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Impact of dividend payments by listed oil and gas companies on their valuation

Introduction

The scientific discussion on dividend policy has been listed by Brealey and Meyers (Brealey and Meyers 2011) as one of the ten most critical issues in finance that have not yet received a rational solution in finance theory. Decisions on the distribution of net profit have a strategic character next to decisions on investments and the formation of an optimal capital structure. On the one hand, net profit distribution determines how the company is perceived by the capital market and signals its future financial situation, and on the other, it determines the amount of retained earnings reinvested in the company. The size of investments affects the level of profits generated in future periods, and therefore the ability to pay future divi-

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dends. Dividend payments are perceived by the market as a positive signal of a company's good financial standing and its prospects. It can therefore be expected that the declaration of a dividend by a company will increase demand for its shares and consequently boost its price. Strong market reactions to the news of a dividend pay-out lead to an increase in share price volatility. However, many authors question the validity of this theory, arguing that dividends have no informational content and should therefore not be seen as a reliable signal of a company's future performance (Blaszke 2020).

This paper attempts to determine whether dividend payments by companies from the oil and gas sector listed on the Warsaw Stock Exchange (WSE) affect their value as measured by the ratio of price to the share's book value and the level of risk as measured by the ratio of price to net earnings per share. Two hypotheses were formulated for this study.

I. The dividend yield of companies from the oil and gas sector affects their value as measured by the level of investments shaping the book value of shares.
II. The dividend yield influences the value of the price to net earnings ratio and thus the level of risk posed by the company.

The strategy of dividing profit into a portion called retained earnings and a portion transferred to shareholders is an exceptionally topical and critical issue in the face of the necessity to restructure many sectors of the economy towards lower fuel and energy consumption. This strategy may affect the possibility of raising equity capital on the stock exchange through a new share issue and, at the same time, maintain a rational capital structure at the lowest cost of capital.

1. Net profit distribution as part of financial strategy

A dividend is the price that a joint-stock company pays to an investor for his purchase of issued shares and for giving it access to capital. It is the cost of using shareholders' capital (Sierpińska 1999). The basic function of dividends is to reimburse the capital donors for this cost out of the net profit generated by the company. Dividends are an entitlement enjoyed by all shareholders. The amount of the dividend depends on the number of shares held and the level of net profit allocated to the payment of dividends per share. The payment of dividends can be a sign of a company's stability and financial strength; it can help forecast its financial situation, attract investors interested in high yields and current income from equity investment, or serve to optimize its capital structure. Dividends may be paid out in various forms, the most common being cash. Dividend reinvestment plans (DRIPs), in which funds earned from dividends are used to purchase company shares, may be a modern form of shareholder payment policy. These programs are popular and often used in highly developed countries, including the United States, Canada, Australia and New Zealand. An analysis of automatic dividend reinvestment programs offered by companies from the Dow Jones Industrial Average Index shows that they can be an attractive way to buy shares and build a long-term securities portfolio (Kuciński 2020).

In the twentieth century, the dividend policy of companies listed on developed capital markets was subject to various changes, and its basic characteristic was a decline in the share of dividend-paying companies in the total number of companies, a decrease in payment rates and dividend yields against an increase in the value and concentration of payments. In the last quarter of the twentieth century, companies started to allocate ever more of their profits to share buybacks, which reduced the dynamics of dividend payments (Grullon and Michaely 2002). In the EU, the dynamics of share buybacks was even greater, although the ratio of the value of treasury shares to the value of dividends was lower than in the USA. In the twenty-first century, this trend continued (Kowerski 2015). There are a number of hypotheses and theories in pertinent literature (e.g. the signaling theory, clientele effect, agency theory, catering theory, dividend theory based on a company's life cycle) that try to explain the reasons for dividend payments.

The investor preferences presented in pertinent literature for choosing between dividend payments and capital gains is linked to the dispute over the impact of dividend payments on company value (Czapiewski and Kubiak 2016). Despite many years of empirical research, no single theory has been developed to explain why companies pay dividends.

Within neoclassical finance theories, there exist three main approaches to dividend policy. These are (Pieloch-Babiarz 2016):

1. The neutral approach, represented by Miller and Modigliani (Miller and Modigliani 1961). In the theory of the irrelevance of dividends, they showed that the dividend policy has no impact on the company's market value, and for the investor, it is irrelevant whether he receives income in the form of dividends or capital gain. According to this theory, a company's market value is only affected by the investments made in the company.
2. The pro-dividend approach, represented, for example, by Gordon (Gordon 1963) and Lintner (Lintner 1962). By developing the bird in hand theory, these authors showed that the payment of dividends positively affects the company's market value because stock investors prefer the payment of dividends to the possibility of realizing uncertain potential capital gains in the future.
3. The anti-dividend approach, whose proponents argue that the payment of dividends has a negative impact on the company's market value. They see the reason for this in the different taxation of dividends and capital gains. If dividends are taxed at a higher rate than capital gains, shareholders prefer to leave the net profit in the company (Litzenberger and Ramaswamy 1979).

