The Impact of Corporate Governance on the Capital Structure of Companies from the Energy Industry. The case of Poland

Barbara Grabinska 1, Marcin Kedzior 2, Dorota Kedzior 3 and Konrad Grabinski 2,*

1 Department of Finance and Financial Policy, Cracow University of Economics, 31-510 Cracow, Poland; grabinsb@uek.krakow.pl
2 Department of Financial Accounting, Cracow University of Economics, 31-510 Cracow, Poland; kedziorm@uek.krakow.pl
3 Department of Corporate Finance, Cracow University of Economics, 31-510 Cracow, Poland; kedziord@uek.krakow.pl
* Correspondence: kg@uek.krakow.pl

Abstract: The energy sector is expected to face fundamental challenges in the near future. On the one hand, it is experiencing a rapidly increasing demand for energy. At the same time, it is subject to the pressure of the climate policy due to environmental issues. For the same reason, the energy sector is forced to undertake costly investments to transform production from black to green energy. The issue of financing has become one of the key problems of the energy sector, especially in those countries in which energy production traditionally is based on fossil fuels, i.e., coal. The paper aims to investigate the impact of corporate governance on the capital structure of companies from the energy industry. We use three proxies of corporate governance quality: institutional investors, the board size, and state ownership and investigate their impact on capital structure. Our findings suggest that the latter two negatively impact debt levels. In our model, we control for financial factors and CEO personal characteristics. We use a Polish setting since transformational problems of the energy sector in Poland are especially visible. At the same time, energy companies in Poland are subject to the strict EU climate policy.

Keywords: energy sector; corporate governance; capital structure; theories of capital structure; CEO personal characteristics; financial reporting; emerging markets; Poland

1. Introduction

In recent years the energy sector has experienced rapid growth, as the energy demand has dramatically increased. Still, it also faced crushing criticism, as it is one of the biggest producers of greenhouse gas emissions and is the first to blame for causing global warming. Energy companies are expected to contribute to more sustainable growth by investing in renewable energies, reducing carbon emissions, addressing challenges with climate change and biodiversity protection [1]. This is strongly connected to the pressure they encounter to show how they contribute to society. These are the demands articulated from different groups of company stakeholders, and the effective mechanisms of corporate governance are crucial to ensure that these expectations are properly addressed.

On the other hand, the increasing awareness of the vital role that business and industry play in sustainable development has resulted in a fundamental change in the lending process. Banks and other financial institutions tend to introduce sustainability criteria into their procedures for granting loans to minimize the risk associated with lending decisions [2]. These processes will strongly influence the conditions for acquiring capital and will shape the capital structure of the energy sector. In recent years it was especially visible with the issue of so-called “black energy”. The banking sector in many countries introduced a policy avoiding financing companies using fossil fuels like coal. In many cases,
this creates a serious financing problem and changes the capital structure of the companies in the energy industry.

In our study, we aim to investigate the impact of corporate governance factors on the capital structure of companies from the energy industry. Numerous reasons dictate the choice of a research objective. First of all, the energy sector is very important for many national economies. It strongly influences GDP growth, employment, and economic competitiveness [3,4]. Secondly, the very strong increase in demand for electricity, which has been significant in recent years, has caused an increase in prices, initiating economic, social and political problems. One of the ways to reduce the costs of generating energy is the right decisions regarding the financing of the enterprise. Thirdly, due to its very strong impact on the environment and carbon dioxide emissions, the European energy sector has been the subject of pressure from the EU, which encourages it to use more environmentally friendly technologies. This results in the necessity to obtain appropriate funds for this purpose, often in external financing. It is, therefore, necessary to explore the financing potential of investments in “green energy”. Fourthly, these companies, usually controlled by the state in the EU, should be subjected to appropriate control mechanisms that will facilitate the financing of revolutionary, technological changes in changing the method of energy production. The mechanism of effective control is ensured in the situation of properly functioning corporate governance systems.

We explore corporate governance as the main driving force of capital structure. As we argue later in the paper, a good quality corporate governance system may mitigate the conflicts between managers, shareholders and other stakeholders. It may impact the firm’s information environment, lowering information asymmetry and incentivizing engagement of external capital providers. We selected three proxies of the corporate governance characteristics, which in our opinion have the potential to be influential in shaping the capital structure of companies from the energy industry. We hypothesize that higher institutional ownership, lower state ownership, and a smaller board size positively impact on capital structure, allowing for higher debt financing. We also control for financial factors and CEO personal characteristics, which may also shape capital structure.

Poland is a post-communist economy which became an EU member in 2004. On the one hand, the Polish economy has made huge progress in modernization, establishing market institutions and building strong ties with Western Europe. On the other hand, some sectors remain underinvested or unchanged, mainly for political reasons. In the case of the energy sector, there are several crucial issues unsolved. Many older investment projects are advanced or are about to be completed. At the same time, there is almost no, or very few, new investments. Economic and political environments make the situation difficult for firms from the energy sector. First, the EU climate policy makes energy production from coal more costly, and coal remains the predominant energy source in Poland. Second, coal mining costs are increasing, and companies from the energy sector are financially engaged in restructuring the coal mining industry. Third, there are expected unfavorable legal changes to the water law, which could potentially result in increased energy production costs. Therefore, Poland is subject to the EU climate policy combating fossil energy sources, mainly coal. At the same time, coal is the only source of energy accessible on a large scale in Poland for geographical and historical reasons. Looking at the issue of the energy sector’s capital structure through the Polish lens where the key problems are magnified, provides an interesting insight into other emerging markets.

Our literature review determines the choice of control variables, which supposedly shapes the financial structure of the sampled firms. As the proxy for the capital structure, we use financial leverage calculated as total liabilities to total assets. We use cross-section regression with robust standard errors and time lag between dependent and independent variables. Our results suggest that state ownership and board size have a negative and significant influence on capital structure.
Our study enriches the existing knowledge of the broadly construed theme of capital structure. The analysis is concerned with companies from emerging markets, as exemplified by Poland. So far, the literature on the subject indicates that the capital structure of energy companies has been empirically verified in such emerging markets as Pakistan, India, Kenya, and Vietnam. Pertinent literature, centered on companies from the energy sector, has investigated such financial variables as asset turnover or the non-debt tax shield on a very small scale. To the best of the authors’ knowledge, this work is the first on the capital structure of energy companies in Central and Eastern Europe. It constitutes the first research linking the capital structure of energy companies with selected corporate governance indicators.

The paper is structured as follows: (1) capital structure theories in the context of companies from the energy industry; (2) financial factors determining capital structure; (3) CEO characteristics and capital structure; (4) corporate governance determinants of capital structure and hypotheses development; (5) sample description and research design; and (6) results. The last section concludes the most important results of empirical research.

2. Capital Structure Theories in the Context of Companies from the Energy Industry

Relevant literature features numerous theories describing decisions surrounding the creation of the capital structure of business entities. The most important ones include classic theories (the net income theory, net operating theory, traditional theory, Modigliani and Miller theory) and more contemporary theories such as the agency, trade-off and pecking order theories. According to the net income theory, financing methods determine the company’s value. Given that the cost of indebtedness is lower than that of equity, at least theoretically, the company’s value increases as more debt is employed because the weighted average cost of capital decreases [5]. However, it is worth noting that this theory is based on very strong assumptions, such as the non-existence of taxes, the cost of debt being lower than the cost of equity, and the assumption that debt financing does not increase the risk in the eyes of investors [6].

The net operating theory, in a way, contradicts the net income theory. It assumes that the company’s value does not depend on the capital structure, but rather on the operating income. As debt financing increases, so does the cost of equity capital. Both theories were in a way connected by Durand [7], the father of traditional theory. He posited that debt is to a limited extent beneficial if it does not threaten to bankrupt the company and has a positive effect on its value. The cost of capital can be reduced due to the optimal financing structure, i.e., the relationship between debt and equity. The cost of capital may decrease on the back of moderate use of debt and, conversely, increase when liabilities swell. Thus, the value of the company peaks for a specific capital structure which minimizes the cost of such capital [5].

As far as the classic theories of capital structure are concerned, the theories of Modigliani and Miller deserve special attention. Originally, the authors assumed that company value does not depend on its capital structure, assuming perfect capital markets. This assumption holds in conditions of no taxation, agency costs, bankruptcy costs and information asymmetry [8]. Modigliani and Miller assume that shareholder value depends to a greater extent on the ability to generate cash flows. Over time, they incorporated the tax shield effect into their model, concluding that indebtedness may positively affect company value. To some extent, the benefit for the company comes from the state subsidizing interest, as interest is deducted from the tax base [9]. Modigliani and Miller’s proposals and their model of achieving an optimal enterprise value have been the subject of many analyses, polemics, and critiques. Their theorems would be used to create more practical and real equilibrium models in later periods [10].

