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Institutional Investors and Firm Performance: Evidence in the Oil and Gas Industry

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Abstract

This study investigates the effect of institutional investor ownership on the financial performance of firms in the oil and gas (O&G) industry. Using a panel of the 50 largest O&G companies worldwide from 2006 to 2020, we test the hypothesis that institutional investors enhance shareholder value and market capitalization through active monitoring and strengthened corporate governance. To address endogeneity and unobserved heterogeneity, we apply the System Generalized Method of Moments (GMM-Sys). Results demonstrate that institutional ownership has a positive and statistically significant effect on Tobin's Q, supporting the view that these investors can improve governance and align managerial decisions with long-term value creation. Dividend payouts also display a positive association with performance, consistent with agency theory. Carbon emissions are likewise positively related to valuation, indicating that carbon-intensive operations continue to yield substantial returns despite increasing environmental pressures. In contrast, firm size, leverage, and ESG scores do not emerge as significant determinants of performance, possibly reflecting industry-specific dynamics and measurement constraints. Overall, the findings highlight the dual reality in O&G valuation – where both investor-driven governance improvements and short-term drivers, such as dividends and fossil-fuel-based revenues, shape performance. The study contributes to the literature on institutional ownership with industry-specific evidence, suggesting that if institutional investors adopt long-term, sustainability-oriented strategies, they could play a pivotal role in guiding high-emission sectors through the transition toward lower-carbon business models. Future research should investigate institutional investor heterogeneity, investment horizons, and their role in advancing ESG practices and long-term value creation in the O&G industry.

Keywords: institutional investors, firm performance, oil and gas industry, GMM-sys

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Introduction

Oil has become an indispensable product for economic progress since it was consolidated as the main energy resource of modern economies. Society has established a dependence on this commodity due to its high energy density and extensive supply chain, ranging from exploration and extraction through processing to end use. In this context, companies with significant financial scale were created and have ranked among the largest companies in the world for decades. However, the energy paradigm shift to renewable sources is imposing a relevant redirection on the strategies of these corporations, challenging their leadership [1; 2].

The oil and gas (O&G) industry has also been facing changes in its strategic decision-making process with the emergence of the financialization phenomenon. This process is characterized by the progressive interrelation between the productive and financial areas of non-financial companies, implying a new finance-dominated accumulation regime [3]. Lazonick and O'Sullivan [4] emphasized that this process reorients corporate management strategies with a focus on shareholders' interests, resulting in a shift from the "retain-and-reinvest" pattern to "downsize-and-distribute". The cornerstone of this transformation is the shareholder value maximization (SVM) perspective. This new dynamic tends to be validated by the financial market by the appreciation of the stock price, influencing the company's market value [5–7].

The impacts of financialization have scaled up significantly since the late 1970s, with the increasing presence of institutional investors in the ownership structure of non-financial companies. In general, an institutional investor is a financial intermediary that "manages and invests other people's money" [8]. Pension funds, mutual funds, investment funds, hedge funds, and insurance companies are examples of institutional investors. In addition to the increase in the number and diversity of these entities, the volume of assets managed by them has been growing. To illustrate, according to Bebchuk et al. [9], between 1950 and 2017, institutional ownership of US corporate equity increased from 6.1 to 65%, which means that "institutional investors now control a large majority of the shares of public companies and have a dominant impact on vote outcomes at those companies". In the early 2020s, the three largest investment managers in the world, known as the "Big Three" – BlackRock, Vanguard, and State Street – managed more than US\$ 20 trillion in assets [10–12]. Considering the pivotal S&P 500 stock index, Fichtner et al. [13] pointed out that "the Big Three combined constitute the largest owner in 438 of the 500 most important American corporations, or roughly in 88 percent of all member firms".

Several studies have investigated the influence of institutional investors on the corporate strategies of non-financial companies [14–16]. Since these agents do not represent a homogenous group, their influence on company strategies varies widely, according to the "business model" of institutional investors [8; 14] and their monitoring efforts in the companies that they invest in. Despite the vast literature

on this topic, no study has explored the influence of institutional investors on corporate finance strategies in the O&G industry using a dynamic panel data approach. This novelty allows us to contribute to the literature by providing empirical evidence on how institutional investors may influence financial performance in a strategic sector under pressure to adapt to a low-carbon economy.

In this context, the purpose of this study is to evaluate whether the participation of institutional investors in the ownership structure impacts the financial performance of O&G companies. The research question guiding this study is: Does institutional investor ownership improve the financial performance of O&G companies? The hypothesis is that, by monitoring the activities of these companies and establishing corporate governance guidelines, the participation of these investors enhances value generation and increases market capitalization.

This study provides a comprehensive analysis of how institutional investors have impacted the financial performance of O&G companies. Given the importance of the O&G industry in the world's economy, research that evaluates how the decision-making process in O&G corporations can be influenced is relevant. Findings can provide relevant points for discussion regarding the role of institutional investors in guiding companies' strategic decisions. This point is particularly relevant nowadays since this industry has reached its mature phase and needs to adapt to a new energy paradigm. Institutional investors have the potential to influence the transition to a low-carbon economy, reorienting companies' strategies.

