


Article

Capital Structure, Corporate Governance, Equity Ownership and Their Impact on Firms' Profitability and Effectiveness in the Energy Sector

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Abstract: This paper aimed to research the interrelation between capital structure, corporate governance, equity ownership, and how they affect firm performance. The sample used consisted of 10 leading-energy-sector companies traded in the NYSE, most of which rank among the largest companies in the world by market capitalization, while the US-based ones are also Fortune 500 companies. Over the eleven-year period examined, from 2009 to 2019, a sampling frame of 110 data series was gathered and analyzed using panel data methodologies. The impact of the key parameters of capital structure, corporate governance, and equity ownership was tested using regression analysis (panel data method) on firm performance, measured by profitability. Our results support a significant relation among major capital structure and corporate governance parameters and firm performance, whereas no evidence was found to support a significant impact of equity ownership on the dependent variable found ascertained. Furthermore, our findings support that in our sample firms, pecking order and agency cost theories play an important role in the financing of these firms, while static trade and irrelevance theory find no support.

Keywords: capital structure; corporate governance; firm performance; equity ownership; regression analysis (panel data method); capital structure theories; profitability; energy sector

JEL Classification: G30; G10; G38; M48; Q48; Q49; M42



Citation: Georgakopoulos, G.; Toudas, K.; Poutos, E.I.; Kounadeas, T.; Tsavalias, S. Capital Structure, Corporate Governance, Equity Ownership and Their Impact on Firms' Profitability and Effectiveness in the Energy Sector. *Energies* **2022**, *15*, 3625. <https://doi.org/10.3390/en15103625>

Academic Editors: Apostolos G. Christopoulos, Petros Kalantonis and Ioannis Katsampoxakis

Received: 30 March 2022

Accepted: 12 May 2022

Published: 15 May 2022

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1. Introduction

Energy is essential in every aspect of life. As our world advances, the requirements for more oil, coal, natural gas, and biofuel, as well as nuclear, hydro, wind, and solar power advance as well. According to the International Energy Agency, global energy demand is projected to have increased by at least 25 percent by 2040 [1]. The energy industry is a very challenging environment shaped by—among other determining factors—greenhouse gas emissions, climate change, and geopolitics. To be efficient, a firm operating in this field needs to constantly consider these factors and make the right choices, both internally and externally. The purpose of every economic entity is to be able to create profit through added value. The best way to do so is by fine-tuning capital structure, corporate governance, and equity ownership in the best way to increase performance.

The main objective of this research study is to combine capital structure, corporate governance, and equity ownership to examine their impact on the performance of a firm,

measured by its profitability. Our proposed model uses as its explanatory variables those presented in the literature review. The contribution of this research is that, to the best of the authors' knowledge, it is the only paper so far that attempts to combine these three areas of corporate finance, with a view of examining their effect upon the firm's performance. More specifically, we test the combined impact of liquidity and leverage, the board of directors and its synthesis, and the power of major shareholders on decision making.

The structure of this research study is as follows: First, in the Literature Review, the theoretical fundamentals supporting our independent variables, i.e., capital structure, corporate governance, and equity ownership, are presented and associated with firm performance. There follows the methodology section of this research study. Subsequently, the data collected are presented, followed by their analysis and a section on empirical results. The paper concludes with remarks regarding this research and our proposal for further investigation based on our findings.

2. Materials and Methods

This multipoint approach to firm performance is rare in the pertinent literature. Margaritis and Psilaki (2010) [2] researched this field considering fewer elements, while other research studies took only one element into consideration.

