174795	0.15033	0.138678	1.08402	0.319980

Both for the previously analysed company and for Enea SA the variability of capital structure (Var. 10) had an impact on the variability of the analysed enterprise's value. In addition to the mentioned factor, the following variables were of significance: Var. 15 (Leverage PGE Polska Grupa Energetyczna SA) and Var. 31 (Leverage PGE Polska Grupa Energetyczna SA). In line with the analysis carried out, other factors were not taken into consideration. Therefore, it may be stated that the variability of Enea SA's value does not depend solely on the changeability of its capital structure but also on the variability of return on assets and of the capital structure of the largest Polish energy company listed on GPW.

The next company to undergo analysis was Energa SA. The results of multiple regression analysis are shown in Table 4.

Table 4. Multiple regression results for Energa SA.

Summary of the regression of dependent variable: var. 3 (Sheet 33) $R = .46314025$ $R^2 = .21449889$ Adjusted $R^2 = .14904046$ $F(1.12) = 3.2769$ $p < .09536$ Standard estimation error: .16252						
	b*	Standard error	b	Standard error	t(12)	p
Absolute term			0.016767	0.046663	0.359309	0.725607
var. 31	0.463140	0.255848	0.112727	0.062273	1.810213	0.095358

In the case of this company no significant variables (among the analysed variables) were shown with a major impact on the value variability of the enterprise listed on GPW.

Inter Rao Lietuva AB was investigated next. The results of multiple regression analysis are shown in Table 5.

Table 5. Multiple regression results for Inter Rao Lietuva AB

Summary of the regression of dependent variable: var. 4 (Sheet 33) $R = .90708896$ $R^2 = .82281038$ Adjusted $R^2 = .76965350$ $F(3.10) = 15.479$ $p < .00044$ Standard estimation error: .12273						
	b*	Standard error	b	Standard error	t(10)	p
Absolute term			-0.126231	0.042232	-2.98899	0.013597
var. 9	-0.654309	0.136168	-0.334342	0.069580	-4.80515	0.000718
var. 20	-0.455051	0.139754	-0.091891	0.028221	-3.25609	0.008631
var. 10	0.357486	0.138666	1.523899	0.591107	2.57804	0.027508

The analysed company is the only energy company listed on GPW without Polish capital. As shown in the study, the variability of Inter Rao Lietuva AB's value depends, among other factors, on the variability of its return on equity (Var. 20), with the remaining factors having an impact on the variability of its value: Var. 9 (Leverage Elektrociepłownia Będzin) and Var. 10 (Leverage Enea SA).

The following analysed enterprise was Zespół Elektrociepłowni Wrocławskich Kogeneracja SA. The results of multiple regression analysis are shown in Table 6.

Table 6. Multiple regression results for Zespół Elektrociepłowni Wrocławskich Kogeneracja SA.

	Summary of the regression of dependent variable: var. 5 (Sheet 33) R= .87353873 R ² = .76306991 Adjusted R ² = .61498861 F(5,8)=5.1530 p<.02076 Standard estimation error: .07748					
	b*	Standard error	b	Standard error	t(8)	p
Absolute term			0.06853	0.022331	3.06886	0.015375
var. 16	-0.4308	0.27705	-1.24158	0.798398	-1.55509	0.158534
var. 27	-21.0408	17.11621	-4.23265	3.443171	-1.22929	0.253891
var. 19	20.6990	17.10828	4.11027	3.397249	1.20988	0.260859
var. 29	-0.3742	0.22325	-0.07922	0.047262	-1.67619	0.132227
var. 13	-0.2875	0.21878	-0.55727	0.424033	-1.31423	0.225199

Similarly to Energa SA, also in this case no significant variables were found to influence the variability of the analysed company's value, except for the absolute term.

The next enterprise to undergo analysis was Zespół Elektrowni Pątnów-Adamów-Konin SA. The results of multiple regression analysis are shown in Table 7.

Table 7. Multiple regression results for Zespół Elektrowni Pątnów-Adamów-Konin SA.

	Summary of the regression of dependent variable: var. 6 (Sheet 33) R= .96888604 R ² = .93874016 Adjusted R ² = .84072442 F(8,5)=9.5774 p<.01173 Standard estimation error: .08758					
	b*	Standard error	b	Standard error	t(5)	p
Absolute term			-0.14450	0.060666	-2.38182	0.063023
var. 14	-1.6821	0.384304	-3.27222	0.747587	-4.37704	0.007175
var. 11	1.0710	0.170556	8.27086	1.317175	6.27924	0.001505
var. 28	-0.8090	0.151190	-0.13914	0.026002	-5.35102	0.003062
var. 22	-1.8148	0.414012	-0.01886	0.004303	-4.38344	0.007132
var. 18	16.7441	8.988166	4.45790	2.392978	1.86291	0.121516
var. 16	-0.3814	0.167177	-1.93153	0.846600	-2.28152	0.071402
var. 9	-0.2276	0.114039	-0.09981	0.050004	-1.99601	0.102461
var. 26	-16.3790	8.940117	-4.46379	2.436464	-1.83208	0.126429