Literature review

Due to the amount of resources under their management, institutional investors have the potential to impact the global financial dynamics [17–19]. With the consolidation of the shareholder value maximization principle as a standard of corporate governance [20] and their increasing participation in the ownership of non-financial companies, these entities have played a significant role in defining corporate strategies.

One of the key contributions of institutional investors is their ability to provide liquidity to the markets. By investing large amounts of capital, they increase the supply of financial resources, which can benefit companies that need funding for their projects [21; 22]. On the other hand, some authors argue that these agents exert 'myopic' pressures on corporate management to achieve short-term returns [15; 23; 24] undermining long-term strategies [12; 25].

Focusing on the impact of institutional investors on corporate performance, the studies present mixed evidence. For instance, Abedin et al. [26] found evidence using a sample of publicly traded companies in Bangladesh that these agents have a positive influence on Tobin's Q and the return on asset (ROA) of the companies. Daryaei and Fattahi [27] conducted a similar analysis, showing that Tobin's Q, ROA, and Return on Equity (ROE) increase with institutional ownership. Similar evidence is reported by Han and Xiao

[28], who found that private placements involving only institutional investors are significantly linked to improved long-term performance in Chinese A-share listed companies.

Bajo et al. [29] also contributed to this debate. The authors verified that the central and more active institutional investors enhance the value of US companies since their presence produces a certification effect on the firm receiving the investment. Further, using a sample of firms in 30 countries, Bena et al. [30] showed that foreign institutional investors foster long-term investment, increasing innovation, firm valuation, and internationalization of companies' operations. Additionally, Alghorbany et al. [31] demonstrated that institutional investors enhance the effectiveness of IT investments by reducing agency-related concerns, thereby improving corporate performance.

On the other hand, Charfeddine and Elmarzougui [32] investigated the influence of institutional investor shareholding on the performance of French companies and found a negative and significant relationship between institutional ownership and financial performance. Satt et al. [33] found similar results in the Moroccan market, showing that the negative effect lingers regardless of the characteristics of the institutional investor (government or private institutions). According to the authors, since the majority of these investors presented small shareholdings, they did not exert a close monitoring effort, presenting short-term trading interests, rather than a long-term-oriented view. Finally, Bazhair and Alshareef [34] observed no effect of institutional shareholding on financial performance among Saudi companies.

Recent studies have also investigated the relation between institutional investors, corporate environmental performance (CEP), and corporate financial performance (CFP). Nguyen et al. [35] found that long-term institutional investors help U.S. firms align corporate social responsibility (CSR) with shareholder value by reducing cash flow risk. Similarly, Miller et al. [36] showed that institutional investors strengthen the CEP-CFP link when they internalize the costs of poor environmental practices, adopt a stakeholder-oriented perspective, and prioritize long-term value creation. In particular, local socially responsible and dedicated funds play a key role in reducing risks and fostering innovation. Following this debate, Li et al. [37] demonstrated that foreign institutional ownership improves the positive relationship between CSR performance and firm value in Chinese firms, especially in non-state-owned enterprises and those with high customer awareness or foreign board members. Complementarily, Alkurdi et al. [38] found that institutional ownership is positively associated with higher sustainability disclosure, particularly among more profitable firms.

Overall, these studies suggest that institutional investors can positively influence financial outcomes by strengthen-

ing corporate governance, reducing agency costs, and supporting long-term strategies. Although findings vary across contexts, there is growing evidence that the type, orientation, and active engagement of institutional investors are critical for translating CSR and sustainability practices into financial gains and lower risks. Moreover, the long-term investment horizon typical of institutional investors allows firms to convert environmental and social initiatives, often costly in the short term, into long-term value through risk mitigation, operational efficiency, and innovation.

While most empirical studies have focused on non-financial firms within specific countries or regions, they often overlook the industry-specific dynamics that may influence corporate behavior. This study addresses this gap by examining the impact of institutional investors on firm performance within the O&G sector. Although recent research has explored the relationship between ESG adoption and financial performance in O&G companies [39–42], limited attention has been paid to the role of institutional investors in this context. This remains a critical oversight, given the strategic importance of the O&G sector in ongoing energy transition efforts and environmental policy discussions.

Methodology

Model

To evaluate the influence of institutional investors on financial performance in the O&G industry, we use a model that explores the relationship between market value (Tobin's Q) and institutional investors' participation in the ownership structure of O&G companies.

The variable of interest is the institutional investor shareholding. On the one hand, the greater the potential of the firm to generate value, the greater the incentives for the participation of these investors. On the other hand, due to the monitoring and the new management guidelines, this presence tends to enhance the market value of the companies [26; 43; 44]. That is, we have a reciprocal relationship between Tobin's Q and the presence of institutional investors in the ownership structure [32; 45; 46]. Thus, the hypothesis of strict exogeneity of the regressors is invalidated, which makes estimators with random effects or fixed effects inadequate.