2.1. Financial Structure

The seminal work of Modigliani and Miller (1953) and Modigliani and Miller (1963) [3,4] laid the foundations for capital structure theories and empirical investigations, such as the trade-off theory, conducted with very interesting results. Hovakimian et al. (2012) [5] noted that smaller firms with fewer tangible assets may be exposed to more bankruptcy risk even if their current capital structures are more conservative, while large firms with more tangible assets can take advantage of tax shields by increasing their debt without increasing their chances of bankruptcy. More recent researchers, i.e., DeAgelo and Roll (2015) [6] and Campell and Rogers [7], in capital structure are beginning to focus less on leverage and pay more attention to the volatility of debt and debt ratios.

Further to trade theory, pecking order theory introduced by Donaldson in 1961 [8] and modified by Myer and Majluf (1984) [9] is based on the fact that asymmetric information dictates the preferred order of capital financing. Oolderink (2013) [10], studying a sample of listed Dutch companies, found that pecking order theory prevailed as a theory model over static trade-off theory. It should be noted that Prasad et al. (2001) [11] suggested that the deficiency in these theories is the limited number of studies conducted within developing economies as opposed to those regarding developed markets; thus, we do not have enough empirical evidence concerning the implementation of these theories in these economies. As with pecking order theory, the signaling theory of capital structure, based on Ross (1977) [12], postulates that managers have more information about the company's performance than outsiders. Furthermore, in the pertinent international literature, there are studies opposed to pecking order theory that maintain that a signaling effect on capital structure outweighs the importance of pecking order theory (Harris and Raviv (1991) [13]; Ross (1977) [12]; Leland and Pyle (1977) [14]; Henkel (1982) [15]. Signaling suggests that a firm that issues debt conveys a positive signal to investors highlighting that the firm is growing. Allen and Faulhaber (1989) [16] suggested that firms may, on purpose, increase debt levels to signal the market that they are expecting a positive reaction, at least in the short run, risking a correction by the market in the future. Furthermore, Park et al. (2016) [17] found similar results arguing that decreasing information asymmetry enables firms to decrease underpricing and adjust the firm's value accordingly. As management financing choices affect the wealth of shareholders, we must also consider agency costs; Means and Berle (1932) [18] first introduced the terms of agent and principal, whereas Jensen and Meckling (1976) [19] used agency cost theory to explain financing preferences, with researchers continually elaborating on the matter—Zardkoohi et al. (2015) [20]; Panda and Leepsa (2017) [21].

Managers tend to make choices that are not always beneficiary to the shareholders. Enron in 2001 and Goldman Sachs in 2007 were characteristic instances of agency problems, in which cases agents (managers) acted on behalf of principals (shareholders), leading to an increase in cost that can be explained by agency theory. Some agency problems can be avoided by using policies engaging the managers in equity; Jensen (1986) [22] argued that “debt reduces agency costs of free cash flow by reducing the cash flow available for spending at the discretion of the manager”. These controlled effects of debt are a potential determinant of capital structure. Jensen and Meckling 1976) [19] additionally suggested that there is conflict between shareholders and debtholders that intensifies when bankruptcy chances increase.

2.2. Capital Structure

Brigham and Ehrhardt (2008) [23] defined capital structure as “the firm’s mixture of debt and equity”; they also discussed the concept of capital structure decision, in conjunction with Brealey et al. (2014) [24]. They jointly defined it as “The choice between debt and equity financing”.

There is a wide range of parameters related to capital structure. Daskalakis and Psilaki (2008) [25] argued that larger companies lean toward debt financing; subsequently, asset structure and profitability impact leverage negatively, which also supports the pecking order theory. Margaritis and Psilaki (2010) [2] found supporting evidence to Meckling’s agency cost hypothesis, namely, that higher leverage levels are related to improved efficiency. Special notice should be given to the cost of financing. It is understood that financial planning should be considered with less costly solutions. In their study on WACC, Brusov et al. (2011) [26] noted that one flaw of the Modigliani–Miller (MM) theorem is the assumption that company lifetime is infinite, whereas company lifetime is, of course, finite and the WACC changes accordingly. In general, though, debt is cheaper than equity. Katsampoxakis et al. (2018) [27] examined—among others—the optimal debt ratio of listed firms listed on the ASE before (2005–2009) and after (2010–2016), marking the breakout of the Greek economic crisis. The extracted results do not seem to be consistent with MM theory during the pre-crisis period, in contrary to the post-crisis period.

