

MASTER THESIS U.S.E. USEMT – BF

Institutional ownership, Firm Performance & ESG Scores

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Abstract

This paper seeks to identify the effect of institutional ownership on firm performance. Building on existing literature, this paper studies if similar results can be seen in the context of seventeen European Nations and specifically, firms in the STOXX Europe 600 for the last ten years. This paper further attempts to fill a gap in the literature by also studying the effect of Institutional ownership on firm ESG ratings. Two major test variables are studied: 'Number of institutional investors' and 'Proportion of institutional ownership'. Several control variables are also included in the analysis to ensure overall robustness of the model. A panel data approach is utilized for firms that have been present over the entire sample period and positive significant results are found for 'number of institutional investors' with respect to firm ESG scores. Any further understanding of the effect of institutional ownership is relevant to stakeholders in financial markets and also has implications on corporate governance.

JEL classification: C33, G23, G300

Keywords: Institutional Investors, Corporate Governance, Panel data

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1. Introduction

This paper aims to discuss the effect of institutional ownership on firm corporate governance, with a focus on firm performance as well as its potential effect on firm ESG considerations. This is done to understand the role institutional investors play in monitoring and influencing management decisions, and by extension, the ability to create a reduction in agency conflicts between the firm's management and its shareholders. As institutional investors are increasingly playing an important governance role in firms around the world, this paper seeks to explore in more depth the areas in which these investors may focus their attention. In this case, we further seek to contribute to the literature by examining the potential effect on ESG considerations in the context of European firms. This paper also seeks to show that institutional ownership affects ESG scores both directly and indirectly. Furthermore, the transmission mechanism between institutional ownership and firm performance is a key focus area to policy makers, investment managers and investors. Studying this topic enables the identification of the key factors responsible for this value-enhancing mechanism.

Institutional ownership of US listed companies nearly doubled from 1980 to 2010 (Blume & Keim, 2014), which has resulted in an increasing level of interest being focused on the influence that these institutional investors have on firms, and specifically, on corporate governance. Institutional ownership in China has also increased substantially from 3.04% in 2004 to 32.65% in 2014 (Lin & Fu, 2017). This shows that there is a trend towards high institutional ownership in several developed and emerging markets. However, while there has been a large amount of focus on US listed firms, literature on the effect of institutional ownership holds true for Europe, and with the STOXX600 being among the largest world indices by market capitalization, the potential impact of institutional ownership on its constituents could be of significant value for investors, regulators, and other market participants in general. This paper seeks to further add to the literature by studying this.

Ferreira & Matos (2008) explain that large institutions have the ability and means to conduct increased monitoring of firm management from within. Several methods have been described in the literature, ranging from threatening the sale of shares to the utilization of corporate voting rights. Several studies describe that large institutional ownership directly reduces agency costs and therefore increases firm performance (Cornett et al., 2007; Ferreira & Matos, 2008; Jiang & Liu, 2014). Therefore, there may be a direct link between the effect of institutional ownership and firm performance. Thus, to a large extent, the level of institutional

ownership as well as the number of institutional investors can have an influence on the management of the organization and by extension, influence shareholder value.

Regarding the effect of institutional ownership on ESG considerations, any conclusions may have a significant impact on the way firm's are analyzed. There has been a clear trend in the industry toward incorporating a firms ESG ratings for investment as well as valuation purposes. Therefore, if there is a positive effect of institutional ownership on ESG ratings, there could be a further feedback loop that makes firms with better ESG ratings more attractive to potential investors. This may then improve firm performance further. Velte (2020) details that the positive relationship between institutional owners and ESG performance is due to the moderating and mediating influence of the institutional shareholders.

The paper is further organized as follows: **Section 2** will delve into the previous literature surrounding institutional ownership involvement in firms' internal corporate governance and by extension, its effect on firm performance. Literature on the potential effect on ESG considerations is also discussed as this is a key focus area for researchers and market participants going forward as well as a key research question for this study. **Section 3** includes the hypotheses section which provides an overview of the expected results based on the theoretical and empirical framework. This section includes the variables utilized (both test and control variables) as well as their respective proxies (and supporting literature). This is followed by **section 4**, data & methods in which the data sources, overview of descriptive statistics as well as the empirical models are explained. The results of the empirical tests will be displayed and elaborated on in **section 5** and any similarities or deviations with current literature will also be discussed here. **Section 6** includes the concluding remarks of the paper and lastly, **section 7** ends with the limitations of the study.