The problem of the interdependent relationship between the variables, quite common in corporate finance [47], can be mitigated by using the Generalized Method of Moments (GMM), developed by Arellano and Bond [48]. The GMM focuses on estimating dynamic models, which include lagged values of the dependent variable and explanatory variables, supposedly not correlated with errors, as instrumental variables.¹ Equation (1) describes the estimated model:

$$TQ_{it} = \alpha TQ_{it-1} + \beta_0 + \beta_1^t x_{1it} + \beta_2^t x_{2it} + a_i + \mu_{it}. \quad (1)$$

¹ While the System GMM estimator is appropriate for addressing endogeneity and dynamic relationships, other methods, such as fixed effects or Dynamic Panel Threshold Regression, may also be suitable, depending on the assumptions regarding endogeneity and potential non-linearity.

Where i and t represent, respectively, the firm and the time (years). The dependent variable (TQ_{it}) is Tobin's Q, which is calculated by the ratio between the equity market value and the equity book of the company. The intercepts are represented by β_0 , β_1^t , and β_2^t . The vector that constitutes the explanatory variables, x_{it} , is divided into two subvectors: endogenous or predetermined (x_{1it}) and exogenous (x_{2it}). Finally, $a_i + \mu_{it}$ represents, respectively, the random effects and the error term of the model, given that $\mathbb{E}[\mu_{it}] = \mathbb{E}[a_i] = 0$.

In the model developed by Arellano and Bond [48], the variables are transformed into the first difference to correct the effects on the unobserved heterogeneity. Thus, the assumption of strict exogeneity can be more flexible, considering only a sequential exogeneity of the regressors. To this end, the hypothesis that the regressors are correlated with past values of the error term, but not with its present or future values, is accepted. This approach enables the use of past or future values of the regressed variables or of variables external to the model as instruments, provided that they meet the same assumptions [14; 47].

The procedure consists of calculating the differences of the variables in terms of their lagged values. Then, we can accommodate the hypothesis that endogenous regressors are correlated with past values of the error term, but not with their present or future values, configuring a sequential exogeneity of the regressors [14; 47; 49]. However, according to Arellano and Bover [50], the model described, estimated by the Generalized Method of Moments in Differences (GMM-Dif), although capable of conceiving asymptotically valid and consistent statistics, can generate inaccurate and biased results.

To deal with these issues, Blundell and Bond [51] developed an extension of the method, namely the Systemic Generalized Method of Moments (GMM-Sys), which is used in this research. In this approach, the estimators are combined in a system of regressions in differences with regressions in level, using the lags of the endogenous explanatory variables in differences as instruments. If the hypothesis of sequential exogeneity is validated, other moment conditions are imposed on the GMM-Sys, equations (2) and (3):

$$\mathbb{E}[\Delta y_{it-1}(a_i + \mu_{it})] = 0; \quad (2)$$

$$\mathbb{E}[\Delta x_{1it-1}(a_i + \mu_{it})] = 0. \quad (3)$$

Another assumption is also considered, Δx_{1it-1} and a_i are not correlated. This premise remains if the form of the correlation does not change over time. Therefore, the GMM-Sys takes advantage of the same momentary conditions as

the GMM-Dif and adds others, increasing the efficiency and performance of the estimator [47; 52]. The GMM-Sys modeling occurs in two stages, which can generate underestimated standard errors. Thus, the study uses Windmeijer's correction for finite samples, ensuring that the two-stage results are more efficient and the standard errors are not biased [14; 53].

Data and variables

Companies were selected based on the European Classification of Economic Activities (NACE Rev. 2), focusing on firms engaged in exploration, support services, refining, and equipment manufacturing within the oil and gas sector. From the initial range of firms listed in the Refinitiv Eikon database, we retained the 50 largest companies based on total sales revenue, which together accounted for approximately 83% of the sector's revenue² – Appendix A. To ensure consistency across the panel, firms with missing values for any of the model variables in all years were excluded. The final dataset covers the period from 2006 to 2020.

To capture the influence of institutional investors on financial performance, we considered Tobin's Q (TQ) as the dependent variable – equation (4). This variable has been widely used to evaluate the performance of companies in the financial markets [26; 32; 43–45; 54–56].

$$TQ_{it} = \frac{EMV_{it}}{EBV_{it}}, \quad (4)$$

Where TQ_{it} is the ratio between the equity market value (EMV) and equity book value (EBV) of the company i in year t . Tobin's Q was scaled by the book value of equity to ensure comparability across firms.

We also considered the following control variables: company size, financial leverage, dividends, carbon emission, and the presence of institutional investors in the ownership structure of O&G companies (Table 1). Next, we explain these control variables and their expected relationship between these variables and TQ :

- **Average Sales (*Size*):** the sales (in logarithm) were used as a proxy for size [57]. The O&G industry comprises companies with high revenue generation capacity and a high degree of maturity, which tends to influence asset pricing. Also, the larger the size of the company, the greater its visibility [54]. Therefore, the expected relationship between TQ and *Size* is positive.
- **Debt (*Debt*):** financial leverage was analyzed by the debt-to-equity ratio [44]. On one hand, an increase in financial leverage may signal a larger future cash flow, which can positively influence a firm's valuation.