Debt could also be tax-deductible, which, in turn, indicates taxation as a determinant factor. On the other hand, taxation is not always relevant, as argued by Cristian and Topan (2016) [28], and depends more on the sector and the location of the firm. Debt-related financing is affected by numerous factors. These include the expected cash inflows, or the risks involved. Managers inside the company have the freedom to finance operations with debt if expected cash inflows exceed cash outflows, and a stable income or a rise in inflows is expected. Risk in capital structure could stem from the proportion of debt financing, as mentioned above, but also includes systematic and nonsystematic risk. At the firm level, we cannot control systematic risk, but nonsystematic risk is avoidable by diversification and internal measures. The debt-to-equity ratio is a determining parameter. Basdekis et al. (2020) [29] examined the optimal debt ratio of the European automobiles sector in their study, and their results are consistent with MM theory that financial leverage at a “low” level is beneficial for firms, but beyond the turning point of 47.4%, it becomes counterproductive. According to Katsampoxakis (2021) [30], the unconventional policy determined and implemented by the ECB during the economic crisis period in the EMU countries, in order to achieve financial stability, was also profoundly important. According to Jensen (1986) [22], the optimal debt-to-equity ratio is defined as the point where the marginal costs of debt just offset the marginal benefits, and firm value maximization results; Jensen (ibid) added that the more debt increases, the more the agency costs of debt rise, including bankruptcy costs. The size of the firm is thus related to capital structure. This parameter is expected to be of significance because, in general, larger companies benefit by economies of scale, which, among other things, affect performance directly or indirectly. There are numerous studies that support this fact; Gleason et al. (2000) [31] argued that a larger company size is directly associated with greater performance, while other researchers,

e.g., Daskalakis, et al. (2014) [32], found that “firms belonging to different size groups seem to behave similarly regarding the relationship between the debt they use and their profitability, size, asset structure and growth”. The industry in which a business operates is a major determining factor of financial structure, due to diverse reasons such as nonlinear sales entailing a stricter economic environment with financing coming mostly from equity to avoid risk of bankruptcy. The type of capital structure other companies use in the same sector should also be taken into consideration as an indicating factor. This might provide some valid information regarding the proper use of debt and equity within the industry in question. Liquidity is another important factor associated with interrelates with capital structure. The marginal value of liquidity is the loss of profit from interest when our capital is not working for us. A lot of companies may need more liquidity than others, but this subject is more complicated, and many exogenous factors come into play. The state of the economy and other exogenous factors within a country may dictate certain policies concerning the use of finance within a firm. This could apply to the intertemporal situation of a state or a crisis within a developed country. Katsamposakis et al. (2015) [33] examined the impact of specific corporate and market features on the profitability of companies listed on the ASE. They found that the size, volatility of profitability, and accruals of companies do not seem to affect their profitability in a statistically significant way. An uncertain environment is obviously less appealing for use of debt, while it would be more useful to operate conservatively and with less risk; the institutional framework of a country also plays a major part. Recently, Forte and Tavares (2019) [34] researched a large sample of 48,840 firms across Europe and found that the institutional framework of a country affects the relationship between debt and firm performance. This is in opposition to the findings of Daskalakis and Psilaki (2008) [25] that firm effects are more important than county ones. Additionally, Weill (2008) [35] found that there is a connection between a country’s legal system and the performance of a firm. The disposition of the owner plays a part in capital structure, especially if the owner is the founder of the company as well. In addition to their different functions, there is an interrelation between capital structure corporate governance and equity ownership.