The analysis of the enterprise demonstrated that there are four variables to describe the variability of Zespół Elektrowni Pątnów-Adamów-Konin SA. Var. 14 (LEVERAGE Zespół Elektrowni Pątnów-Adamów-Konin SA), Var. 11 (LEVERAGE Energa SA), Var. 28 (ROA Inter Rao Lietuva AB) and Var. 22 (ROE Zespół Elektrowni Pątnów-Adamów-Konin SA). Here it is possible to state that, among others, changes in the capital structure and the variability of return on equity of the analysed enterprise influence the variability of the studied enterprise's market value.

PGE Polska Grupa Energetyczna SA was analysed next. The results of multiple regression analysis are shown in Table 8.

Table 8. Multiple regression analysis for PGE Polska Grupa Energetyczna SA

Summary of the regression of dependent variable: var. 7 (Sheet 33) $R = .95949669$ $R^2 = .92063390$ Adjusted $R^2 = .79364814$ $F(8,5) = 7.2499$ $p < .02153$ Standard estimation error: .05948						
	b*	Standard error	b	Standard error	t(5)	p
Absolute term			-0.00287	0.018946	-0.15139	0.885584
var. 13	-1.05290	0.182469	-2.13982	0.370836	-5.77027	0.002197
var. 31	1.01830	0.229648	0.18421	0.041544	4.43417	0.006802
var. 11	0.77284	0.193252	3.56151	0.890568	3.99915	0.010332
var. 28	-0.74850	0.177175	-0.07681	0.018183	-4.22460	0.008291
var. 12	0.58775	0.206182	0.46088	0.161676	2.85065	0.035796
var. 14	0.41416	0.179139	0.48075	0.207942	2.31195	0.068740
var. 9	0.33045	0.188258	0.08646	0.049257	1.75528	0.139569
var. 18	0.18336	0.168675	0.02913	0.026797	1.08707	0.326611

The analysis showed that the variability of the market value of PGE Polska Grupa Energetyczna SA is influenced by 5 variables, including: Var. 13 (Leverage Zespół Elektrociepłowni Wrocławskich Kogeneracja SA), Var. 31 (ROA PGE Polska Grupa Energetyczna SA), Var. 11 (Leverage Energa SA), Var. 28 (ROA Inter Rao Lietuva AB) and Var. 12 (Leverage Inter Rao Lietuva AB).

The last of the analysed companies was Tauron Polska Energia SA. The results of multiple regression analysis are shown in Table 9.

Table 9. Multiple regression results for Tauron Polska Energia SA

Summary of the regression of dependent variable: var. 8 (Sheet 33) $R = .87806816$ $R^2 = .77100369$ Adjusted $R^2 = .70230479$ $F(3,10) = 11.223$ $p < .00153$ Standard estimation error: .06766						
	b*	Standard error	b	Standard error	t(10)	p
Absolute term			0.02026	0.022183	0.91331	0.382571
var. 10	-0.707770	0.155935	-1.46299	0.322323	-4.53889	0.001077
var. 19	0.419104	0.156846	0.08264	0.030927	2.67208	0.023409
var. 18	-0.404419	0.156841	-0.06084	0.023596	-2.57853	0.027486

In the case of this company it was found that only three variables can have an impact on the variability of its value, such as Var. 10 (Leverage Enea SA), Var. 19 (ROE Energa SA), and Var. 18 (ROE Enea SA).

4 Conclusions

As demonstrated in the article, capital structure variability may have an impact on the variability of the value of specific enterprises from the energy sector in Poland. This was the case for three among the analysed companies: Elektrociepłownia Będzin SA, Enea SA and Zespół Elektrowni Pątnów-Adamów-Konin SA. In the remaining cases the proportion

of borrowed capital was slightly less important. A lower impact of the variability of leverage may arise from the fact that in most cases the debt level is stable and the risk of the dividend not being paid out is minimal. It should also be emphasised that enterprises on the energy market in Poland function on a regulated market, which also may influence investors' perception of risk related to capital structure. The obtained results further make it possible to conclude that investors take numerous aspects into consideration when deciding on whether to buy or sell a company's stock. It is not surprising that the analysis of share purchases in a given entity also includes the operation of the remaining companies from the sector. On the basis of the study it can be concluded that investors pay greater attention to the risk (leverage) in the case of small enterprises (with a lower market value) than companies with a high value. In the case of large companies, investors are more likely to consider their profitability.

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