²The sample was based on companies operating in both upstream and downstream segments of the O&G sector. Specifically, 26 integrated companies – engaged in production, transportation, and refining – were selected; 8 crude oil producers focused on exploration, drilling, production, and supply of crude oil; 14 companies specialized in refining and marketing petroleum products; and 2 suppliers of equipment and services to oil fields and offshore platforms. Regarding ownership structure, the sample includes 15 international oil companies and 35 national oil companies. Geographically, the sample was composed of firms originating from a wide range of regions, including 16 companies from the United States and Canada, 18 from Asia (Russia included), 13 from Europe, 2 from Latin America, and 1 from Oceania.

On the other hand, a higher debt-to-equity ratio can restrict future cash flow due to amortizations and interest payments in the next period [26; 32; 56; 58]. Thus, the level of leverage is lagged by one period and the expected relationship between this variable and Tobin's Q is undefined.

- Dividends (*Dividends*): the payout of the company is analyzed by the total dividends paid during the fiscal year relative to net income³. O&G companies have a history of high distribution of dividends [59]. The payment of dividends contributes to the reduction of agency costs and can improve firm performance [60; 61]. We expect a positive relationship between *Dividends* and *TQ*.
- Carbon emission (CO_2): this variable is calculated as the ratio between a company's total CO_2 -equivalent emissions (in million tons) and its total assets. It includes both direct emissions from owned or controlled sources (e.g., combustion from plants, vehicles, and equipment) and indirect emissions from purchased energy (e.g., electricity), but excludes emissions from the broader value chain (e.g., suppliers and customers). To account for firm size and reduce scale-related bias, CO_2 emissions were normalized by total assets – a particularly relevant adjustment in the O&G industry, where carbon intensity varies substantially across firms. While environmental performance has become increasingly important for non-financial corporations, especially in carbon-intensive sectors, revenues in this industry remain closely tied to fossil

fuel activities. As such, the relationship between CO_2 and *TQ* is undefined [56].

- Environmental, Social, and Governance (ESG): is defined as a binary variable that equals 1 if the company's ESG score – calculated by Thomson Reuters⁴ – exceeds the average for the oil and gas industry, and 0 otherwise. This operationalization allows for the differentiation of firms within the same sector, capturing relative rather than absolute ESG performance. Several studies indicated that the higher the ESG performance, the higher the capability of the firm to attract investors [62–64]. The use of a dummy variable represents a simplified approach to capturing ESG performance. The expected relationship between *ESG* and *TQ* is positive.
- $QTobin_{t-1}$ (TQ_{t-1}): O&G companies are mature companies, with a good history of appreciation in the financial market. These characteristics lead to inertial behavior, or a temporal persistence regarding the value of these companies [47]. Consequently, the expected relationship between this variable and *TQ* is positive.
- Institutional Investors (*II*): this variable is obtained by the ratio between the number of voting shares (common shares – CS) held by institutional investors and the total number of common shares. The expected relationship is positive [26; 43].

We also considered dummies for years to isolate shocks that could impact the valuation of companies, such as changes in the oil price.

Table 1. Explanatory variables used in the model

Explanatory variable	Description	Definition	Expected signal
TQ_{t-1}	Financial Performance	Ratio between the equity market value and equity book value (lagged by one period)	(+)
Size	Size	Total sales, in logarithm.	(+)
Debt	Debt-to-Equity Ratio	Ratio between total debt (lagged by one period) and shareholders' equity.	(undefined)
Dividends	Dividends	Ratio between dividend distribution and net income, in logarithm.	(+)
CO_2	Environmental Performance	Ratio between carbon emissions (in millions of tons of CO_2 equivalent) and total assets.	(undefined)
ESG	Environmental, Social, and Governance	Dummy variable that takes 1 if the company's ESG score is above average in the O&G industry, and 0 otherwise.	(+)
II	Institutional Investors	Ratio between the number of common shares held by institutional investors and the total number of common shares.	(+)

³ It does not include share buybacks. This decision ensure consistency, given that dividends and buybacks, which are reported separately in the database and represent distinct mechanisms of shareholder remuneration potentially associated with different firm strategies and valuation implications.

⁴ The ESG score methodology, adopted by Thomson Reuters, comprises more than 400 individual measures, grouped into 10 categories, incorporating indicators related to environmental performance, workforce management, innovation capacity, shareholder relations, and other relevant dimensions [65].