In the opinion of numerous authors, classic theories may be a good starting point for analyzing the capital structure of energy companies [5,6,8,9]. It seems that the risk of excessive indebtedness in energy companies is lower than in other business entities. Firstly, the value of these companies’ fixed assets is relatively high, which constitutes a very good
form of loan security for banks. They are characterized by a relatively constant or growing demand for their services (electricity). After all, in many countries, the dominant investor in these entities is often the state, which effectively mitigates financial risk.

The capital structure of energy companies is also influenced by the agency theory introduced by Jensen and Meckling [11]. They noticed that companies often face conflicts of interest between owners, managers and lenders. Owners may strive to implement risky investment projects financed through debt, which lenders usually do not agree on. Managers may also be reluctant to run bigger risks, as they often care about their own interests and the status quo and not necessarily about generating maximum shareholder value. This situation occurs when ownership and supervisory functions are separated, which is often the case in listed companies [12]. In this situation, banks will also be reluctant to finance the company’s expansion through debt. As a result, managers’ performance should be particularly controlled and monitored, resulting in increased agency costs.

According to the agency theory, the capital structure is cast in such a way so as to minimize agency costs arising from conflicts of interest between management, lenders and owners [8]. It is worth noting, though, that debt has the potential to discipline management boards: higher debt levels can reduce agency costs. A high level of indebtedness is equivalent to a higher level of risk, which contributes to more stringent supervision by banks and other stakeholders. Moreover, indebtedness reduces the free cash flow at managers’ disposal, encouraging them to act more efficiently and it allows control of the agency problem [13].

In the case of the Polish energy sector, the agency theory will probably be less applicable. The vast majority of energy companies are state-owned, and the Ministry of State Assets appoints management boards. Hence it should be assumed that they pursue the interests of the main shareholder. The energy sector should be assessed as being relatively stable from the point of view of energy demand. Moreover, these companies have rather limited intangible assets, owning tangible fixed assets instead. Therefore, the costs of asset supervision (agency costs) should not be presumed to be high. They are higher in companies boasting a large share of intangible assets [14]. Relatively minor conflicts will occur between the owners and the banks. As a major investor, the state would rather not be inclined to pursue risky investment projects at the expense of the financial sector.

The trade-off theory developed by Kraus and Litzenberger [15] is another important theory of capital structure. It assumes the use of debt in the capital structure, which reduces the tax burden but invokes bankruptcy costs [5]. According to the trade-off theory, the correct level of debt is attained at the point at which the level of debt maximizes the company’s value, i.e., the marginal benefit of the debt is greater than or equal to the costs of its use [16]. In practice, this means that the use of an interest tax shield predominates over the negative impact of debt in the form of bankruptcy costs that arise with the debt [17]. It is also important that the company has a positive gross financial result. Only then it is possible to use the tax shield. It is also worth noting that based on the static trade-off theory, the company does not minimize the cost of capital by increasing indebtedness, as this increases risk [8].

The optimal level of debt is the point of equilibrium, which varies from company to company. Business entities with a tangible fixed asset value may sustain more debt in the balance sheet total, which is used as a pledge against bank loans. Additionally, more profitable companies may benefit from the debt tax shield, to a greater extent maintaining an acceptable level of risk [12]. Since the optimum level of debt is not sustainable from year to year, companies in a given industry pursue such a level of indebtedness that is considered appropriate and safe in a given economic sector [13]. The so-called industry effect also corroborates the need for an optimal capital structure [18]. In economic practice, the optimum level of debt often means the average level of indebtedness of companies in a given industry.
On the other hand, Kopecky, Sugrue and Tucker [10] provide empirical evidence implying that enterprises can maintain potential suboptimal, inappropriate shares of particular forms of financing, which may persist for a long time. The mergers and acquisitions market may strongly affect managerial decisions regarding the creation of a company’s capital structure, including the target financing structure. Kopecky, Sugrue and Tucker [10] argue that the relationship between the structure of capital and the valuation of shares is more complex. This should be assessed from the point of view of various participants in the market game, such as stock analysts, investors, financial directors, and lenders. They are often forced to change their opinions on the target and current capital structure and to determine whether this is reflected in stock prices.

The importance of trade-off theory in the energy sector was emphasized several times [6,9]. The industry effect will probably be very strong in the energy companies’ sector, which will strive to use the so-called optimal target capital structure. As they are stable companies with a relatively lower risk of bankruptcy, they can afford to use a relatively higher but stable level of debt in their capital structure. Another argument for this may be the higher demand for capital due to the need for large investments in so-called green energy.

Another particularly important theory that affects companies’ capital structure is the pecking order theory. This was initiated and subsequently expanded by Donaldson [19] and Myers and Majluf [20]. The theory holds that companies prefer financing through internal sources in the first place. On the other hand, as regards external sources, debt financing is selected first, followed by equity financing [16,21]. This choice is explained by the cost of capital, which is lower for internal rather than for external sources of financing.

The differences in the cost of financing between external and internal funding substantially arises from the phenomenon of information asymmetry. Managers from within the company have better access to internal information than external stakeholders, e.g., investors. Hence, external capital providers will demand additional financial information and a higher price for their capital contribution. Therefore, this undermines Modigliani’s and Miller’s assumptions that all capital market participants have the same access to information [12]. According to Myers and Majluf [20], information asymmetry and transaction costs affect the financing structure to a greater extent than the benefits resulting from the use of trade-off theory.

The pecking order theory does not assume an optimum financing structure, so it somewhat opposes the trade-off theory. This financing sequence is typical of large, profitable companies that do not need to use external financing sources to expand. Thus, highly profitable companies do not use debt because their retained earnings are high enough [22]. It seems that although the pecking order theory reflects the economic realities well, empirical studies do not unequivocally confirm that it is the most important theory of capital structure [8].

The influence of the pecking order theory on the capital structure of energy companies was emphasized by, inter alia, Berkman, Iskenderoglu, Karadeniz, and Ayyildiz [17], Mutwiri [13], and Mudany, Ngala and Gituro [23]. Energy companies will probably, to some extent, develop their capital structure based on the pecking order theory. Being relatively large and boasting stable financial results, they will partially finance their operations from their own resources. However, the necessary expenditure on the production of green energy may also require external financing. On the other hand, Mutwiri [13] argues that the premium in the form of a higher cost of capital for external financing will probably not be that high. This is due to the high value of tangible fixed assets in their balance sheets, which are characterized by a relatively low information asymmetry, as well as a stable and safe shareholding structure (i.e., state-ownership).

3. Financial Factors Determining Capital Structure

The amount of empirical research verifying the factors that affect energy companies’ capital structure is rather limited. The most important indebtedness factors identified by
Berkman, Iskenderoglu, Karadeniz, and Ayyildiz [17] include profitability, the share of tangible fixed assets, liquidity and asset turnover. Ghani and Bukhari [16] investigated the impact of tangibility, size, growth and profitability. Kiran [21] analyzed the influence of company size, a non-debt tax shield, growth, earnings volatility, profitability and tangibility. Similar factors were analyzed by Shah, Shah, Raja, and Naseem [8]. The study investigates the following factors which potentially affect capital structure: profitability, company size, tangibility, and growth opportunity. In the same vein, the study of Chakrabarti and Chakrabarti [6] analyses company size, tangibility, asset turnover, firm age, debt service capacity, liquidity, and non-debt tax shield.

An equally extensive range of factors can be found in the study of Nga and Long [9] and Saeed [12]. Nga and Long [9] analyzed the impact on debt of profitability, asset structure, company size, age, state shareholding, liquidity, and the ratio of depreciation to total assets. Saeed [12] investigated the following factors: tangibility, non-debt tax shield, volatility, company size, profitability, industry effect, growth opportunities, earnings volatility, cash retention, and shareholding structure.

The firm’s size is an important factor affecting the capital structure of energy companies [6]. Large business entities should be viewed as less risky and less at risk of bankruptcy than smaller business entities [21]. Larger companies generally have more experience in their industry, know their customer behavior, and appear to be more creditworthy to banks and other credit institutions. They can diversify their activities to a greater extent and can pursue them on an international scale [24]. Thanks to their expertise, they manage their liabilities better [25]. Additionally, the value of their fixed assets is higher, which facilitates debt taking [26]. On the other hand, ownership and control are separated in larger companies, and, consequently, their agency costs are generally higher [27]. In larger companies, the phenomenon of moral hazard manifests itself more. The entities may experience de-economies of scale, lower efficiency, and could be less prone to change. These factors may have a negative impact on the level of debt [25].