Most researchers believe that the choice of a net profit distribution strategy and any change in it is met with a certain investor reaction that is not without impact on the company's market value. Investors' reaction to a change in dividend policy comes in the form of the market evaluation of an event in a given company, which is reflected in an increase or decrease of additional rates of return realized by shareholders. Studies of additional rates of return indicate that events such as dividend increases, and the commencement of dividend payments are positively received by shareholders in the short term. Decisions on dividend

payments and their size are conditioned by a number of factors, the impact of which varies in different periods of companies' operation and the general economic and capital market situation.

2. Determinants of dividend payments to shareholders

The factors determining the distribution of net earnings are generally divided into microeconomic, macroeconomic and capital market-related factors. Microeconomic factors relate mainly to the functioning of the company and the values that characterize it. These include the level of net profit generated, shareholder structure, the company's life cycle, its level of indebtedness and the management's aversion to increasing it, the potential for new share issues, available investment projects, return on assets and equity, liquidity determining cash flows, the need to maintain control over the company and its capital structure as well as the cost of its raising.

Macroeconomic factors include economic conditions, usually measured by GDP growth, inflation and interest rates, foreign trade figures and balances, currency risk, tax and legal systems favorable to economic entities, and the specifics of the sector to which the dividend paying company belongs. Capital market determinants include the situation in global capital markets as reflected in local markets, economic sentiment and the risk of change in geopolitics. They are expressed in terms of changes in stock market indices and capital market indicators.

The strength of the impact of individual determinants on the net profit distribution policy varies considerably. Some of the determinants have a significant impact on the level of dividend payments, while others affect them marginally. In addition, in individual companies, some determinants may be stimulants, while in others, the same determinants may be destimulants.

Analysis of pertinent literature indicates that the level of dividends paid is affected by long-term trends in the changes of net profit and that any short-term fluctuations in its level are insignificant in determining the amount of cash transfer to shareholders. A. Brav, J.R. Graham, C.R. Harley and R. Michaely (Brav et al. 2005) concluded that from the point of view of financial performance, dividends are paid by entities characterized by relatively stable profits. The stability of dividend payments is also due to the level of accumulated profit from previous years. Retained profit as a source of the company's financing is cheaper than external capital raised e.g., through the issue of shares (Jabłoński 2018).

One of the many factors determining the decision to pay dividends is the shareholder structure and the associated degree of ownership concentration. The higher the degree of ownership concentration, the stronger the control over management by the owners and the pressure to achieve specific shareholder objectives, including the payment of dividends. Among the owners of public limited companies, strategic and major shareholders, such as investment funds, have the greatest decision-making power. By contrast, the possibilities of

minority shareholders are limited (Pieloch-Babiarz 2017). Long-term investors, who treat dividend payments as a fixed part of their regular income, will prefer shares in companies with high dividend pay-out rates. Short-term investors, on the other hand, will be more interested in capital gain realization (Gajdka 2013).

In analyzing the impact of the ownership structure on net profit distribution strategies, attention must be paid to the behavior of the state as owner. Based on a study of UK companies, Michaely and Roberts (Michaely and Roberts 2012) show that companies with the government as a shareholder pay higher dividends due to a higher probability of the agency problem. In the case of state-owned companies, it is even doubled, occurring between managers and the politicians who oversee them, but also between politicians and the 'ultimate' owners of the companies – the public (Kwiatkowski 2018). In Poland, the State Treasury holds controlling stakes in several companies from the oil and gas sector. Decisions on dividend payments are often determined by the state's financing needs and its financial policy. The State Treasury, due to its usually extensive needs, strives to increase dividend pay-out ratios. It is even said that there exists a problem of the "financial draining" of companies (Kaźmierska-Jóźwiak 2016). However, in recent years, due to the need to restructure the economy towards renewable energy sources, the State Treasury has abandoned its drive to collect dividends from net profit.

The way in which net profit is distributed and the form of dividend payments are influenced by the life cycle of the company. Companies in the early stage of development need funds for investment, thus they rarely pay dividends or pay them in the form of shares. Kowerski (Kowerski 2011) emphasizes that as companies move into subsequent stages of their life cycle, their investment opportunities decrease, resulting in lower capital expenditure, which means that more funds remain available for dividend payments. A company starts paying dividends when it moves from a high growth rate stage to a low growth rate stage, i.e., from the immaturity phase to the maturity phase in its life cycle. A decline in a company's growth rate, profitability and systematic risk defines the point at which a company moves into its maturity phase. In mature companies, the demand for funds to finance growth is lower than in companies in the initial stage of development (Bulan and Subramanian 2011). This is due to the fact that as companies grow, their investment opportunities diminish, resulting in a lower demand for capital expenditure, thus more funds remain for dividend payments (Sierpińska-Sawicz 2015).