2.3. Corporate Governance

There are many definitions of corporate governance; most scholars agree that it is a structure for directing and controlling a firm. There follow two definitions from the Financial Reporting Council and the Organization for Economic Co-operation and Development: “Corporate governance is the system by which companies are directed and controlled. Boards of directors are responsible for the governance of their companies. The shareholders’ role in governance is to appoint the directors and auditors, and to satisfy themselves that an appropriate governance structure is in place. The responsibilities of the board include setting the company’s strategic aims, providing the leadership to put them into effect, supervising the management of the business, and reporting to shareholders on their stewardship. The board’s actions are subject to laws, regulations, and the shareholders in general meeting”.

As far as the procedures and processes according to which an organization is directed and controlled are concerned, “the corporate governance structure specifies the distribution of rights and responsibilities among the different participants in the organization—such as the board, managers, shareholders, and other stakeholders—and lays down the rules and procedures for decision-making”.

There are several parameters relating to corporate governance; cultural characteristics may or may not play a part, depending on many factors. In large multinational organizations with a multidivisional organizational structure, the board of directors’ elements analysis is more valuable with relation to performance. The board of directors is the hierarchically highest mechanism of company decision making and is elected by the shareholders. Its main purpose is the administration of the firm. The board should promote and protect the shareholders’ interests within the company and act on their behalf. Ideally, coherence

is imperative between the shareholders and board of directors, but this is not always the case. As stated by Brealey et al. (2014) [24], “some corporations are owned by a few major shareholders, and therefore there is less distance between ownership and control”. Other important factors related to the board playing a major part in the operation of a firm are the synthesis of the board of directors, the frequency the board meets, the number of members, the gender of the participants, the number of committees participating, the number of nonexecutive members, and the number of outsiders involved in the firm’s operations.

2.4. Equity Ownership

Equity ownership is sometimes interrelated with corporate governance and capital structure because the board of directors and shareholders together may decide not to further fragment the ownership of the firm by issuing new shares, which, in turn, will steer the request for funding toward other solutions. Prasad et al. (2001) [11] argued that “Large shareholders play a positive role in capital markets by lowering monitoring costs and thus reducing the agency costs of debt”. In another study, Muller (2008) [36] suggested that company growth and capital structure are immediately affected by ownership due to their finding that owners who want to stay in control may give up growth opportunities.

2.5. Methodology

There are numerous studies that confirm the interrelation between capital structure and performance, as well as others that maintain that there is no connection between the two. The main considerations regarding capital structure are firm size, which is expected to relate positively to performance, liquidity, leverage, and debt-to-equity and profitability correlation (see Margaritis and Psilaki (2010) [2]). Herciu and Ogrean (2017) [37] found that return on equity (ROE) and debt-to-equity are positively or negatively related, depending on the circumstances. For example, very strong positive relationships were found between technology, healthcare, and telecommunication sectors, while in energy, motor vehicles, and parts sectors, the correlations were positive but not very strong. Accordingly, Harris and Raviv (1991) [13] argued that debt financing smooths out the conflicts between managers and equity holders, and leverage is positively correlated with firm value. The basic parameter from corporate governance that we consider is the size of the board of directors. We research the relationship between the number of members on the board of directors and other factors within company performance. There is also the parameter of gender. The basic parameter for measuring equity ownership against performance is the percentage calculation of the 3 major shareholders. Based on a literature review with a focus on these studies, our model tests the joint contribution of capital structure, corporate governance, and ownership on the firms’ performance, measured by their results, i.e., the earnings before interest and taxes (EBIT) adjusted to the size of the firm. More specifically, we capture capital structure contribution using the debt-to-equity ratio (DE), the firms’ size measured as the natural log of the company’s total assets (FS), and the leverage measured as total debt to total assets (LE). Furthermore, for modeling corporate governance, we use the number of members on the board of directors (BD) and the number of females on the board (FBD). Finally, the affection of equity ownership is measured by percentage participation of the 3 major shareholders on the firms shares issued (SH). Thus, our model has the following form:

$$FP_{i,t} = a_0 + b_1 Lq_{i,t} + b_2 Le_{i,t} + b_3 FS_{i,t} + b_4 DE_{i,t} + c_1 BD_{i,t} + c_2 FBD_{i,t} + d_1 Sh_{i,t} + e_t \quad (1)$$