The trade-off theory holds that larger companies are less at risk of bankruptcy; hence, they can finance their activities to a greater extent through debt [16,28,29]. Generally, they are more profitable. Hence the size of their financial result is enough to enable them to use the interest shield. On the other hand, according to the pecking order theory, larger companies with their own sufficient resources should use less debt. Larger listed companies are saddled with information asymmetry to a limited extent; hence, they will prefer equity financing at the expense of debt financing [8]. The lower transaction costs for large entities on the stock exchange also play an important role here [12].

Traditional high-growth enterprises may incur more debt than high-tech companies due to the lower risk they pose and they could experience less need for supervision and lower information asymmetry [30]. Companies with a high growth potential generally have their own insufficient resources necessary to finance their activities. Therefore they are often forced to rely on external sources of financing, including debt, which is usually of a high value [16]. The above relationships are consistent with the pecking order theory [8].

On the other hand, in the opinion of Chakrabarti and Chakrabarti [6], in energy companies with a high growth potential, the use of debt is costly and risky, so we should assume a negative relationship between debt and growth potential. Kiran [21], in turn, advances the view that growth companies are difficult to supervise, and their future is not fully safeguarded. Hence, agency costs may come into play in this case, and—as a consequence—the share of debt in the capital structure may be small. Their management boards often pursue risky investment projects with a high rate of return and pay banks a lot of interest. Hence, debt is not the most desirable financing source. The above arguments correspond with the trade-off theory, which assumes negative relationships between debt and growth opportunities.

According to Saeed [12], companies with a high investment potential will tap into different financing sources, depending on the type of assets dominating their balance
Companies with tangible fixed assets of a high value will finance their activity through debt. In contrast, business entities with a high value of intangible assets will rely less on liabilities to fund their operations. However, it is worth noting that companies with a high growth potential generally reveal a rather high value of intangible assets [26].

The use of debt in the financing structure allows interest to be deducted from the tax base, known as the debt tax shield. However, it is worth noting that the use of this method of reducing the tax burden may increase the risk of bankruptcy. A certain substitute for the interest tax shield is the non-debt tax shield, which assumes applying a specific accounting policy, such as a depreciation policy, investing in research and development, or a system of tax relief [6]. It should be assumed that the debt tax shield will be positively correlated with debt, while the non-debt tax shield negatively affects the level of debt in companies [21]. Companies’ use of the non-debt tax shield negatively impacts the interest tax shield [31]. The debt tax shield is consistent with the assumptions of the Modigliani and Miller theory. The positive impact of using the debt tax shield because of the moderate use of indebtedness in the capital structure is also consistent with the assumptions of the trade-off theory [12].

Interestingly, using the debt tax shield and the non-debt tax shield is effective for companies generating positive financial results. In the case of energy companies, due to the high share of tangible fixed assets in the balance sheet total assets, it is possible to reduce the tax burden using the debt tax shield considerably. Additionally, the absence of high bankruptcy costs and the generation of stable financial results may promote the use of this tax-reducing option. Depreciation write-offs in energy companies are directly affected by the high level of tangible fixed assets [9].

Liquidity is another important factor affecting the capital structure of energy companies. It can be assumed that companies with a high liquidity level will finance their activities out of their own resources. Hence, they may report a lower demand for debt [6]. The above dependencies are consistent with the pecking order theory, i.e., when they finance their activities, companies first use their funds. On the other hand, a higher liquidity level reduces the risk and cost of bankruptcy. Hence, in certain situations, an opposite relationship can be expected, and thus high liquidity may facilitate indebtedness [17]. Highly liquid companies can finance even more risky projects through debt and could find debt financing cheaper [32]. Medium to large energy companies with stable cash flows and occasional excess liquidity are likely to use their own funds first, at the expense of debt.

Asset turnover, i.e., the efficiency level in using assets necessary to generate revenues, is an important but insufficiently researched factor affecting the capital structure. High asset turnover is synonymous with the management’s effectiveness in managing the company’s assets [6]. A similar view is held by Berkman, Iskenderoglu, Karadeniz and Ayyıldız [17]. The metric may also indicate the scale of the reduction in agency costs of managerial discretion [33]. The company’s operational efficiency boosts its growth and contributes to lowering the cost of capital. It should be remembered that energy companies are somewhat doomed to spend a lot on operating assets, consequently reducing asset turnover. Energy companies with a high asset turnover ratio will be able to finance their activities through debt. Similar dependencies were reported by Serghiescu and Văidean [34].

The impact of profitability on companies’ capital structure is multifaceted. It should be noted that, on the one hand, profitable companies boast a very good credit standing and consequently enjoy privileged access to less costly debt [35,36]. Moreover, highly profitable companies enjoy more possibilities in terms of servicing debt and loan installments and therefore pose less of a risk to banks [21]. A lower bankruptcy risk in profitable companies may push them to take more loans [37]. In addition, profitable operating activities can induce business entities to expand and make further investments, for which debt will need to be incurred. Profitable business entities should often become indebted and should introduce further control mechanisms on the part of the bank. In this way, agency costs are reduced [36].
On the other hand, it should be noted that highly profitable firms have their own adequate funds and have no demand for external capital. Consequently, there is no additional need to disclose significant new financial and non-financial information [38]. Energy companies can expect a negative impact of profitability on their debt level [8]. Similar results are reported by Ghani and Bukhari [16], Korkmaz and Karaca [39] and Ahmed and Sabah [40].

The trade-off theory assumes a positive relationship between debt and profitability, which may increase further because of the debt tax shield [6]. On the other hand, the pecking order theory posits a negative relationship between profitability and capital structure because profitable companies will primarily use internal sources of financing [41]. Pertinent literature reveals the predominance of a negative association [21].

4. CEO Personal Characteristics and Capital Structure

Hambrick and Mason [42] formulated an Upper Echelon Theory, postulating that the CEO personal characteristics, cognitive base and values influence organizational outcomes. The theory is based on the premise that when the powerful actors within organizations, i.e., managers, confront the unknown situation and overabundance of information, their decision-making process is determined by their experiences, preferences, and biases, rooted in personal characteristics like education, age, or tenure. This conjectures that managers’ psychological and demographic traits influence their strategic choices and organizational performance through a three-stage processes: defining a field of vision, selective perception, and interpretation. Zwiebel [43] argues that the choice of capital structure is one of the strategic decisions voluntarily chosen by the CEO. Therefore, we conjecture that it is also subject to the influence of personal CEO characteristics.

Since 1984, when the Hambrick and Mason paper was published, numerous studies emerged investigating the impact of the CEO features on the firm’s financial outcomes. For example, the literature suggests that incoming CEOs at the early stage of their reign tend to be more risk-averse and careful due to their limited knowledge and relatively weak position. With time, CEOs become more knowledgeable, prefer high-risk strategies, and become more powerful [44,45]. Kaur and Singh [46] and McGuinness [47] provide empirical evidence implying that CEO tenure positively impacts financial leverage. They argue that a long tenure allows the CEO to build strong relationships and alliances with key stakeholders, which enable them to raise debt. We share this chain of reasoning and expect that CEO tenure will be increasing debt in capital structures.

Another important CEO characteristic—age—was also a subject of at least several interesting studies. The literature suggests that age correlates positively with reporting quality [48] and risk aversion [49], and firm performance [50,51]. Older CEOs are supposed to avoid high-risk strategies to protect their reputation and position [49]. However, other studies present empirical evidence suggesting a negative correlation between CEO age and a firm’s performance [52,53]. Kaur and Singh’s findings [47] imply that younger CEOs are more prone to raising debt. In the same vein, we expect older CEOs to rely more on equity financing, resulting in lower debt in capital structure.

CEO education also plays a significant role in shaping a company’s output. La Rosa, Bernini and Terzani [54] point out that education is associated with a capacity for information processing, less risk-aversion and better information about the external environment. The field of education also affects managerial behavior and, in consequence, a firm’s output. For instance, Tyler and Steensma [55] argue that CEOs with an educational background in engineering tend to be more engaged in operational affairs and better understand the technological process and the need for technological change and innovation. Engineering education is more common for CEOs in the industry sector, while economic and business education is in the financial industry. Bertrand and Schoar’s [56] findings suggest a positive impact of business education on performance as proxied by a return on assets. We expect CEOs with an economic (business) education to compensate for the lack of technical knowledge with finance, resulting in a higher debt in financial structure.
5. Corporate Governance Determinants of Capital Structure and Hypotheses Development

The capital structure determinants have been widely documented in the prior literature. Extensive theoretical and empirical research has been dedicated to investigating the association between the company’s capital structure and corporate governance. This strand of research is grounded in agency theory, which posits that capital structure is influenced by agency costs arising from the conflict of interests between shareholders and managers. The presence of agency problems usually lowers corporate performance and distorts decisions concerning financial policy. The idea of high-quality corporate governance is to mitigate these costs through rules, processes and practices by which a company is directed and controlled. Corporate governance ensures that the company has appropriate decision-making processes and controls in place. As a result, the interests of all stakeholders are properly balanced [57].