Studying the dividend policy from many angles, H. DeAngelo, L. DeAngelo and R. Stulz (DeAngelo et al. 2006) extended the list of factors determining decisions on dividend payments to incorporate variables resulting from the company's life cycle theory, describing the maturity of the company: the number of years since going public and, above all, the ratio of retained earnings to equity and the ratio of retained earnings to total assets. They found that more mature companies are more likely to pay dividends.

In their study of dividend decision factors, E.F. Fama and K.F. French (Fama and French 2001) considered the investment opportunities of companies measured by the ratio of market value to book value of assets or the annual growth rate of assets. They found that these

opportunities depend on company size and their development stage. A study of companies listed on the New York Stock Exchange shows that profitable companies that are larger but with low investment opportunities are more likely to pay dividends. Growth companies, which prefer to retain a substantial portion of their profits, pay low dividends. According to McManus, Gwilym and Thomas (McManus et al. 2006), if the owners plan to invest in the company, they allocate the profit to dividend payments only in exceptional cases. If a significant part or all of the profit is earmarked for dividends, it may indicate the owners' lack of interest in the further development of the company. G. Grullon, R. Michaely and B. Swaminathan (Grullon et al. 2002) in their research found a negative relationship between the propensity to pay dividends and investments. As companies grow, their investment opportunities decrease, which reduces the need for funds to finance it, so more funds can be allocated to dividends. Examining the determinants of dividend policy, Damodaran (Damodaran 2017) also addressed the issue of the level of investment made. He notes that offering a higher dividend does not increase the value of the company if it invests in bad projects. In contrast, a company with good projects boosts its value even if it does not pay dividends to shareholders. Additionally, Brav, Graham, Harvey and Michaely (Brav et al. 2008) argue that investors are willing to accept low dividends in return for a high return on their investment.

The method of profit distribution is extremely important in the context of investment financing, as retained earnings increase the ability to finance projects and strengthen a company's ability to generate profit in the future and protect the company from underinvestment. Retained earnings reduce the financial risks associated with an increase in excessive debt, as the company finances itself to a greater extent with equity. The choice of financing sources changes depending on the stage of development in which the company is at and its current financial policy. The way a company finances itself determines its dividend payment policy in many different ways. According to Frielinghaus, Moster and Fire (Frielinghaus et al. 2005) companies in the early and late stages of their life cycle are not able to bear the financial risk, whereas companies in an established position can bear the additional risk associated with debt financing, thus companies in the growth and late stages of their life cycle are financed to a greater extent with equity, whereas at the maturity stage, equity is replaced with debt.

Distributions to shareholders are one way of achieving an optimal capital structure. A large share of financing debt should lower the level of dividends, as a large debt is a kind of management commitment to allocate the cash the company generates to servicing that debt in the first place. In addition, a large share of debt in financing itself signals the likely high profitability of the company in the future, thus reducing the motivation to use dividends as a vehicle for such a message. A large share of debt in the capital structure means that the flexibility of financing is reduced. A company with easy access to a wide range of sources of capital can afford larger distributions to shareholders. Thus, the greater the share of debt in the capital structure, the lower the dividend pay-out ratios (Cwynar and Cwynar 2007; Pieloch-Babiarz 2018). In some situations, creditors may introduce restrictions on dividend

payments to shareholders in a bid to secure their own interests. The provisions of obligation or credit agreements include covenants concerning, among others, constraints on dividend payments from profit aimed at ensuring the company's ability to service its debt (Sierpińska-Sawicz 2018).

The dividend policy is also influenced by macroeconomic and capital market factors such as the economic situation affecting the capital market, inflation, global oil and fuel prices, government anti-inflationary shields.

Kowerski's research (Kowerski 2011) confirms that the economic situation measured in terms of the dynamics of GDP changes has an impact on decisions about whether to pay dividends or not. In particular, this applies to companies in a good economic situation. These companies pay out dividends more often than during a downturn. This relationship has not been confirmed in relation to companies with a worse than average economic and financial situation. Moreover, in times of economic prosperity, many companies that have not paid dividends before start paying them. This is so because companies' management boards are more optimistic about the future possibilities of continuing dividend payments in subsequent years. In turn, Jabłoński and Kruczowic's research (Jabłoński and Kruczowic 2016) into selected macroeconomic factors, based on an analysis of the correlation of GDP growth, investment rate and the PMI index signaling the prevailing economic sentiment with the amount of dividends paid, revealed a lack of significant correlation between macroeconomic factors and the amount of dividends paid. Gajdka (Gajdka 2013) notes that if investors perceive strong economic growth opportunities, the probability of dividend payments is lower. On the other hand, in the case of an economic slowdown, investors will prefer dividend payments to retaining net profit in the company for investment purposes.