2. Literature Review

2.1. Institutional Investors and Firm Performance

According to the literature surrounding this topic discussed by Lin & Fu (2017); Liu (2014); Jiang & Liu (2014); Ferreira & Matos (2008); Cornett et al. (2007) as well as Healy et al. (1992), institutional investors (who are in many cases large shareholders) are able to supervise and monitor the firms they invest in to reduce information asymmetry, reduce agency issues, and consequently maximize shareholder value. These investors can do so by utilizing 'active measures' by using their ownership rights to improve corporate governance and to ensure that the goal of creating shareholder value is prioritized. Alternatively, institutional investors can engage in 'passive monitoring' whereby they do not intervene in management, but rather trade shares to earn speculative short-term profits from informational advantages (Lin & Fu, 2017). However, we need to first look at the empirical evidence regarding the effect of (high) institutional ownership on firm performance as well as ESG ratings.

Cornett et al. (2007) studied the effects of institutional ownership on firm performance for large firms within the S&P100 from 1993 to 2000 and found a significant and positive relationship between several variables proxying for institutional involvement and the firms operating performance. The study utilized **proportion of institutional ownership**, number of institutional investors, proportion of the board size being institutional investors as well as several control variables to account for firms' internal corporate governance processes. The study reported a positive significant relationship between the **number of institutional investors** and firm performance. Moreover, the results indicate that this has more than twice the impact on ROA than the proportion of institutional ownership. In contrast, the study finds an insignificant relationship between the proportion of institutional investors on the board and firm performance and proposes that this is due to the scarcity of institutional investors who sit on the board of directors. Other studies find similar results and so this variable is excluded.

However, Jiang & Liu (2014) showed insignificant results for proportion of institutional ownership but significant positive results for board independence. Furthermore, Jiang & Liu (2014) found that the presence of institutional investors on the board resulted in positive stock returns in the long run. However, this was for instances where institutional board members were present. In practice, this is a relatively rare occurrence. The results of the study propose that institutional board members lead to an increase in managerial entrenchment and subsequently an alignment with long term shareholder interests. It was found that the higher levels of entrenchment of directors resulted in reduced risk-taking, significantly lower levels

in research and development, lower financial leverage as well as an increase in payouts. Thereby creating more shareholder value. Jiang & Liu (2014) further discussed that by sitting on boards, institutional investors gain access to internal corporate governance, and can therefore have an impact on corporate decision making. The study found that there is a positive relationship between the presence of institutional directors on the board and the concentration of institutional shareholdings in a firm.

Ferreira & Matos (2008) conducted a study on the effect of institutional ownership on firms in 27 countries. This has been one of the most comprehensive studies conducted to date and claims that the sample size encompasses nearly 40% of the world's market capitalization. The study finds that firms with higher institutional ownership are associated with higher firm valuations and better operating performance. The study made use of several measures of firm performance including return on assets (ROA) and net profit margin (NPM). Both measures result in positive significant results implying that institutional investors are effective at monitoring corporate managers. Furthermore, in accordance with the findings from Cornett et al. (2007), there is also a negative association between institutional ownership and capital expenditures. This creates further empirical evidence that institutional ownership mitigates management's tendency to overinvest by undertaking negative NPV (net present value) projects to extract private benefits. This is supported by the theoretical framework surrounding agency conflicts.

To further study the effect of institutional ownership, there should be a consensus of the literature outside the US and Europe as well. Lin & Fu (2017) conducted a study in the context of the Chinese stock market and found results consistent with the studies conducted on US firms. The study was conducted on Chinese listed firms between 2004 and 2014 with a focus on the channels by which institutional investors influence firm performance. The study obtained results consistent with analysis conducted in developed nations such as the US. That is, the results showed that institutional ownership is positively related to firm performance and that this is attributable to the 'active monitoring' effects of institutional ownership. The study further finds that shareholder value is enhanced by attracting analysts. This result is also supported by other literature conducted in China. Yuan et al. (2007) analyzed the impact of institutional ownership (specifically mutual funds) on firm performance between 2001 and 2005 including 1211 firms and found a positive relationship. The study aimed to show that it is mainly pressure insensitive institutional investors that result in improved firm performance.

Chan et al. (2014) conducted a study with a focus on examining the role of mutual funds on firm financial reporting quality in China. The study contained 8231 firm year observations between 2003 and 2008 and concluded that these institutional investors played an integral part in the external governance mechanism and by extension, had an impact on firm performance. The main argument proposed is that these pressure insensitive institutional investors are more capable of persuading the management of the firm against decisions that could reduce firm value or expropriate investor wealth. The paper also highlights that they are able to discipline management when they do take such decisions, and this is in the form of the active measures described earlier. This provides further support to the notion that institutional ownership (at least in some forms) provides the ability to influence firm performance in a positive manner. This is consistent with the literature of US firms as well as developing nations.

2.2. Institutional Investors and firm ESG scores

ESG can be classified as 'a firm's configuration of principles of environmental, social and governance (ESG) responsibility; processes of ESG responsiveness; and politics, programs, and observable outcomes as they relate to the firms' societal relationships' (Velte, 2020). Existing theory remains inconclusive on the effect of CSR on firm value and financial performance (Friede & Bassen, 2015). However, with the substantial literature showing positive results on the effect of institutional ownership on firm performance, it is then also possible that institutional ownership influences firm ESG considerations which may then impact firm performance further.