According to Shleifer and Vishny [58], corporate governance can be defined as referring to how suppliers of finance assure themselves of a return on their investment. Jiraporn, Kim, Kim and Kitsabunnarat [59] point out that just as corporate governance can play a disciplining role, leverage has also been argued to alleviate agency costs. First of all, the rising leverage is associated with a higher probability of the company’s bankruptcy. The increased default risk motivates managers to reduce their consumption of perks and improves their efficiency [60]. Secondly, by increasing the use of debt financing and thus shrinking the equity base, the managerial share in the ownership structure is raised. In effect, managers are better motivated to act in the best shareholder interest [11]. Thirdly, as Jensen [61] suggests, debt leverage imposes constraints on managerial discretion because it reduces the free cash flows available for managerial disposal. Berger, Ofek and Yermack [62], based on the sample of industrial firms in the 1984–1991 period, provide empirical evidence suggesting that in firms with weak monitoring systems, managers deprived of compensation incentives and without managerial stock ownership tend to use less debt financing. Lower debt levels are also found in companies with a long tenure of CEO, a large board and a low participation of outsiders.

Jiraporn Kim, Kim and Kitsabunnarat [59] investigate how aggregate corporate governance quality influences a company’s capital structure. Measuring governance quality with a broad-based index provided by the Institutional Shareholder Services (ISS) finds a strong negative association between governance quality and firms’ leverage. Firms with low corporate governance quality tend to be more leveraged. Grounded in the agency theory, the authors explain this inverse association, stating that a high level of debt in companies’ capital structure substitutes for corporate governance mechanisms work to alleviate agency costs. Therefore, their conclusions are in line with the substitution hypothesis. ISS is a comprehensive metric of corporate governance, consisting of 51 governance standards divided into a few categories: the presence and features of audit committees, the characteristics of boards of directors, state-ownership, ownership structure, executive and director remuneration and their education. Further analysis suggests that five governance categories are negatively associated with the leverage: audit, ownership, board, state and compensation.

Chang, Chou and Huang [63] also test the impact of corporate governance on the speed of capital structure adjustments. The authors investigate two effects of leverage on capital structure adjustments, both originating from the agency theory: the disciplinary role of debt and the potential takeover defense role of debt. The authors use the G-index as a proxy for agency conflicts and test its association with managers’ motivations to adjust its capital structure to target leverages. G-index reflects the strength of shareholders rights and consists of 24 components, compensation-related, antitakeover and state law-related provisions in a corporate charter. The results suggest that overlevered firms with a weak governance adjust more slowly to their target leverage ratios than their counterparts with strong governance. This is explained by the fact that weak governance companies face more takeover threats, and for this reason, they use debt as an antitakeover tool.
In the case of undelivered firms with weak governance, the speed of adjustment to their target debt level is also slower than for their counterparts with strong governance. This time, the effect of using debt as a takeover defense measure is outweighed by the benefits of managerial discretion. They conclude that a high quality of corporate governance is an effective mechanism in alleviating the agency costs in financial decisions. It prevents managers from choosing the leverage levels based on their personal benefits, regardless of the optimal target leverage.

5.1. Board Size

An effective board is an important element of high-quality corporate governance in the company. It can mitigate the agency costs and risk stemming from the company’s separation of ownership and control. Previous literature has given a lot of attention to the issue of how board characteristics are associated with board effectiveness. The board size is a feature commonly investigated and leads to stronger corporate governance mechanisms. However, the results of the studies are not unequivocal.

On the one hand, large boards may have the potential and expertise to deal with complex problems ahead of the company [64]. On the other hand, as Jensen [65] and Lipton and Lorsch [66] suggest, the director “free-riding” problems appear in large boards. Therefore they imply that an effective board counts not more than 8 or 9 members.

Coles, Daniel and Naveen [67] provide empirical evidence suggesting that neither very big nor too small boards effectively deal with companies’ challenges. The size of the board of directors is also influenced by sector specificity. Firms with complex business activities, which have great advising requirements, may benefit from large boards. Baulkaran and Bhattarai [68] report for Canadian firms that in the 2003–2010 period, the average board size is about ten directors, but energy sector and mining companies are characterized by smaller boards, while firms from the financial sector have typically larger boards.

The literature suggests that there is no one size that is optimal for all companies. However, the situation is different from the sector perspective. The findings of Baulkaran and Bhattarai [68] imply that the optimal board size depends on the industry affiliation. Following this line of reasoning, we expect that companies from the very specific sector (i.e., energy), which are exposed to similar market forces, legal requirements, and macroeconomic risks, will be characterized by a similar optimal board size. Coles, Daniel and Naveen [67] conjecture that complex firms that are large, more diversified and have a much more complex business model have greater advising requirements and the opposite. Their findings suggest a U-shaped relation between board size and business model complexity. They argue that larger boards bring more experience and wisdom and offer better advice. This is especially important in the energy sector, in which board members serve as representatives of the key stakeholders, i.e., state, community, etc. They also help legitimize the firm’s actions concerning sensitive environmental issues and mediate the conflicting interests of the key stakeholders. Coles, Daniel and Naveen [67] conclude that firms with a high leverage depend more on external resources and could have greater advising requirements. They argue that for this reason, larger boards enhance access to debt financing.

Cheng and Courtenay [69] find that the board size is positively related to the company voluntary disclosure and affects financial statements’ better integrity. In this way, it can be associated with decreasing information asymmetry between managers and investors. Alves, Couto and Francisco [70] investigate how board composition influences the capital structure. Their findings regarding the association between board size and the use of financing sources are inconclusive. They conclude that board size may impact on the board effectiveness and information asymmetries in a non-linear way. For this reason, its influence on capital structure is complex and requires further in-depth research. The companies with a larger participation of independent directors on board tend to have capital
structure characterized by the following relationships: (1) more external capital than retained earnings; (2) more short-term debt than retained earnings; (3) more long-term debt than short-term debt; and (4) more external equity than long-term debt.

5.2. Institutional Investor

The presence of institutional investors among the firm’s shareholders has an influential impact on corporate governance. They exhibit some key characteristics affecting crucial managerial decisions, that are also related to capital structure. Firstly, they are long-term investors, usually much more sophisticated than minority shareholders, and have strong incentives to enhance firm value [71]. They are more experienced, have access to various sources of information and databases, and have at their disposal a wide array of human resources and analytical skills. All of this affects a firm’s information environment, decreasing information asymmetry [72] and lowering the cost of equity relative to debt [73]. Secondly, they are capable of exerting their power, which usually results in better practices of corporate governance [74] and provides more active and thorough monitoring from the shareholder’s side. Institutional investors introduce an external disciplinary mechanism for management, which may replace an internal one provided by debt. In general, all of the aspects of institutional ownership mitigates agency costs.

Kiran and Narender [21] argue and provide empirical evidence suggesting that active monitoring performed by institutional investors procures more information, decreases information asymmetry and makes the firm’s stock more attractive for other investors resulting in the so-called substitution effect. In effect, the debt is exchanged for equity. In the same vein, Michaely and Vincent [73] found out that institutional holding negatively affects firm financial leverage; however, the financial leverage does not affect institutional engagement. The study of Chung and Wang [71] provides empirical evidence suggesting that a company reduces its debt level as institutional investors substitute for external debt monitoring.

The above findings support the “substitution” theory, which posits that institutional ownership replaces debt. Another contrary research strand aligns with the “complementary” theory, which posits that institutional investors may play a complementary role with debt. La Porta, Lopez-de-Silanes, Shleifer and Vishny [75], using the “outcome model”, conclude that institutional investors may force management to take more debt in the capital structure to limit managerial discretion. We noticed that there is more empirical evidence supporting substitution theory. Therefore we are expecting a negative influence of institutional ownership on capital structure.

5.3. State Ownership

The ownership structure is one of the key corporate characteristics. Literature analyses constitutes ownership structure from different perspectives, such as insider vs outsider directors, gender structure, board size, the presence of institutional investors or a state. State-owned companies (SOEs) are especially common in the energy sector. It is estimated that most of the energy companies in the EU have been transformed into minority SOEs, in which a state owns less than 50% of voting rights, 10% of the world’s largest 2000 firms are majority SOEs and sales equivalent to 6% of global GDP are generated [76].