Another important macroeconomic factor influencing dividend policy is inflation indicating an increase in prices. Companies react both in conditions of high double-digit inflation and falling prices (deflation). Both of these phenomena affect the level of the profit generated by the company and the implementation of the investment program. In inflationary conditions, dividend-paying companies often suspend dividend payments in order to direct the profit to investments in assets that will preserve the real value of their capital (Skousen 2011). During periods of low inflation, companies have a stable dividend policy and pay dividends every year. In periods of higher inflation, investors expect not only rising earnings, but also that dividends will grow at a rate roughly commensurate with the rate of earnings (Brigham and Houston 2005).

Companies' willingness to pay dividends increases with an upturn in the capital market (Kowerski 2011). Moreover, the probability of dividend payments increases when stock market investors value companies paying dividends more than companies not paying dividends (Baker and Wurgler 2004) and to companies buying back their own shares (Pieloch-Babiarz 2017).

In conclusion, it should be emphasized that the dividend policy always results from many factors with a multiple impact.

3. Research method

This research uses data on the oil and gas sector taken from the Warsaw Stock Exchange Yearbooks of 2010–2020. In the ISIN (International Securities Identification Number) system, these companies are classified as 211 (mining and production), 212 (oil and gas distribution) and 219 (other oil and gas companies). There are eight such companies listed on the Warsaw Stock Exchange. The study uses data on five companies; as the remaining three did not pay dividends, their data is incomplete and their trading on the WSE is negligible. Symbol 211 – (mining and production) is used to denote domestic companies – PKN Orlen, PGNiG, Lotos and foreign companies MOL and Serinus. The companies used for the study process crude oil and gas produced by themselves as well imported resources.

The dividend yield and related ratios of price to the book value of the companies' shares and share price to net earnings per share were used to assess the impact of dividend policy on share value. Dividend payments can affect the share price and therefore shape the two above relationships.

The P/BV (Price/Book Value) ratio is the ratio of the price of one share to its book value. This ratio shows how the capital market values a company's assets in relation to its book value depending on the level of investments made. A low P/BV ratio may sometimes be indicative of financial problems faced by a company, or a future deterioration of the results or development prospects of a given company. The Price Earnings Ratio (P/E ratio) – share price to net earnings per share – defines the number of years after which the capital invested in a share will be returned, assuming that the company will continue to generate profits at the current level. The ratio reflects the degree of risk involved in the purchase of the share. Higher risk usually results in a significant decrease in the indicator, as investors seek to compensate for uncertainty and risk with higher investment profitability (Sierpińska and Jachna 2012). An important indicator that is used when comparing the net profit distribution strategy and its impact on company value is the dividend yield (DYR). It is calculated as the ratio of dividend per share to the market price of the share. The value of this ratio determines the direct benefits obtained by shareholders from owning shares, and thus it may have an impact on share price and consequently on the value of the company.

To assess the relationship between the dividend yield and the ratio of share price to its book value (market value to book value) and the ratio of share price to net earnings per share, the Pearson's linear correlation coefficient was used, the magnitude of which determines the degree of interdependence between two series of financial parameters (Aczel and Sounderpandian 2018). The use of the Pearson coefficient requires that the presence of a linear relationship between the parameters under analysis be verified. A positive sign of the correlation coefficient is indicative of a positive relationship between the analyzed variables (an increase in one factor means an increase in the other factor), while a negative sign indicates the opposite relationship between the analyzed parameters (an increase in one factor means a decrease in the other factor). The closer the correlation coefficient is to one, the stronger

the correlation is. The absolute value of the correlation coefficient indicates the strength of the interdependence of the analyzed variables. The value of the correlation coefficient at the level given below means (Górecki 2011):

- $r = 0$ no interdependence, no correlation;
- $0 < r < 0.3$ weak correlation of variables;
- $0.3 \leq r < 0.5$ moderate correlation of variables;
- $0.5 \leq r < 0.7$ the variables are considerably correlated;
- $0.7 \leq r < 0.9$ the variables are highly correlated;
- $r \geq 0.9$ the variables are very highly correlated;
- $r = 1$ total interdependence (strictness).

Different authors propose different scales for the correlation coefficient. For example, Ostasiewicz et al. (Ostasiewicz et al. 2003) state that a coefficient smaller than 0.2 means that there is no relationship between the variables under study. For the purpose of interpreting the calculated correlations, the scale presented above was adopted.

4. Assessment of the level of dividend payments by oil and gas companies

The basic relationships characterizing the stock market presented in Table 1 are indicative of considerable variability. The market value of listed companies in 2010–2020 oscillated around their book value with the average value of the P/BV ratio at 96%. Only in three years during the eleven year-period did the market value the companies slightly higher than their book value. As a result of the Covid19 crisis, the market value of companies plunged in 2020. The average value of companies in that year stood at 67% of their book value, with foreign companies landing at 52% and oil and gas companies at 71% of their book value. Investors valued oil and gas companies better than companies from many other sectors, which is why the average stock market value of these companies was higher than that of the entire stock market.