Table 2. Descriptive statistics

Variable	Obs.	Average	Standard deviation	Minimum	Maximum
TQ	695	1.92	1.94	0.08	15.96
Size	726	24.29	1.33	18.43	26.89
Debt	720	59.65	57.16	0.00	700.76
Dividends	591	-0.98	1.00	-5.77	3.70
CO ₂	502	0.04	0.03	0.00	0.23
ESG	750	0.45	0.50	0.00	1.00
II	747	22.93	20.46	0.00	83.71

Note: TQ = Tobin's Q; Size = natural logarithm of total sales; Debt = debt-to-equity ratio; Dividends = ratio between dividend distribution and net income, in logarithm; CO₂: the ratio between carbon emissions (in millions of tons of CO₂ equivalent) and total assets; ESG = dummy variable that takes 1 if the company's ESG score is above average in the O&G industry, and 0 otherwise; II = the ratio between the number of common shares held by institutional investors and the total number of common shares.

The variables TQ_{t-1} and II were treated as endogenous, whereas the other variables were considered exogenous. To deal with this issue, the estimators were adapted to instrumental variables. Using lags of the original regressors as instrumental variables contributes to minimizing dynamic endogeneity. This problem occurs due to the feedback effects of the response variable for the regressors, that is, shocks that affect the dependent variable and will possibly affect the independent variables in subsequent periods [47]. The variables "Carbon emission (CO₂)" and "Dummies for years" were also incorporated as instrumental variables. According to the literature, the participation of institutional investors tends to reduce the carbon emissions of companies [66]. Therefore, environmental performance is correlated with the endogenous variable.

Results

Table 2 presents the descriptive statistics of the variables. The mean Tobin's Q (TQ) was 1.92, with a minimum of 0.08 and a maximum of 15.96, indicating high dispersion among the O&G companies of the sample. The mean sales ($Size$), in logarithm, was 24.29. This value was expected since the sample is characterized by the presence of large companies. The average financial leverage was around 60%, whereas the mean ratio between dividends and net income (in logarithm) was -0.98.

In addition, for every US\$ 1 billion in total assets, the set of companies emits, on average, 400,000 tons of CO₂. The maximum was recorded by Formosa Petrochemical in 2015, reaching 2.3 million tons of CO₂ equivalent for every billion dollars of total assets. The ESG dummy mean was 0.45 – considering 750 observations, 336 were above average.

The average participation of institutional investors in the ownership structure of the sample companies was 22.93%,

ranging from zero to 86.71%. The literature shows that the shareholding control of institutional investors varies according to the selection of companies and the definition used for their classification. For example, focusing on the US market, Bebchuk and Hirst [67] estimated that, for S&P 500 companies, the "Big Three" (BlackRock, Vanguard, and State Street) "collectively held a median of 27.6% of votes cast at annual meetings" at the end of 2021. For Indian firms, Panda [68] verified institutional investor participation of 21%. In addition, Al-Sartawi and Sanad [69] and Musallam et al. [70] verified participation of around 50% among Bahraini and Indonesian companies, respectively.

Appendix B shows the set of descriptive statistics and the distribution of the variables by year. We note a decrease in the maximum point reached by companies in Tobin's Q and a higher average indebtedness during 2015 and 2016 when the international oil price dropped sharply. The data also shows an increasing participation of institutional investors (median), as verified by previous studies [9; 13]. In addition, the ESG dummy shows an inflection point between 2014 and 2015. Whereas, in 2006, only 12 companies were above the mean ESG score, in 2020, this number reached 31 companies that showed an improvement in ESG performance in this period.

Table 3 shows the correlation matrix between the variables. Contrary to expectations, we observe a negative and significant correlation between Tobin's Q and company size ($Size$). In addition, carbon emission (CO₂) registered a positive and significant correlation with financial performance. Whereas carbon emissions showed a negative and significant correlation with the ownership of these investors, the ESG metric showed a positive and significant correlation. These findings point out the importance of environmental performance and corporate governance for institutional investors. As indicated by previous studies,

Table 3. Correlation matrix

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) TQ	1.000						
(2) II	0.032 (0.393)	1.000					
(3) Size	-0.240* (0.000)	0.087* (0.019)	1.000				
(4) Debt	0.074 (0.050)	-0.086* (0.021)	-0.040 (0.282)	1.000			
(5) Dividends	-0.026 (0.532)	-0.105* (0.011)	0.080 (0.053)	0.043 (0.301)	1.000		
(6) CO ₂	0.199* (0.000)	-0.128* (0.004)	0.011 (0.809)	0.000 (1.000)	0.031 (0.523)	1.000	
(7) ESG	-0.055 (0.144)	0.195* (0.000)	0.323* (0.000)	-0.015 (0.692)	0.238* (0.000)	-0.146* (0.001)	1.000

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

institutional investors are in the process of changing their portfolio allocation to reduce their exposure to carbon-intensive assets [71; 72], seeking to mobilize resources under the aegis of ESG. In 2021, BlackRock, a preeminent capital management corporation, stated that ESG has become a critical factor in company valuation [73].

Table 4 presents the results of the first and second stages of model estimation, showing the estimated coefficients, standard deviations (in parentheses), and significance level (represented by asterisks). For all coefficients, we used the correction of standard errors proposed by Windmeijer for finite samples, orthogonal deviations, and corrections for small samples.