The presence of the state in the ownership structure provides advantages and disadvantages. A state-owned company is presumed to be politically connected, which affects its strategic decisions [77–79]. The more traditional line of reasoning argues that government exerts its power over SOEs to pursue its policy agenda. The energy sector is a special case since it is a matter of state security. What is more, SOEs are treated as the extension of economic policy tools to remedy market failures and protect public welfare, i.e., securing the energy market, preserving low prices and building political capital. From this perspective, a state represents a wider array of stakeholders. As a result, SOE management pursues not only financial but also social and political goals [80–82]. State ownership in-
creases the risk of engaging in costly political or social activity, sacrificing financial objectives [83,84], and in consequence, discouraging other institutional investors. There are other reasons potentially driving away non-state institutional investors. Firstly, SOEs are often infected with severe agency problems. State representatives on the board of directors or managers usually lack sufficient competencies resulting in inefficient governance [85]. Secondly, government policy often sets up a salary cap or fixed remuneration, substantially lower than in the case of non-state-owned companies, resulting in weaker manager motivation [86].

The literature provides empirical evidence that a state, a powerful actor, influences a wide range of strategic decisions like R&D intensity, internalization and capital structure. The majority of findings suggest that SOEs pursue a more risk-averse strategy, which translates into lower R&D intensity, internalization and financial leverage [87,88].

There is a strand of research investigating the relationship between political connection and capital structure. One can argue that state ownership is equivalent to being politically connected. However, this line of research generates contrary results. For example, the findings of Khwaja and Mian [89] imply that politically connected firms are more indebted. They reason for this is due to the willingness of state-owned banks to provide financing. In the same vein, the study of Bliss and Gull [90] provide empirical evidence that politically connected firms exhibit a higher leverage ratio. The state serves the role of the intermediary and guarantor. The findings of Zou and Xiao [91] and Li, Yue and Zhao [92] also detected a positive relationship between state ownership and financial leverage in the Chinese context. They argue that a government to prevent state control avoids issuing equity, resulting in a higher debt-to-equity ratio. Therefore, we can conclude that the literature provides inconsistent and contrary results concerning the impact of state-ownership on capital structure. We conjecture that in the case of firms in the energy industry in Poland, the influence of state-ownership on the capital structure may also be twofold. On the one hand, it can deter other external capital providers due to its tendency to pursue a state policy agenda. However, on the other hand, it can also facilitate access to financing from state-affiliated banks.

Based on the above literature review and theoretical arguments, we posit three hypotheses. We conjecture that the financial structure of companies from the energy sector is dependent on the firm’s corporate governance characteristics. More specifically, we hypothesize that:

**Hypothesis 1:** Higher institutional ownership has a statistically significant and positive impact on the financial structure, allowing for more debt in capital structure.

**Hypothesis 2:** The presence of a significant state ownership in company shareholding decreases debt financing.

**Hypothesis 3:** Board size has a statistically significant and negative impact on the financial structure, resulting in less debt financing.

6. Sample Description and Research Design

The Polish energy sector is in the top ten in the European Union in terms of the main macro energy indicators, which is in line with the potential of the Polish economy—eighth in the EU in terms of GDP and population. The energy sector employs approximately 600,000 people. It generates around 8% of the gross value added of the Polish GDP—half of that in the energy sector alone and half in the related sectors [93]. The structure of the electricity production in Poland is heavily based on conventional sources, with over 70% of the production of primary energy from coal and lignite and below 20% share of renewable energy sources in total primary production in 2020 [94]. The growing social awareness about adverse climate change and sustainable energy sources accompanied by the EU’s restrictive policy to limit carbon dioxide emissions has forced Poland to take
measures in reshaping energy policy and has placed many companies from the energy sector in a difficult position. The main goals of climate and energy policy in Europe were outlined by the European Council on 24 October 2014 and revised in December 2018 with the following targets to be achieved by 2030 [95]:

- a reduction of at least 40% in greenhouse gas emissions compared to 1990 levels. The target was updated on 17 September 2020 to an emissions reduction of 55% based on the adoption of the 2030 EU Climate Target Plan [96];
- an improvement of 32.5% in energy efficiency;
- an increase to 32% of the share of renewable energies in energy consumption;
- an interconnection of at least 15% of the EU’s electricity systems.

The cornerstone of the present energy policy in EU member states is outlined in the Energy Union Strategy published on 25 February 2015 [97]. It aims at building an energy union that gives EU consumers secure, sustainable, competitive and affordable energy. In order to meet the energy and climate targets for 2020, the EU member states are obliged to establish a 10-year integrated national and climate plan (NECP) for the years from 2021–2030.

The EU climate and energy policy has a huge impact on financing investments in the energy sector. The Dutch bank ING announced in 2015 that it would not credit investments based on coal, and this was followed by the majority of financing institutions in Europe [98]. The energy companies with production based on fossil fuels face major financing challenges. Poland’s main electricity producers are four subsidiaries of companies with state ownership, with around 60% of the sector’s total capacity. These are also companies heavily burdened with the carbon footprint associated with their production based on fossil fuels. The current situation limits the investment potential of these companies in the segment of low- and zero-emission sources and slows down the energy transformation in Poland. For this reason, the Polish government plan is to follow with a restructure of leading energy companies. The concept is based on the separation of coal-fired power plants from the structure of energy companies [99].

Our study uses a sample of firms from the energy sector listed in the Warsaw Stock Exchange. The research sample consists of all companies belonging to the WIG index from the energy sector based on the industry classification based on NACE Rev. 2. We retrieve data from the financial statements, NOTORIA database, EMIS database, annual reports, and internet sources covering the 2012–2019 period. The dataset consists of 109 firm-year observations. The sample consists of all listed companies from the energy sector in Poland. No missing data were observed. The analyzed firms are dominant entities in the capital group. Therefore the financial data from the consolidated financial statements were taken into account.

We use the ratio of financial leverage as a proxy for the capital structure. We take values from the forward year and regress with the current values of independent variables to avoid endogeneity problems. We employ three data types as independent variables: corporate governance, our main study focus, and the firm’s financial factors and CEO personal characteristics as the control variables.

Based on the literature review, we use five financial ratios as control variables. Other studies provide empirical evidence that liquidity, profitability, asset turnover, the level of asset depreciation, and market-to-book value have an impact on the firm’s capital structure. We expect the same for the companies from the energy sector industry. In our sample, a proxy for the capital structure, financial leverage is between 24–100%. Liquidity ranges between 0.37 to almost 5.00, with a median of 1.41. This can be considered a good level, suggesting that only a small fraction of companies have liquidity problems. We proxy profitability by return on asset ratio (ROA), ranging from −38% to almost 21%, with a median of nearly of 4%. This shows the problems with the energy sector in Poland, which is based on so-called ‘black energy’ produced from coal, which nowadays, due to the EU legislation, is much more costly.
The Upper Echelon Theory urges us also to control for the CEO personal characteristics. Therefore, we include in our model proxies for the CEO tenure and age and the profile of the CEO education. The latter is operationalized through three dichotomous variables: EDU_ENG, EDU_ECON and EDU_LAW. Each refers to a different education profile, respectively engineering, economic and legal. In almost 13% of cases, a CEO has two profiles. In the sample, there was no CEO without any of these three profiles. The majority of CEOs, almost 60%, have an economic education, while 44% have an engineering profile and only 9% have a legal background. CEO age is between 38–69 years old with a median of 50 years and almost the same mean; 25% of CEOs are 44 years old or less, and 25% are 55 years old or more. This suggests that the energy sector is more traditional, where years of experience carry weight. CEO tenure is between 0–11 years, with a median of 2 years and a mean of almost 3 years (see Table 1). We suspect that this low median value is due to the frequent CEO rotation in state-owned companies.

Table 1. Descriptive statistics of the CEO characteristics.

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. of Obs.</th>
<th>Min.</th>
<th>Max.</th>
<th>25th Percent.</th>
<th>50th Percent.</th>
<th>75th Percent.</th>
<th>Mean</th>
<th>St. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEO_TENURE</td>
<td>109</td>
<td>0.000</td>
<td>11.000</td>
<td>0.750</td>
<td>2.000</td>
<td>4.000</td>
<td>2.721</td>
<td>2.773</td>
</tr>
<tr>
<td>CEO_AGE</td>
<td>109</td>
<td>38.000</td>
<td>69.000</td>
<td>44.000</td>
<td>50.000</td>
<td>55.000</td>
<td>50.266</td>
<td>7.762</td>
</tr>
<tr>
<td>EDU_ENG</td>
<td>109</td>
<td>0.000</td>
<td>1.000</td>
<td>0.000</td>
<td>0.000</td>
<td>1.000</td>
<td>0.440</td>
<td>0.499</td>
</tr>
<tr>
<td>EDU_ECON</td>
<td>109</td>
<td>0.000</td>
<td>1.000</td>
<td>0.000</td>
<td>0.000</td>
<td>1.000</td>
<td>0.596</td>
<td>0.493</td>
</tr>
<tr>
<td>EDU_LAW</td>
<td>109</td>
<td>0.000</td>
<td>1.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.092</td>
<td>0.290</td>
</tr>
</tbody>
</table>

Source: Authors own elaboration based on the data from financial statements, the NOTORIA database and publicly available internet sources.