Investors would have waited for just over nineteen years to realize a return on the capital invested in equities. This period was shorter for foreign companies at almost fifteen years and 15.8 years for companies from the oil and energy sector. Due to the high volatility of companies' net profit and share prices shaped by many factors, the P/E ratio can show extremely high or extremely low values, which limits its informative content. For example, in 2016 in the oil and gas sector, the ratio was forty-nine years and a year later it was only slightly over eight years. In 2017, the return period on the equity market averaged thirty-nine years and in 2019, a mere eleven years.

Average dividend yield in the stock market was relatively high. The average dividend yield for the stock market over the eleven years stood at 3.0%, 2.5% for foreign companies and 2.2% for the oil and gas sector. In the individual years studied, the dividend yield in this sector showed more variation than the stock market average. In 2020, it stood at just 1.3%,

Table 1. Key stock market indices for equities, foreign companies and the oil and gas sector in Poland in the period 2010–2020

Tabela 1. Podstawowe wskaźniki giełdowe dla rynku akcji, spółek zagranicznych oraz sektora paliw i gazu w Polsce w latach 2010–2020

Year	WSE share price (average values)			Foreign companies			Oil and gas (at year end)		
	P/BV	P/E	Dividend yield DYR	P/BV	P/E	Dividend yield DYR	P/BV	P/E	Dividend yield DYR
2010	1.16	18.2	2.4	0.80	17.0	1.7	1.07	12.3	0.7
2011	1.06	12.5	2.5	0.67	11.6	3.0	0.74	7.9	1.0
2012	0.89	11.7	3.9	0.55	18.1	2.9	0.88	15.5	0.7
2013	0.96	15.8	3.6	0.57	16.2	2.7	0.75	14.9	2.7
2014	1.09	29.9	3.1	0.77	X	2.2	0.78	×	3.4
2015	1.05	18.3	2.3	0.90	17.2	1.5	0.96	20.1	3.0
2016	0.82	17.3	3.4	0.63	11.8	3.4	1.24	49.0	2.5
2017	1.09	39.2	2.3	0.88	×	2.3	1.29	8.3	2.7
2018	0.98	12.7	2.5	0.83	11.7	2.8	1.25	8.7	2.3
2019	0.86	11.0	2.9	0.69	8.7	3.1	0.93	10.4	3.7
2020	0.67	24.8	3.6	0.52	20.1	5.1	0.71	10.6	1.3
Average	0.96	19.2	3.0	0.71	14.7	2.5	0.95	15.8	2.2

× – No data.

Source: Stock Exchange Yearbooks (*Roczniki Giełdowe*), WSE equity market Table 2, Foreign companies Table 20, oil and gas Table 18 up until 2016 and Table 22 Sector indicators (all companies – year end data).

Table 2. Dividend yields of listed companies from Poland's oil and gas sector in the period 2010–2020

Tabela 2. Stopa dywidend spółek giełdowych sektora paliw i gazu w Polsce w latach 2010–2020

Company	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
PKN Orlen	–	–	–	3.7	2.9	2.4	2.3	2.8	2.8	3.9	1.7
PGNiG	2.2	2.9	–	2.5	3.4	3.9	3.2	3.2	1.0	2.5	1.6
Lotos SA	–	–	–	–	–	–	–	1.7	1.1	3.6	2.4
MOL	–	–	2.4	3.1	5.1	3.4	2.6	2.4	3.9	4.5	–
Serinus						–	–	–	–	–	–

Source: author's own calculations based on data taken from Stock Exchange Yearbooks (*Roczniki Giełdowe*) Prior to 2016 – Table 17, from 2017 Table 22. Companies by market value.

while for foreign companies, it was as high as 5.1%, with the average for the Warsaw Stock Exchange also being above the average for the entire period, at 3.6%. Investing in the shares of companies proved to be an extremely attractive proposition compared to bank deposit rates, which followed the opposite trend to share prices and were exceptionally low. In contrast, share prices fell dramatically in the first months, but rebounded to a relatively high level in the following months, despite the economic slowdown in the wake of the pandemic.

From 2010 to 2020, the most attractive fuel companies in terms of the dividend yield were PKN Orlen and Hungary's MOL. PKN Orlen's average dividend yield in the period 2013–2020 totaled 2.8% and MOL's was 3.4% in 2012–2019. From the point of view of dividend payment continuity, PGNiG was an attractive company, as it failed to pay a dividend only in 2012 and reported an average dividend yield of 2.6%. Lotos SA only started paying dividends to shareholders in 2017. Companies' dividend policy varies, as the rationale for its formation differed from year to year. In companies from the oil and gas sector, the distribution of profit is mainly influenced by the directions and pace of growth, opportunities to find sources of financing, and different opportunities of accessing stock market capital. The profit distribution policy pursued by the companies in the analyzed sector in particular years could have been reflected in the value of their shares. The net profit distribution strategy pursued by Lotos SA led to its shares being undervalued. Grupa Lotos SA in 2010–2016 was valued by the market significantly below its book value. Only in 2017–2019 when the company started paying dividends was its market value higher than its book value.