In order to test our model, a series of prerequisites related to the quality of the energy companies participating in our empirical application was imposed. More specifically, (1) all energy companies should be among the largest companies globally based on their capitalization, (2) all data should be published under the same IFRS norms, and all necessary information related to our variables had to be clear. Thus, we end up accepting for our sample only these firms that are listed on the NYSE market and exclude large companies due to the lack of data or the possibility of inconsistency within the public data. As a result,

the sample used includes the 10 largest energy companies that are traded in the NYSE. The examination period covers 11 years (2009–2019). This multivariate analysis was conducted using pooled data regression analysis (panel data methodology).

3. Results

Our empirical results are the outcome of three variations of the formula presented in Methodology: the initial model, Equation (1), estimated as pooled regression analysis (panel data methodology) (model I, Table 1); the same model structure (Equation (1)) tested under the assumption that there are fixed cross-section effects among these companies (model II, Table 1); and under the assumption that there are yearly effects (model III, Table 1, time-fixed effects).

Table 1. Empirical Results.

| Model | EGLS (Model I) | Cross-Section Effects (Model II) | Period Effects (Model III) |
|---------------------|--------------------------|----------------------------------|----------------------------|
| R ² adj. | 0.345 | 0.474 | 0.545 |
| F-stat. prob. | 0.000 | 0.000 | 0.000 |
| Variables | | | |
| Constant | 0.112 ** | 0.108431 ** | 0.120631 ** |
| LQ | 0.0002 ** | 0.000216 ** | 0.000116 ** |
| LE | −0.335 ** | −0.476409 ** | −0.202229 ** |
| FS | $−6.61 \times 10^{-5} *$ | $−4.74 \times 10^{-5}$ | $−8.94 \times 10^{-5} **$ |
| DE | 0.000322 * | 0.000246 * | 0.000537 ** |
| BD | 0.004517 ** | 0.007786 ** | 0.003118 |
| FBD | −0.008456 ** | −0.006917 | −0.005615 * |
| SH | −0.031385 | −0.083715 | −0.075098 ** |

** significant for 95%, * significant for 90%.

3.1. Model I—Results

The results obtained from the regression analysis (panel data methodology) showed that those statistically significant are profitability, liquidity, leverage, the Board of Directors, and the number of females on the Board of Directors. All these parameters have t-statistic values and low probability values. While the firm size, debt-to-equity, and shareholders parameters have low t-statistic values, high probability values are rejected as not significant. Based on the adjusted R-squared, the model (1) explains approximately 35% of the variations; additionally, F-statistic parameters with a high value of Prob (F-statistic) and a low value indicate an overall high significance of the model.

3.2. Model II—Results

This model, Model II, splits the constant term into two terms: a_0 , which captures the overall sample average constant affection; and $a_{(0,i)}$, which absorbs the impact of the individual firm on a_0 . The constant term a_0 is statistically significant, as well as liquidity, leverage, and board of directors, with a 95% confidence interval. All these have t-statistic values and low probability values, with debt-to-equity, firm size, number of females on the board, and shareholders having low t-statistic and high probability values, being rejected as not significant. The R-squared has been increased and is based on the adjusted R-squared; this model explains approximately 47% of the variations, which is higher than our previous model. This indicates that the variable we introduced to the model was significant in explaining the variation in the dependent variable. Additionally, F-statistic parameters with a high value of Prob (F-statistic) and a low value indicate an overall high

significance of the model. As with the first regression analysis (panel data methodology), firm performance and leverage are negatively correlated.