The results indicate a robust fit of the model to the data. In the Hansen test of overidentifying restrictions, we do not reject the null hypothesis, which attests to the suitability of the instruments. The Arellano and Bond [48] autocorrelation tests found a first-order negative autocorrelation in the idiosyncratic errors of the first difference, but not of the second. Thus, the hypothesis that μ_{it} is not autocorrelated is corroborated.

The two-stage estimator is more efficient but biased. However, with Windmeijer's correction, the two-stage specification becomes asymptotically more efficient and unbiased [53]. Therefore, the interpretation of the model will focus on the results from the second stage.

The results indicate that Tobin's Q lag in a certain period is statistically significant and positively correlated with its

current value, which confirms the hypothesis of the inertial behavior of the variables, in line with the theoretical assumption [47].

The analysis reveals that the dividend variable has a positive and statistically significant effect on financial performance, consistent with the empirical evidence reported by Bossman et al. [74] and Farrukh et al. [75]. This finding aligns with agency cost theory, which posits that dividend payments serve as a governance mechanism to mitigate conflicts of interest between managers and shareholders. As Easterbrook [76] notes, higher dividend payouts reduce the free cash flow under managerial discretion, compelling firms to raise external financing and thereby subjecting managerial decisions to greater investor scrutiny. Such monitoring fosters transparency, accountability, and alignment of managerial incentives with shareholder interests, while promoting disciplined investment and more efficient capital allocation – factors that collectively improve firm performance [76; 77].

The strength of this relationship may also reflect the maturity of many O&G companies, which often operate with stable cash flows and limited high-return reinvestment opportunities, making dividends a preferred means of returning value to shareholders. Regular dividend payments can also signal financial stability and management's confidence in future earnings, reinforcing investor trust and supporting firm valuation. In the O&G sector – characterized by high capital intensity, cyclical commodity prices, and sub-

stantial cash generation during upturns – dividends may be perceived both as a commitment to shareholder returns and as a hedge against market volatility, further strengthening their positive association with financial performance.

A positive relationship between carbon emissions and Tobin's Q is also observed. This outcome reflects the prevailing cash flow structure in O&G companies, which remains heavily reliant on carbon-intensive activities that continue to deliver strong market returns despite their environmental costs. During the 2010s, institutional investors maintained substantial positions in such assets, while O&G firms began repositioning themselves as broader energy providers, a strategy that helped sustain their market valuations during the ongoing energy transition [78; 79].

This positive association may reflect a short-term effect, whereby immediate cash flows from carbon-intensive operations continue to drive firm valuation during this transitional period [80]. However, as global pressure for carbon neutrality intensifies and green investments gain traction, O&G companies have increasingly diversified into renewables, biofuels, and electricity distribution, while expanding R&D efforts to align with evolving market expectations – even though ESG scores have not yet shown a significant impact on firm performance [81].

Institutional investors are also adapting, as they recognize the potential to align environmental sustainability with financial performance. As a result, they are gradually redirecting capital toward climate-aligned strategies and reshaping market perceptions around the valuation of carbon-intensive assets [81–83]. Supporting this trend, Machado et al. [79] found that firms with higher levels of environmental innovation increasingly attract institutional investments.

In addition, results indicate that institutional investors' presence in the ownership structure positively impacts the financial performance of O&G companies. These agents not only provide capital but also actively engage in monitoring and advising firms, encouraging the adoption of practices that enhance long-term value [35; 36]. This influence can be particularly relevant in industries characterized by capital intensity and exposure to commodity cycles, where investor pressure can drive firms toward operational efficiencies, lower litigation and crash risks, and sustainable innovation pathways [37; 44]. Moreover, institutional investors can act as certification mechanisms that signal firm quality to the market, enhancing valuation beyond direct monitoring effects [29].

Finally, size, debt, and ESG show no significant influence on financial performance. The absence of a size effect is likely due to the homogeneity of the sample, which comprises only the largest companies in the O&G industry, thereby limiting variation in this dimension. As for debt, although the coefficient is not statistically significant, the relatively high standard deviation suggests a polarized distribution: while some firms operate with little or no debt, others are highly leveraged. This divergence may neutral-

Table 4. GMM-Sys estimation results

	1st stage		2nd stage	
TQ_{t-1}	0.805	***	0.806	***
	(0.099)		–117	
Size	–0.111		0.035	
	(0.390)		(0.270)	
Debt	1.211	*	0.634	
	(0.715)		(0.552)	
Dividends	0.509	***	0.375	***
	(0.180)		(0.143)	
CO₂	3.240	**	2.850	*
	–1.582		–1.500	
ESG	–0.108		–0.058	
	(0.383)		(0.400)	
II	1.945	***	1.533	**
	(0.682)		–0.786	
Dummies of Year	YES		YES	
Number of obs.	394		394	
No. of groups	45		45	
No. of instruments	44		44	
AR(1)	–2.50		–2.12	
p-value	0.013		0.034	
AR(2)	–1.13		–0.99	
p-value	0.258		0.322	
Hansen	18.05		18.05	
p-value	0.755		0.755	