In some years, the market valued the Hungarian company MOL higher than Polish companies. In 2010, when the economic crisis was on-going, MOL was valued 13% higher than its book value, while Lotos S.A.'s market value was 35% and PKN Orlen's market value was 18% lower than its book value. In 2020, MOL's market value amounted to 81% of its book value, PKN Orlen's market value was 61%, Lotos's was 67% and PGNiG's was 74% of their respective book values. It should also be noted that MOL paid regular dividends between 2012 and 2019, and its average dividend yield over this period was higher than in Polish companies. In 2019, it stopped paying dividends, whereas Polish companies did pay dividends and yet were valued lower.

This may be due to investors' assessment of companies' abilities to generate profit and pay dividends in future years. Extreme values of the P/BV ratio were posted by the British company, Serinus, which was exceptionally highly valued by the market despite the fact that it did not pay dividends. While in 2013, its market value was over five times higher than its book value, in the last year of the study period, the figure skyrocketed to fifty-eight times the book value.

Attention should also be paid to the period of return on capital tied up in shares resulting from the level of share prices and the value of generated net profit. For Polish oil companies, this period does not reveal such drastic differences as it does for MOL. Only in 2013 was it almost fifty-five years for PKN Orlen and almost sixty years for MOL. In 2020, MOL was well valued by the market despite the fact that it did not pay a dividend.

Table 3. The P/BV ratio in listed companies from Poland's oil and gas sector in the period 2010–2020

Tabela 3. Kształtowanie się wskaźnika C/WK w spółkach giełdowych sektora paliw i gazu w Polsce w latach 2010–2020

Company	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
PKN Orlen	0.82	0.54	0.73	0.62	0.99	1.31	1.47	1.47	1.33	0.96	0.61
PGNiG	0.94	0.99	1.26	1.06	0.88	0.98	1.07	1.09	1.11	0.66	0.74
Lotos SA	0.65	0.39	0.61	0.51	0.38	0.61	0.83	1.06	1.37	1.26	0.67
MOL	1.13	0.80	0.81	0.66	0.66	0.77	1.43	1.43	1.27	1.12	0.81
Serinus	–	–	–	5.35	3.06	3.07	1.95	3.33	2.44	2.91	57.55

Source: author's own calculations based on data taken from Stock Exchange Yearbooks (*Roczniki Giełdowe*) Prior to 2016 – Table 17, from 2017 Table 22. Companies by market value.

Table 4. Changes in the P/E ratio of listed companies from the oil and gas sector in Poland in 2010–2020

Tabela 4. Kształtowanie się wskaźnika C/Z w spółkach giełdowych sektora paliw i gazu w Polsce w latach 2010–2020

Company	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
PKN Orlen	9.2	6.3	6.5	54.7	×	17.1	10.8	6.6	7.2	8.3	8.3
PGNiG	8.0	9.9	86.1	7.1	13.3	10.7	20.7	11.4	12.2	14.5	5.3
Lotos SA	7.1	3.7	6.8	18.8	×	×	22.1	7.2	8.3	17.2	×
MOL	20.3	7.9	16.0	59.8	15.1	15.8	×	8.7	8.2	9.0	476.0
Serinus	–	–	–	–	–	–	×	×	×	×	×

× – brak danych.

Source: author's own calculations based on data taken from Stock Exchange Yearbooks (*Roczniki Giełdowe*) Prior to 2016 – Table 17, from 2017 Table 22. Companies by market value.

5. Correlation between the examined financial parameters

To verify the two hypotheses formulated in the introduction, use was made of the data contained in Tables 1–4. There exists a linear correlation between the analyzed pairs of values of financial parameters. In order to determine Pearson's linear correlation coefficients, the rates of change of market indices such as the dividend yield, price to book value of shares and price to net profit per share were calculated. First, an analysis was performed of changes in the ratios for Polish companies listed on the WSE, foreign companies (Table 5) and companies from the oil and gas sector (Table 6). The calculated correlation coefficients indicate

Table 5. Pearson correlation coefficient between the dividend yield, P/BV and P/E of companies listed on the WSE

Tabela 5. Współczynnik korelacji Pearsona między stopą dywidendy, C/WK i C/Z spółek GPW

Variable	Determined correlation coefficients are significant at $p < 0.05$				
	Average	Standard deviation	Dividend yield DYR	P/BV	P/E
Correlations for the WSE					
Dividend yield DYR	1.077086	0.292983	1.000000	–0.806953*	–0.259693
P/BV	0.959671	0.174211	–0.806953*	1.000000	0.477906
P/E	1.213360	0.696893	–0.259693	0.477906	1.000000
Correlations for foreign companies					
Dividend yield DYR	1.207187	0.525039	1.000000	–0.774790*	–0.017712
P/BV	0.983942	0.246914	–0.774790*	1.000000	–0.017712
P/E	1.093002	0.496948	–0.017712	–0.188878	1.000000

* Significant at $p < 0.05$.
Source: author's own calculations.