In our model, we use the following variables:

- \( F_{\text{LEV},i+1} \) — financial leverage calculated as total debt to total assets taken from the forward year of the \( i \)-company in year \( t+1 \);
- \( \text{INST\_OWN}_{i,t} \) — institutional ownership of the \( i \)-company in year \( t \) calculated as the sum of institutional investors’ shares in the company’s shareholding, each having at least 5% share;
- \( \text{TREASURY}_{i,t} \) — the share of the state in the \( i \)-company’s shareholding in year \( t \);
- \( \text{BOARD\_SIZE}_{i,t} \) — number of directors in the supervisory board in the \( i \)-company in year \( t \);
- \( \text{CEO\_TENURE}_{i,t} \) — CEO tenure at the reporting date in months in the \( i \)-company in year \( t \);
- \( \text{CEO\_AGE}_{i,t} \) — CEO age at the reporting date in years in the \( i \)-company in year \( t \);
- \( \text{EDU\_ENG}_{i,t} \) — an engineering profile of the CEO education, a dichotomous variable (1 — for the CEO having engineering education, 0 — otherwise);
- \( \text{EDU\_ECON}_{i,t} \) — an economic profile of the CEO education, a dichotomous variable (1 — for the CEO having economic education, 0 — otherwise);
- \( \text{EDU\_LAW}_{i,t} \) — a legal profile of the CEO education, a dichotomous variable (1 — for the CEO having legal education, 0 — otherwise);
- \( \text{LIQ}_{i,t} \) — liquidity of the \( i \)-company in year \( t \) calculated as current assets to current liabilities;
- \( \text{ROA}_{i,t} \) — a return of assets of the \( i \)-company in year \( t \) calculated as net income to total assets;
- \( \text{SIZE}_{i} \) — a firm’s size calculated as the natural logarithm of total assets;
- \( \text{ASSET\_TURN}_{i,t} \) — an asset turnover of the \( i \)-company in year \( t \) calculated as sales to average total assets;
- \( \text{ASSET\_DEPR}_{i,t} \) — an asset depreciation of the \( i \)-company in year \( t \) calculated as total depreciation to total assets;
- \( \text{M\_TO\_B}_{i,t} \) — a market-to-book ratio of the \( i \)-company in year \( t \) calculated as market capitalization to the equity.
In Table 1, we present CEO_Tenure in years, while in Table 2 in months. For the model, we use the natural logarithm of CEO_Age and CEO_Tenure.

<table>
<thead>
<tr>
<th>Table 2. Descriptive statistics.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>F_LEV</td>
</tr>
<tr>
<td>INST_OWN</td>
</tr>
<tr>
<td>TRESURY</td>
</tr>
<tr>
<td>BOARD SIZE</td>
</tr>
<tr>
<td>CEO_TENURE</td>
</tr>
<tr>
<td>CEO_AGE</td>
</tr>
<tr>
<td>EDU_ENG</td>
</tr>
<tr>
<td>EDU_ECON</td>
</tr>
<tr>
<td>EDU_LAW</td>
</tr>
<tr>
<td>LIQ</td>
</tr>
<tr>
<td>ROA</td>
</tr>
<tr>
<td>SIZE</td>
</tr>
<tr>
<td>ASSET_TURN</td>
</tr>
<tr>
<td>ASSET_DEPR</td>
</tr>
<tr>
<td>M_TO_B</td>
</tr>
</tbody>
</table>

Source: Authors own elaboration based on the data from financial statements, the NOTORIA database and publicly available internet sources.

Previous studies use various forms of regression analysis. Berkman, Iskenderoglu, Karadeniz, and Ayyildiz [17], and Krian [21] utilize panel regression with fixed effects, while Ghani and Bukhari [16] and Shah, Shah, Raja, and Naseem [8] use a pooled regression and Kirmi [5] an OLS regression. Chakrabarti and Chakrabarti [6] employ an OLS and panel regression. In a similar vein, Saeed [12] opts for OLS and panel regression, and additionally, a pooled regression. Nga and Long [9] chose to use the GLS regression to overcome the heteroskedasticity of the error. For the same reason, in our study, we use an OLS regression with a robust option. Even if there is no heteroskedasticity, the robust standard errors will become just conventional standard errors. However, the second advantage is that robust standard errors overcome the potential lack of normality.

Most previous research uses financial leverage calculated as total debt to total assets as the proxy for the capital structure [6, 8, 9, 16, 17, 21]. However, Nga and Long [9] provide a more detailed analysis by decomposing total debt between short- and long-term debt. We remain more traditional with regard to the selection of the dependent variable—we choose financial leverage as the proxy for the capital structure calculated as total debt to total assets. The novelty we introduce is the time lag between dependent and independent variables. We assume that shaping capital structure is longer than a short-term process. The impact of factors influencing capital structure take at least several months to one year.

The second aspect of our choice—introducing a time lag—partially refers to the endogeneity problem. There are potentially at least two sources of endogeneity: simultaneity and omitted variables. The introduction of the time lag helps us avoid the simultaneity problem. In other words, we can assume and expect some independent variables at the time $t$ to determine the capital structure in the next year (time $t + 1$). However, it would be impossible to claim that capital structure in the time $t + 1$ affects any independent variables in previous periods (time $t$). The latter problem of omitted variables is more severe and more difficult to overcome. Variables omitted in the model may affect both dependent and independent variables, causing biased coefficient estimates. This problem may be solved by the careful selection of the control variables. The study of Coles and Li [100]
provides an extensive insight into this problem by analyzing corporate finance empirical designs in the various subfields. They detected the omitted variables problem in at least 17 of the 20 areas. Therefore, the findings of Coles and Li [100] suggest that the problem is still present in the majority of corporate finance research designs and is difficult to overcome. They suggest that, for example, for capital structure studies, researchers should concentrate on new theories related to firm characteristics, better proxies, and the markets in which firms operate. We are following this recommendation by focusing on the energy market. Finally, we analyzed carefully empirical designs of other studies and tried to select the most important control variables to minimize the problem of omitted variables. Following other empirical designs, we employ as control variables: profitability [6,8,9,16,17,21], liquidity [6,9,17], asset turnover [6,17], and SOE [9]. Yet, as the findings of Coles and Li [100] suggest, we are aware that we are not able to eliminate the endogeneity problem completely.

### 7. Results

In our empirical research, we considered using a proxy for the firm’s size. Unfortunately, our proxy—natural logarithm of total assets is highly correlated with the TREASURY variable. Therefore, we decided to abandon the SIZE variable from our model. A similar situation occurs for our key corporate governance variables, TREASURY and INST_OWN, for which the correlation coefficient is very high (Table 3) and negative, suggesting that institutional investors tend to avoid state-owned companies. A high correlation between independent variables may cause a problem of multicollinearity. Therefore, we calculate the variance inflation factor (VIF) after running regression, which assesses how much the variance of an estimated regression coefficient increases if predictors are correlated (Table 4).