$$FP_{i,t} = a_0 + a_{0,i} + b_1Lq_{i,t} + b_2Le + b_3FS + b_4DE + c_1BD + c_2FBD + d_1Sh \quad (2)$$

3.3. Model III—Results

This model, Model III, splits the constant term into two terms: a_0 , which captures the overall sample average constant affection; and $a_{(0,t)}$, which absorbs the impact of time on a_0 . The results obtained from the regression analysis (panel data methodology) showed that statistically significant parameters are the constant term, the liquidity, leverage, firm size, debt-to-equity, the number of females on the board, and the percentage participation of the three major shareholders on the firms shares issued. Based on the adjusted R-squared, this model explains approximately 54.5% of the variations; additionally, F -statistic parameters with a high value of Prob (F -statistic) and a low value indicate an overall high significance of the model.

$$FP_{i,t} = a_0 + a_{0,t} + b_1Lq_{i,t} + b_2Le + b_3FS + b_4DE + c_1BD + c_2FBD + d_1Sh \quad (3)$$

4. Discussion

4.1. Model I

Under this model specification (Equation (1)), we find a positive relation of firm performance with liquidity parameters, and the number of members on the board of directors' parameter. This means that a higher current ratio is related to better firm performance. It can also be observed that firm performance and leverage are negatively correlated, which agree with the findings of Daskalakis and Psilaki (2008) [25]. Contrary to expectations, firm size and debt-to-equity parameters are statistically insignificant from the corporate governance perspective. The findings suggest that a larger board of directors seems to benefit profitability, while there is also an indication that the number of females on the board of directors relates to less profitability. Equity ownership parameters measured by the percentage calculation of the three major shareholders parameter do not seem to play any part in firm performance.

4.2. Model II

Our cross-section model (Equation (2)) supports that those positively correlated are the firm performance with liquidity, and the number of members on the board of directors, only this time, the females on the board are statistically insignificant with a negative impact on the firm's profitability, along with firm size, debt-to-equity, and the percentage calculation of the three major shareholders. The firm-specific constant coefficient shows that a positive relationship to the above factors is related to the following firms Total S.A., Petrobras, and Occidental Petroleum Corporation. Those negatively correlated are Exxon Mobil Corporation, Royal Dutch Shell, Chevron, BP, ConocoPhillips, Equinor ASA, and EOG Resources (Appendix A, Table A1).

4.3. Model III

In our time-effects model (Equation (3)) findings, we present a statistical significance on profitability, liquidity, leverage, debt-to-equity, firm size, and shareholders. All these have t-statistic values and low probability values. The number of members on the board of directors and the number of females on the board have low t-statistic and high probability values and are rejected as not significant. In that case, the R-squared has been increased and based on an adjusted R-squared; this model explains approximately 54% of the variations, which is higher than our previous model—as happened with the previous model, this indicates that the variable we introduced to the model was significant in explaining the variation in the dependent variable. Additionally, F -statistic parameters with a high value of Prob (F -statistic) and a low value indicate an overall high significance of the model. On this occasion, those positively correlated to firm performance are debt-to-equity and

liquidity. Conversely, those negatively correlated are firm size, leverage, and percentage calculation of the three major shareholders, and those statistically insignificant are the number of members on the board of directors and the number of females on the board. The time-specific constant coefficient shows that a positive relationship to the above factors relates to the years: 2009, 2010, 2011, 2012, 2013, and 2018. Those negatively correlated are: 2014, 2015, 2016, 2017, and 2019. As statistical significance increased from the previous model, we have concluded that the economic environment in which the company operates is more important than the firm constant.