Table 6. Pearson correlation coefficient between the dividend yield and P/BV and P/E of oil and gas companies

Tabela 6. Współczynnik korelacji Pearsona między stopą dywidendy a C/WK i C/Z spółek sektora paliw i gazu

Variable	Correlation (oil and gas sector) The determined correlation coefficients are significant at $p < 0.05$				
	Average	Standard deviation	Dividend yield. DYR	P/BV	P/E
Dividend yield DYR	1.285256	0.974774	1.000000	–0.328440	–0.222371
P/BV	0.981224	0.214273	–0.328440	1.000000	0.575980
P/E	1.175868	0.632128	–0.222371	0.575980	1.000000

Source: author's own calculations.

that there is a significant negative correlation between the dividend yield and price to book value (–0.807) for the shares listed on the WSE and for foreign companies (–0.775). When the dividend yield increases, the price to book value ratio for shares decreases. Moreover, a negative insignificant correlation occurs between the dividend yield and the ratio of share price to net earnings per share. It stands at –0.259 for the entire stock market and at –0.189 for foreign companies. This means that stock market investors perceive dividend payments as a depletion of investment capital, and this is reflected in the share price. Institutional investors, who predominate in the Polish equity market, therefore acknowledge the long-term

effects of the net profit distribution strategy. Dividend payments do not entail an increase in companies' share prices.

In the case of the oil and gas sector, there is no significant correlation between the dividend yield and the price to book value ratio and the price to earnings ratio (Table 6). The dividend yield is weakly correlated with the P/BV ratio, the correlation is negative (–0.328). A similar correlation exists between the dividend yield and the P/E ratio (–0.222). An increase in the dividend yield reveals a decrease in both analyzed relationships.

Pearson correlation coefficients were separately calculated for four listed companies from the oil and gas sector (Table 7). The geometric mean of changes in the values of indices on whose basis the r-Pearson coefficient was determined was calculated. In this case, the correlation is also weak, negative and insignificant, i.e. no effect of a change in the dividend yield on a change in the analyzed ratios was ascertained. A slightly higher negative correlation occurs between the dividend yield and the P/E ratio than between the dividend yield and the P/BV ratio.

Table 7. Pearson correlation coefficient between the dividend yield, P/BV and P/E for four oil and gas companies

Tabela 7. Współczynnik korelacji Pearsona między stopą dywidendy, C/WK i C/Z czterech spółek sektora paliw i gazu

Variable	Correlations for the four companies listed in Table 2. The labelled correlation coefficients are significant at $p < 0.05$				
	Average	Standard deviation	Dividend yield DYR	P/BV	P/E
Dividend yield DYR	1.03593	0.340999	1.000000	–0.047578	–0.193920
P/BV	0.90700	0.244564	–0.047578	1.000000	–0.520986
P/E	14.86448	6.357125	–0.193920	–0.520986	1.000000

Source: author's own calculation.

In summary, the differences in Pearson correlation coefficients for the entire stock market, foreign companies and the oil and gas sector are not large. However, a stronger negative correlation between the dividend yield and the P/BV and P/E ratios is found for the entire WSE stock market and foreign companies than for the oil and gas sector. There is also no correlation between the studied financial parameters of the four studied companies from the oil and gas sector. This means that shareholders react less strongly to changes in the dividend yield when valuing shares in this sector. This may be due to the participation of the State Treasury in the shareholding structure of these companies and fluctuations in the financial result under the influence of changes in oil and gas prices on global markets. Poland is a significant importer of these commodities. In addition, institutional shareholders, who predominate on the Polish stock market, have a long-term approach to investing capital in the stock

market. They are interested not only in current income from shares in the form of dividends but also in income from the increase in the value of shares, and this income is the result of investment projects. Reducing retained earnings at the expense of dividend payments may have increased companies' leverage. The greater the share of debt in the capital structure, the lower the potential for dividend payments. The average cost of capital is also a crucial factor. Traditional sectors such as crude oil and natural gas have lower rates of return than sectors comprising state-of-the-art companies. Excessive debt raises the average cost of capital, which makes fewer investment projects profitable. Dividend payments are one way of achieving an optimal capital structure at which the cost of raising capital is the lowest.