Notes: i) *** p < 0.01, ** p < 0.05, * p < 0.1; ii) The 'YES' indicates that year dummies were incorporated into the model (their coefficients were not presented due to a space constraint); iii) For the Hansen, AR (1), and AR (2) tests, we highlighted the statistics and just below the p-value.

ize the average effect, indicating that the impact of debt depends on firm-specific factors such as capital structure, risk tolerance, and financial strategy. With respect to the ESG variable, the lack of statistical significance may reflect both the characteristics of current practices in the O&G industry and limitations of the available data. While ESG performance has gained visibility among investors, many sustainability initiatives in this sector remain in their early

stages, potentially delaying their impact on market valuation. In addition, the use of an industry-relative dummy simplifies ESG measurement and may not capture variations in specific environmental, social, or governance dimensions that could influence firm performance more directly – an analysis that would require a dedicated focus on this dimension.

Conclusions

Several studies have investigated the influence of institutional ownership on corporate strategies. While some emphasize the positive role of institutional investors in monitoring and improving firm value, other suggest these agents may exert short-term pressure on managerial decision-making. This study contributes to this debate by evaluating the impact of institutional investor ownership on firm performance in the O&G industry – one of the most strategic sectors of the global economy which is currently under financial and environmental pressure.

Based on a panel of the 50 largest O&G companies and using the GMM-Sys, our findings indicate that institutional ownership has a positive and significant influence on financial performance. These results are consistent with prior evidence that highlights the beneficial role institutional investors can play in enhancing governance and aligning corporate strategies with shareholder interests.

The results confirm the relevance of institutional investors in capital markets and, in particular, in the O&G sector. As major capital holders and significant shareholders, they can influence both governance practices and long-term strategies, including those related to the energy transition. This underscores the need for regulatory approaches that address not only corporate practices but also the incentives and monitoring capacity of these investors. In a sector facing substantial sustainability challenges, their engagement can accelerate the adoption of sustainable practices and support low-carbon transitions.

Our results reveal that carbon emissions and dividend payments continue to exert strong influence on firm performance, suggesting that short-term financial metrics remain central to valuation in the sector. This coexistence points to a transitional moment: while institutional investors appear to support value-enhancing strategies, firms still rely on carbon-intensive activities and short-term shareholder rewards, reflecting the ongoing tension between legacy business models and the imperative of long-term transformation.

These insights are particularly relevant for investors, executives, and policymakers seeking to understand the drivers of performance in carbon-intensive industries. They reinforce previous literature that suggests that institutional investors can play a positive role in improving corporate long-term performance and implies that these investors may serve as catalysts for change, with the potential to guide companies through the challenges of the energy transition – provided they adopt long-term, sustainability-oriented approaches.

Nonetheless, this study has limitations. A key constraint is the treatment of institutional investors as a homogeneous group, despite the diversity of their objectives, time horizons, and levels of engagement. This simplification may overlook important nuances in how different types of investors influence firm behavior. Future research should explore these dynamics by distinguishing between pressure-sensitive and pressure-resistant investors, as well as examining the role of investment tenure in shaping firm strategies.

In addition, further research should explore the interaction between institutional ownership, ESG performance, and financial outcomes, particularly in industries undergoing structural transformation. Future studies could also break down ESG performance into its individual pillars – Environmental, Social, and Governance – to generate deeper insights. Additionally, examining the role of long-term-oriented institutional investors in aligning environmental objectives with financial performance represents a promising avenue for research. These investors may contribute to risk reduction and foster innovation, supporting the alignment of sustainability goals with financial outcomes, an area of increasing relevance amid the global transition toward decarbonization.