Liquidity describes the firm's ability to pay off its debts; it offers a glimpse of the firm's financial well-being. Additionally, our results show that liquidity always plays a significant part in firm performance, being positively correlated with profitability. The average current ratio of the whole sample is 1.31—whether it is considered high or low depends on the industry, but the general rule is that anything above 1 indicates that there are enough current assets to cover short-term liabilities. As argued by Brigham and Ehrhardt (2008, p. 125) [23] “an industry average is not a magical number that all firms should strive to maintain—in fact, some very well-managed firms will be above the average, while other good firms will be below it. However, if a firm's ratios are far removed from the averages for its industry, this is a red flag”. Notwithstanding, the standard deviation of liquidity analyzed as a standalone factor is 0.8, which shows that in our sample, companies' liquidity is around the mean.

It is observed that R Square has increased significantly from 38% to 55% to 61%, improving the correctness of fit of our model. Accordingly, our adjusted R-squared, which gives us the percentage of variation explained only by the statistically significant independent variables, increases gradually from 34 to 47% (firm-specific), to 54% (time-specific). In all cases, the standard error is low, which means that we have a high-precision model. In all cases, leverage correlates negatively with the constant (firm performance). Furthermore, a correlation test was run between the two factors.

5. Conclusions

Correlation explains the strength of the relationship between an independent and a dependent variable. Regression analysis revealed a strong negative correlation among firm performance, leverage, and the presence of females on the board of directors. The findings show that high leverage is in opposition to profitability, or more profitable firms tend to use other forms for financing their activities, rather than debt, leading us to accept the pecking order theory and reject both irrelevance proportion and static trade-off theories. Another indication that static trade-off theory does not apply to our case is the fact that debt-to-equity and firm size are statistically insignificant. As managers do not prefer debt issuance signaling market growth, supporting evidence is not found for the signaling theory either. The number of members on the board of directors is positively related to firm performance, combined with the result that the percentage calculation of three major shareholders is insignificant to performance; this indirectly supports the agency cost theory, which holds that the managers and the shareholders have opposite interests. Their conflicting interests seem to align when there is the presence of higher debt levels, which again does not apply in our case.

A glimpse into the future may reveal different approaches to energy problems, with many firms researching other fields outside their original industries. Either way, there is uncertainty when it comes to projections. At the time, this research was undertaken during the outburst of the COVID-19 pandemic. There were lows in the price of shares and the overall performance of companies. A firm that has made the right capital structure decisions will be safeguarded against all opposition and difficulties, if supported by a strong board on the same page with the shareholders when it comes to company interests, as each corporate function is important on its own, but all without exception are interrelated similar to musical instruments in a symphony orchestra.

Author Contributions: Conceptualization, G.G., T.K., E.I.P., K.T. and S.T.; methodology, T.K., E.I.P., K.T. and S.T.; software, E.I.P. and S.T.; validation, G.G., T.K., E.I.P., K.T. and S.T.; formal analysis; T.K., E.I.P. and S.T.; investigation, T.K., E.I.P. and S.T.; resources, E.I.P. and S.T.; data curation, G.G., T.K., E.I.P. and K.T.; writing—original draft preparation, T.K., E.I.P. and S.T.; writing—review and editing, G.G. and K.T.; visualization, G.G. and K.T.; supervision, T.K., E.I.P., K.T. and S.T.; project administration, T.K., E.I.P., K.T. and S.T.; funding acquisition, not applicable. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Please read the methodology section of the article.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. List of companies used in this research.

| Company | Country | Rank According to Forbes | Stock Exchange |
|----------------------------|---------|--------------------------|----------------|
| Exxon Mobil Corporation | US | 1 | NYSE |
| Royal Dutch Shel | NL, UK | 2 | NYSE |
| Chevron | US | 3 | NYSE |
| Total S.A. | FR | 4 | NYSE |
| BP | UK | 5 | NYSE |
| CONOCOPHILLIPS | US | 11 | NYSE |
| EQUINOR ASA | NR | 12 | NYSE |
| EOG Resources | US | 13 | NYSE |
| Petrobras | BR | 14 | NYSE |
| Occidental Petroleum Corp. | US | 17 | NYSE |

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