#### Table 3. Pairwise correlations—Pearson (upper triangle) and Spearman (lower triangle).

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>F.LEV</th>
<th>INT_OWN</th>
<th>TREATUR</th>
<th>BOARD_SIZE</th>
<th>LN_TENURE</th>
<th>LN_AGE</th>
<th>EDU_ECON</th>
<th>EDU_LAW</th>
<th>LIQ</th>
<th>ROA</th>
<th>SIZE</th>
<th>ASSET_TURN</th>
<th>ASSET_DEPR</th>
<th>M_TO_B</th>
</tr>
</thead>
<tbody>
<tr>
<td>F.LEV</td>
<td>1.00</td>
<td>-0.245</td>
<td>-0.349</td>
<td>-0.211</td>
<td>0.169</td>
<td>0.147</td>
<td>0.005</td>
<td>-0.226</td>
<td>-0.401</td>
<td>-0.348</td>
<td>0.091</td>
<td>-0.160</td>
<td>0.164</td>
<td></td>
</tr>
<tr>
<td>INST_OWN</td>
<td>0.167</td>
<td>1.000</td>
<td>-0.715</td>
<td>-0.354</td>
<td>-0.043</td>
<td>0.209</td>
<td>0.186</td>
<td>-0.132</td>
<td>-0.169</td>
<td>-0.036</td>
<td>0.115</td>
<td>-0.645</td>
<td>0.233</td>
<td>-0.298</td>
</tr>
<tr>
<td>TREASURY</td>
<td>-0.409</td>
<td>-0.733</td>
<td>1.000</td>
<td>0.305</td>
<td>-0.199</td>
<td>0.038</td>
<td>0.031</td>
<td>0.007</td>
<td>0.143</td>
<td>0.045</td>
<td>0.404</td>
<td>0.227</td>
<td>-0.176</td>
<td></td>
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<tr>
<td>BOARD_SIZE</td>
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<td>-0.331</td>
<td>0.297</td>
<td>1.000</td>
<td>-0.155</td>
<td>-0.118</td>
<td>-0.138</td>
<td>-0.055</td>
<td>0.042</td>
<td>-0.247</td>
<td>-0.006</td>
<td>0.357</td>
<td>-0.040</td>
<td>0.164</td>
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<tr>
<td>LN_TENURE</td>
<td>0.184</td>
<td>0.059</td>
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<td>-0.105</td>
<td>1.000</td>
<td>0.309</td>
<td>0.045</td>
<td>-0.053</td>
<td>-0.105</td>
<td>-0.018</td>
<td>-0.118</td>
<td>-0.023</td>
<td>0.007</td>
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<td>LN_AGE</td>
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<td>-0.154</td>
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<td>-0.126</td>
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<td>-0.110</td>
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<td>0.071</td>
<td>0.082</td>
<td>0.063</td>
<td>0.038</td>
<td>1.000</td>
<td>-0.626</td>
<td>-0.218</td>
<td>-0.091</td>
<td>0.130</td>
<td>-0.104</td>
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<td>EDU_ECON</td>
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<td>-0.042</td>
<td>-0.129</td>
<td>-0.626</td>
<td>1.000</td>
<td>-0.322</td>
<td>0.144</td>
<td>-0.132</td>
<td>0.133</td>
<td>-0.071</td>
<td>-0.187</td>
<td></td>
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<tr>
<td>EDU_LAW</td>
<td>0.073</td>
<td>-0.137</td>
<td>-0.007</td>
<td>0.133</td>
<td>-0.100</td>
<td>-0.132</td>
<td>-0.218</td>
<td>-0.322</td>
<td>1.000</td>
<td>-0.139</td>
<td>0.041</td>
<td>0.253</td>
<td>0.026</td>
<td>-0.108</td>
</tr>
<tr>
<td>LIQ</td>
<td>-0.288</td>
<td>-0.144</td>
<td>0.109</td>
<td>-0.179</td>
<td>-0.064</td>
<td>-0.120</td>
<td>-0.068</td>
<td>0.147</td>
<td>-0.150</td>
<td>1.000</td>
<td>0.267</td>
<td>-0.078</td>
<td>-0.010</td>
<td>-0.118</td>
</tr>
<tr>
<td>ROA</td>
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<td>-0.020</td>
<td>0.119</td>
<td>-0.090</td>
<td>-0.135</td>
<td>-0.036</td>
<td>0.046</td>
<td>-0.092</td>
<td>-0.042</td>
<td>0.293</td>
<td>1.000</td>
<td>0.009</td>
<td>0.005</td>
<td>-0.274</td>
</tr>
<tr>
<td>SIZE</td>
<td>-0.269</td>
<td>-0.527</td>
<td>0.633</td>
<td>0.398</td>
<td>-0.026</td>
<td>-0.106</td>
<td>-0.125</td>
<td>-0.019</td>
<td>0.277</td>
<td>0.044</td>
<td>0.110</td>
<td>1.000</td>
<td>0.060</td>
<td>-0.160</td>
</tr>
<tr>
<td>ASSET_TURN</td>
<td>0.114</td>
<td>0.121</td>
<td>0.032</td>
<td>0.086</td>
<td>-0.174</td>
<td>0.029</td>
<td>0.071</td>
<td>0.092</td>
<td>0.036</td>
<td>0.072</td>
<td>0.102</td>
<td>0.127</td>
<td>1.000</td>
<td>-0.289</td>
</tr>
<tr>
<td>ASSET_DEPR</td>
<td>-0.430</td>
<td>-0.180</td>
<td>0.240</td>
<td>0.169</td>
<td>0.017</td>
<td>-0.052</td>
<td>0.206</td>
<td>-0.261</td>
<td>-0.106</td>
<td>-0.048</td>
<td>0.010</td>
<td>0.045</td>
<td>-0.266</td>
<td>1.000</td>
</tr>
<tr>
<td>M_TO_B</td>
<td>-0.333</td>
<td>0.179</td>
<td>0.033</td>
<td>-0.026</td>
<td>-0.024</td>
<td>-0.155</td>
<td>0.303</td>
<td>0.496</td>
<td>-0.056</td>
<td>0.337</td>
<td>-0.078</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors own elaboration based on the data from financial statements, NOTORIA database and publicly available internet sources.

#### Table 4. Results of the regression analysis.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Coefficient</th>
<th>Robust Std. Err.</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>INST_OWN</td>
<td>-0.215</td>
<td>0.146</td>
<td>0.145</td>
</tr>
<tr>
<td>TREASURY</td>
<td>-0.190</td>
<td>0.083</td>
<td>0.025   **</td>
</tr>
<tr>
<td>BOARD_SIZE</td>
<td>-0.011</td>
<td>0.006</td>
<td>0.083   *</td>
</tr>
<tr>
<td>TENURE</td>
<td>0.004</td>
<td>0.011</td>
<td>0.709</td>
</tr>
</tbody>
</table>
To test our hypotheses, we used the following model:

\[
F_{\text{LEV},t+1} = \text{INST\_OWN}_{it} + \text{TREASURY}_{it} + \text{BOARD\_SIZE}_{it} + \text{TENURE}_{it} + \text{AGE}_{it} + \text{EDU\_ENG}_{it} + \text{EDU\_ECON}_{it} + \text{EDU\_LAW}_{it} + \text{LIQ}_{it} + \text{ROA}_{it} + \text{ASSET\_TURN}_{it} + \text{ASSET\_DEPR}_{it} + \text{M\_TO\_B}_{it}
\]

(1)

The \(p\)-value for the INST\_OWN is 0.145 (Table 4), below the significance level, suggesting that the influence of institutional ownership on capital structure is not significant. Therefore, we conclude that the regression analysis does not provide empirical evidence supporting H1. The \(p\)-value for the TREASURY variable is 0.025, which is a significant level. This implies that state ownership has a significant and negative impact on capital structure, suggesting lower leverage of firms from the energy sector. Therefore, regression analysis provides empirical evidence to the contrary to H2. The third variable under our focus—BOARD\_SIZE—displays a significant \(p\)-value (0.083), a negative Beta coefficient, suggesting a significant and negative impact on capital structure. It is worth noting that BOARD\_SIZE is negatively correlated with the INST\_OWN and positively with TREASURY. However, the correlation coefficient values are moderate. Finally, among five proxies describing personal CEO characteristics, only one is statistically significant: EDU\_ECON. This suggests that the CEO, who has an educational background in the economic field, is able to attract more debt.

The results of regression analysis also provide interesting findings at the level of control variables. Liquidity and profitability are important factors shaping capital structure and both have a negative impact. On the other hand, the capital market perspective on company valuation as proxied by the market-to-book ratio (or price to book) is an important driver in attracting debt financing. This should not be a surprise considering that a market-to-book ratio also displays how the capital market assesses the company’s future perspectives.

We run a regression with a robust option to obtain robust coefficients. It allows us to avoid many problems with the specification of the model. We also ran a series of post estimation tests. Firstly, we address our concern on the problem of multicollinearity since some of the variables are moderately correlated. In this regard, we calculate the variance inflation factor (Table 4). VIF values are between 1–5, which indicates a moderate correlation between independent variables. This implies that there is no multicollinearity problem.