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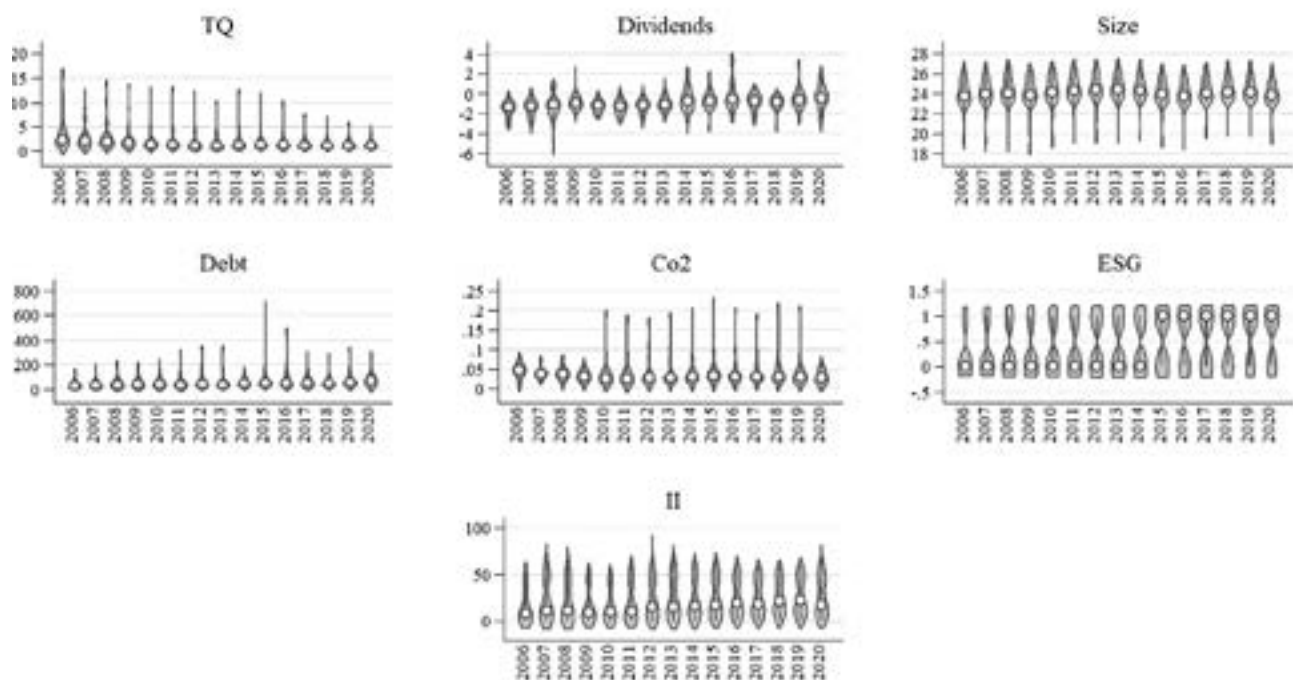
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Appendix A. Selected companies of the study

- 1 AMPOL (CALTEX AUSTRALIA LIMITED)
- 2 BHARAT PETROLEUM CORPORATION LIMITED
- 3 BP PLC
- 4 CANADIAN NATURAL RESOURCES LIMITED
- 5 CENOVUS ENERGY INC.
- 6 CHEVRON CORPORATION
- 7 CHINA PETROLEUM & CHEMICAL CORPORATION
- 8 CNOOC LIMITED
- 9 CONOCOPHILLIPS
- 10 COSMO ENERGY HOLDINGS CO., LTD.
- 11 EMPRESA COLOMBIANA DE PETROLEOS - ECOPETROL S.A.
- 12 ENEOS (JXTG HOLDINGS, INC.)
- 13 ENI S.P.A.
- 14 EOG RESOURCES INC
- 15 EQUINOR ASA
- 16 ESSO SA
- 17 EXXON MOBIL CORP
- 18 FORMOSA PETROCHEMICAL CORPORATION
- 19 GALP ENERGIA, S.G.P.S., S.A.
- 20 HALLIBURTON CO
- 21 HINDUSTAN PETROLEUM CORPORATION LIMITED
- 22 HOLLYFRONTIER CORPORATION
- 23 HUSKY ENERGY INC.
- 24 IDEMITSU KOSAN CO., LTD.
- 25 IMPERIAL OIL LIMITED
- 26 KUNLUN ENERGY COMPANY LIMITED
- 27 MARATHON PETROLEUM CORPORATION
- 28 MOL MAGYAR OLAJ-ES GAZIPARI RT.
- 29 NATIONAL COMPANY KAZMUNAYGAZ JSC
- 30 NESTE OYJ
- 31 OCCIDENTAL PETROLEUM CORPORATION
- 32 OIL & NATURAL GAS CORPORATION LIMITED
- 33 OMV AKTIENGESELLSCHAFT
- 34 PBF ENERGY INC.
- 35 PETROCHINA COMPANY LIMITED
- 36 PETROBRAS
- 37 PHILLIPS 66
- 38 PJSC SURGUTNEFTEGAS
- 39 POLSKI KONCERN NAFTOWY ORLEN SA.
- 40 PTT PUBLIC COMPANY LIMITED
- 41 PUBLIC JOINT STOCK COMPANY GAZPROM NEFT
- 42 PUBLIC JOINT STOCK COMPANY OIL COMPANY LUKOIL
- 43 PUBLICHNOE AKTSIONERNOE OBSHESTVO NEFTYANAYA KOMPANIYA ROSNEFT
- 44 REPSOL S.A.
- 45 ROYAL DUTCH SHELL PLC
- 46 SCHLUMBERGER N.V.
- 47 SUNCOR ENERGY INC.
- 48 TOTAL S.A.
- 49 TURKIYE PETROL RAFINERILERI A.S.
- 50 VALERO ENERGY CORP

Appendix B

Figure 1. Descriptive statistics and distribution graph of the variable



Note: Each graph contains the median (point) and the interquartile range (vertical bar in the center). TQ = Tobin's Q; Size = natural logarithm of total sales; Debt = debt to equity ratio; Dividends = ratio between dividend distribution and net income, in logarithm; CO₂: the ratio between carbon emissions (in millions of tons of CO₂ equivalent) and total assets; ESG = dummy variable that takes on a value of 1 if the company's ESG score is above average in the O&G industry, and 0 otherwise; II = the ratio between the number of common shares held by institutional investors and the total number of common shares.

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