Conclusions

The transformation of the oil and gas market towards greater use of RES and hydrogen to replace traditional fuels undoubtedly has an impact on the valuation of companies from the oil and gas sector listed on the stock market. The sector is characterized by lower dividend yields than those of the stock market average. These rates reveal considerable volatility over time. The fact that a company belongs to a particular sector may be one of the factors determining the choice of that company as a form of capital investment. Sectors in need of restructuring, such as oil and gas, should increase retained earnings at the expense of dividend payments and use them to finance investment projects. Shareholders holding shares for a longer period of time also pay attention to the period of return on capital tied up in shares. On the stock market, oil and gas companies were priced below their book value over several years. In 2016–2018, and in the case of PKN Orlen also in 2015, the market valued oil and gas companies above their book value. This was a period of economic prosperity increasing the chances of net profit growth. The prosperity of the capital market is also not without significance. The calculated Pearson correlation coefficients revealed no significant correlation between the dividend yield and the value of oil and gas companies on the stock exchange expressed by the P/BV ratio and the period of capital return expressed by the P/E ratio. The relationships are negative, which means that as the dividend yield increases, these relationships decrease. A number of micro- and macroeconomic factors influence the correlations between the parameters studied. In the last year of the study period, these strategies were undoubtedly influenced by macroeconomic factors, especially the economic situation resulting from the Covid-19.

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IMPACT OF DIVIDEND PAYMENTS BY LISTED OIL AND GAS COMPANIES ON THEIR VALUATION

Keywords

dividend yield, determinants of net profit distribution, listed companies from the oil and gas sector

Abstract

The distribution of net profit is one of the basic problems of the financial strategy of companies. The amount of retained earnings affects the level of investment and the pace of their development, whereas the level of dividends translates into stock prices. Therefore, it is assumed that maintaining

the right proportions in the distribution of net profit into the retained part and the part transferred to the shareholders will translate into the company's value. The first part of the paper contains theoretical considerations on macroeconomic, microeconomic and the capital market determinants influencing companies' distribution of net profit. A large group of microeconomic factors – long-term trends in changes of net profit, shareholder structure, the company's life cycle and its investment opportunities – as well as a selection of financing sources facilitating the attainment of the optimal capital structure are discussed. The most important macroeconomic factors include the economic situation, the level of inflation, sector specifics and the situation on the stock market. The authors present the results of empirical research in which they assume that the dividend yield of companies from the oil and gas sector influences the value of the company depending on the level of investments shaping the book value of shares, and that the dividend yield affects the duration of the return on capital expressed as the price to net profit ratio, and thus the level of company risk. The calculated Pearson linear correlation coefficients show an insignificant influence of the dividend yield on the value of companies from the oil and gas sector. This value is determined by a number of other factors. The study is based on statistical data for 2010–2020 derived from Warsaw Stock Exchange Yearbooks.

WPŁYW WYPŁAT DYWIDEND PRZEZ SPÓŁKI SEKTORA PALIW I GAZU NOTOWANE NA GIEŁDZIE W WARSZAWIE NA ICH WARTOŚĆ

Słowa kluczowe

stopa dywidendy, determinanty podziału zysku netto, spółki giełdowe sektora paliw i gazu

Streszczenie

Podział zysku netto jest jednym z podstawowych problemów strategii finansowej spółek. Wielkość zysku zatrzymanego wpływa na poziom inwestycji i tempo rozwoju spółek. Równocześnie poziom dywidend przekłada się na ceny akcji na giełdzie. Zakłada się więc, że zachowanie właściwych proporcji w podziale zysku netto na część zatrzymaną i część wytransferowaną do akcjonariuszy przełoży się na wartość spółki. W pierwszej części artykułu zaprezentowano rozważania teoretyczne na temat determinant makro- i mikroekonomicznych oraz rynku kapitałowego warunkujących podział zysku netto w spółkach. Spośród licznej grupy czynników mikroekonomicznych prezentowanych w literaturze omówione zostały długookresowe tendencje w zmianach wielkości zysku netto, struktura akcjonariatu, cykl życia spółki i jej możliwości inwestycyjne oraz dobór źródeł finansowania w celu osiągnięcia optymalnej struktury kapitału. Najważniejsze czynniki makroekonomiczne to: koniunktura gospodarcza, poziom inflacji, specyfika sektorowa oraz koniunktura na rynku giełdowym. Część druga artykułu zawiera wyniki badań empirycznych, w których założono, że stopa dywidendy spółek sektora paliw i gazu wpływa na wartość spółki zależną od poziomu inwestycji kształtujących wartość księgową akcji oraz że stopa dywidendy wpływa na okres zwrotu kapitału wyrażony relacją ceny do zysku netto i tym samym na poziom ryzyka spółki. Obliczone współczynniki korelacji liniowej Pearsona wykazały nieznaczny wpływ stopy dywidend na wartość spółek sektora paliw i gazu. Wartość ta jest kształtowana przez szereg innych determinant. Do badań wykorzystano dane statystyczne za lata 2010–2020 zaczerpnięte z *Roczników Giełdowych*.