We analyzed the relation between observed and fitted values of the dependent variable—financial leverage and statistically significant variables describing corporate gov-

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>0.025</td>
<td>0.044</td>
<td>0.564</td>
</tr>
<tr>
<td>EDU_ENG</td>
<td>-0.001</td>
<td>0.027</td>
<td>0.976</td>
</tr>
<tr>
<td>EDU_ECON</td>
<td>0.052</td>
<td>0.028</td>
<td>0.063   *</td>
</tr>
<tr>
<td>EDU_LAW</td>
<td>0.014</td>
<td>0.035</td>
<td>0.696</td>
</tr>
<tr>
<td>LIQ</td>
<td>-0.058</td>
<td>0.019</td>
<td>0.976</td>
</tr>
<tr>
<td>ROA</td>
<td>-0.794</td>
<td>0.252</td>
<td>0.002   ***</td>
</tr>
<tr>
<td>ASSET_TURN</td>
<td>-0.011</td>
<td>0.025</td>
<td>0.673</td>
</tr>
<tr>
<td>ASSET_DEPR</td>
<td>-0.991</td>
<td>0.721</td>
<td>0.172</td>
</tr>
<tr>
<td>M_TO_B</td>
<td>0.037</td>
<td>0.012</td>
<td>0.002   ***</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.676</td>
<td>0.127</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Source: Authors own elaboration based on the data from financial statements, NOTORIA database and publicly available internet sources. * significance at 10% level. ** significance at 5% level. *** significance at 1% level.
ernance: treasury and board size. Figure 1 shows the relationship between capital structure and the state’s share in the company’s shareholding. The fitted values are predicted from the model. The slope of the trend line is visible in the graph. This depicts the negative impact of state share on financial leverage.

The impact of the second statistically significant variable—the board size is presented in Figure 2. Again, the trend line slope depicts the negative influence of that variable on the financial leverage.

Overall, we concluded that our model is of good quality and with a moderate but acceptable predicting power (adj. R = 0.32), considering that we aimed to detect the influence of the independent variables over the dependent and not to explain the latter’s variability.
8. Concluding Remarks

Research into the structure of companies’ capital has featured in the global literature for many years. Nevertheless, decisions on the choice of methods of corporate financing are as relevant as ever. The prolific scientific achievements within this field devote rather little attention to companies from the broadly understood energy sector. These companies are relatively unique, operating within unique internal and external conditions, and are extremely important for any modern economy. They are often large companies with an entrenched market position that are subject to the disclosure requirement whereby they publish a large amount of financial and non-financial information. Therefore, the scope of information asymmetry in energy companies will probably be small.

Additionally, they are characterized by relatively steady income cash flows and demand for their services at a largely constant or constantly growing (electricity) level. Hence, from this point of view, it should be assumed that they will not be significantly exposed to the risk of bankruptcy. On the other hand, many energy companies in Central and Eastern Europe must adapt to the new EU climate policy. This mandates reductions in energy production, among others in coal-based production, which poses a serious problem for many energy companies, mainly from new EU countries, including Poland.

Unfortunately, our results do not support the first hypothesis (H1). Therefore we have not found empirical evidence suggesting that institutional ownership plays any role in shaping the capital structure of energy companies in Poland. The results may be biased due to the small sample size and the need for further investigation.

Our findings also support the second hypothesis (H2), implying that the state, as the dominant investor, negatively influences debt financing. This may be due to management’s pursuit of the company’s social and political agendas. The state as an investor and the management nominated by the state, are naturally reluctant to take any additional risk, so the share of debt in the financing structure of such companies may decline.

We provide empirical evidence suggesting that a bigger board size reduces debt financing, supporting our third hypothesis (H3). Larger supervisory boards have more comprehensive and sophisticated financial expertise. They positively influence the size of financial and non-financial disclosures, thus reducing the extent of information asymmetry, which facilitates the cheaper obtaiment of equity capital. In this situation, energy companies will finance their operations to a greater extent through equity at debt expense.

The results regarding the influence of CEO personal characteristics on the debt level were not entirely unequivocal. On the one hand, experience gained in each company, the resultant knowledge of the company and the industry, and the CEO’s age and the associated risk acceptance were proved to be statistically insignificant. The impact of economic education on the higher level of debt alone was verified and confirmed. Knowledge of the specificity of corporate financial management gained during economics studies, including the benefits arising from using leverage, may induce CEOs to seek higher, albeit more moderate, indebtedness for energy companies. The impact of the institutional investor on the debt level did not turn out to be statistically significant. Therefore, most often, professional knowledge, attempting to reduce information asymmetry, frequently effective control of management board decisions, effective use of financial leverage and prioritizing the maximization of the shareholder value do not significantly affect corporate debt.

The paper also empirically verifies typical financial factors affecting the capital structure. Factors such as asset turnover or non-debt tax shield, which are not sufficiently investigated in the literature, do not significantly affect capital structure. Therefore, operational efficiency or the chance to reduce taxes due to employing the non-debt tax shield are not the primary factors determining the level of energy companies’ indebtedness. Profitability has a significant impact on the capital structure of energy companies. Companies boasting higher profitability do not use more debt, as they have their own sufficient funds. The strong negative impact of liquidity on the debt level should be construed similarly. Energy companies probably do not need any further mitigation of financial risk to borrow cheaply. Moreover, business entities with a higher growth potential finance their activities
to a greater extent through debt. This situation is explained by the increased demand for external capital, which can be raised more easily in banks due to the large share of tangible fixed assets in total assets and on account of other factors.

Moreover, the obtained results make it possible to verify selected theories of capital structure. The pecking order theory should be considered the most useful in the energy sector. The theory posits that energy companies use their own resources first, followed by debt. This is corroborated by the negative relationship between debt, liquidity and profitability. Classic theories can be assigned less importance due to the low risk of bankruptcy. Surprisingly, the trade-off theory also has little impact due to a lack of a significant risk of bankruptcy. Albeit indirectly, the trade-off theory is to some extent confirmed by the lack of a non-debt tax shield. The agency theory is less applicable to energy companies due to the high proportion of fixed and tangible assets in their asset structure and a low share of intangible assets.

The paper attempts to develop and enrich the knowledge of the capital structure of energy companies. This proved the significant influence of corporate governance on the capital structure of energy companies. It also verified other financial factors significantly affecting the debt in the energy sector. The analysis focuses on practical verification of the usefulness of individual theories of capital structure. To the best of the authors' knowledge, this paper is one of the first works on the capital structure of energy companies in the CEE countries. It constitutes the first research linking the capital structure of energy companies with selected corporate governance indicators. The research results are important to standard setters, managers and owners of energy companies, stock exchange investors and banks. They are extremely important for energy companies that need to generate more “green energy” because of the ensuing investment outlays, which must receive specific financing.

Our results generate important implications for the management of energy companies and banks in the era of necessary expenditure on the transformation of energy based on coal and other fuels into clean, ecological energy. Although these outlays should be assessed as high, the research results confirm that energy companies are prepared for them from their financial situation. The negative impact of financial liquidity and the negative impact of financial profitability means that energy companies with high financial liquidity and high profitability does not increase indebtedness, despite their high creditworthiness. It is, therefore, their conscious financial policy. On the other hand, they have the potential to take out investment loans that can finance the necessary investment outlays in the production of green energy. Moreover, greater development of energy enterprises should increase the demand for foreign capital. Even though the research was carried out on the Member States’ heavily regulated and supervised market, we provide empirical evidence suggesting that factors and theories of capital structure characteristic of unregulated markets are still useful. In this regard, our results are line with the findings of Jaworski and Czerwonka [101].

The empirical results are also useful for the most important stakeholders of energy enterprises, among which the state is the most important. As the dominant investor, the state should strengthen supervision over energy companies and should encourage greater use of debt in the capital structure. This increases the debt disciplining function of managers. Moreover, the results of empirical research has led to the appointment of less numerous supervisory boards, which will more effectively perform supervisory and control functions over managers. Yet, our results also reveal that in the case of energy companies in Poland, the state’s potential for increased indebtedness is untapped. This is unfortunate considering that, as discussed in the literature review section, the state as an investor might positively affect the level of debt.

The research results are also useful for scientists due to the relatively few studies analyzing the debt structure of energy companies. They allow for the verification of interesting relationships between corporate governance and capital structure, taking into account classic financial factors and CEO characteristics determining the debt level of energy
companies. The impact of similar factors on companies’ capital structure on regulated and non-regulated markets is also potentially useful.

The research results can also be important for customers. The dynamics of rising energy prices may be delayed due to debt financing to a greater extent and thus a lower cost of capital. Higher use of debt should not entail higher bankruptcy costs due to the presence of a state investors in many manufacturing enterprises. State institutions, in turn, should to a greater extent support the energy sector in terms of its lower capital intensity and should provide financial support to more modern technologies in the field of energy production, transmission and distribution. In addition, additional state guarantees and preferential interest loans are needed, which can further increase the attractiveness of debt financing and, consequently, reduce the weighted average cost of capital and could support the development of the energy sector.

The work’s limitations include a small research sample limited to energy companies in Poland and, as a result, a relatively small number of observations. Therefore, in future studies, consideration should also be given to extending the research period. Further research should be more internationalized and should address the issue of the capital structure and its influencing factors for emerging as developed economies. Moreover, the research design should involve corporate governance factors which were not verified in this work, such as a reputable auditor, an audit committee, application of IFRS, an industry investor and others.


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