Martínez & Lozano (2021) studied the effect of differing levels of institutional ownership on environmental, social, and governance (ESG) performance in emerging markets (EM). The study consisting of 17318 firm year observations across sixteen countries concluded that firms with low levels of institutional ownership are less likely to promote ESG performance. This implies a positive association between higher levels of institutional ownership and ESG performance. The study also notes that this positive relationship is only evident after the proportion of institutional ownership exceeds 43%, constituting a critical mass. Buchanan et al. (2018) studied the effect of institutional ownership and corporate, social and governance (CSR) on firm value during the 2008 financial crisis. The study showed that higher levels of institutional ownership significantly affects the relation between CSR practices and firm value and that this relationship was positive during the crisis. The study implied that

higher institutional ownership plays a major monitoring role to enhance firm value, especially in times of financial crisis when agency problems are exacerbated.

Velte (2020) conducted further empirical analysis on the effect of institutional ownership on ESG performance and disclosures. The study found that long-term institutional ownership leads to improved ESG performance. The study also details that improved ESG performance promotes a higher ratio of institutional owners.

Furthermore, in a SASB symposium, senior leaders of some of the largest institutional investors such as Blackrock, Ca LPERS, Ca LSTRS and Wells Fargo emphasized the relevance of ESG data for their investments and its incorporation into their investment strategies (Ailman et al. 2017). This further emphasises that ESG is high up on the list of institutional investors priorities. This also implies that they will be willing to use their ownership rights to steer corporate governance to more ESG friendly strategies and thus improving the firms ESG ratings. It should also be noted that ESG considerations are likely to be highly valued by mainstream investors as they provide the ability to shed light on the future idiosyncratic risks not usually captured by traditional risk factors. Therefore, it is prudent for institutional investors to prioritize a pro ESG agenda (with their ownership power) if this aligns with their investment strategy. This provides a large incentive for institutional investors to improve the ESG scores (from within) for firms in which they have a large ownership stake.

3. Hypotheses

3.1. Overview

The literature details two main arguments regarding the role of institutional investors on firm performance and ESG scores. Firstly, institutional investors conduct extensive research to identify efficient firms to invest in, therefore allocating capital to the most efficient firms (Yuan et al., 2007). Secondly, institutional investors provide large financial incentives for the monitoring of internal corporate governance. This in turn leads to greater managerial efficiency and therefore improved managerial decision making. Specifically, decision-making that aims to improve shareholder value. This being in the form of higher firm performance as well as the recently studied phenomenon of higher ESG scores which can result in better valuations and subsequently higher investor demand for the firms shares. This then causes a positive effect on the firm's share price and creates value for the institutional investors. Jiang & Liu (2014) detail that institutional investors can combine their knowledge and expertise with internal information gained through the board seats to provide a higher level of advice and monitoring which should improve performance and shareholder value. Moreover, the institutional investors who have significant shareholdings in the firm have a large incentive to improve firm performance as when this occurs, the institutional investors stand to profit from significant improvement in their portfolio value.

The results are expected to be in line with relevant related literature discussed earlier and further summarized below. The following hypotheses are expected for the coefficient of each main explanatory variable (excluding control variables as the economic theory behind these are already established and their aim is to provide robustness to the model by improving the explanatory power of the main test variables):

H1: Institutional ownership improves firm performance

Therefore, the two test variables 'Proportion of institutional ownership' and 'Number of institutional investors' are expected to have a positive relationship with firm performance, ceteris paribus. Therefore, a positive coefficient is expected for both test variables.

H2: Institutional ownership improves firm ESG Scores

As with hypothesis 1, the two test variables 'Proportion of institutional ownership' and 'Number of institutional investors' are expected to have a positive relationship with firm ESG scores, ceteris paribus. Therefore, a positive coefficient is expected for both test variables.

For the coefficients on the control variables, the expected results are consistent with those discussed in the literature review. This is in line with the economic theory as well as the empirical evidence supporting the findings.

3.2. Variables and proxies

3.2.1. Dependent Variables Firm Performance

For firm performance, Cornett et al. (2007) and Healy et al. (1992) used the *operating cash flow return on assets* (i.e., earnings before interest and taxes and adding depreciation as a ratio over total assets) with success. Both studies detailed that this measure of cash flow ROA (return on assets) is superior to the otherwise used Tobin's q. Justifications in these studies as well as Ferreira & Matos (2008) discuss that Tobin's q reflects the expectations of the firm's prospects in future years through the market value, whilst the cash flow ROA is a superior proxy for firm performance due to its focus on current performance. This justification follows for this paper as we are concerned with the level of institutional ownership on current firm performance. Tobin's q may also be more susceptible to endogeneity issues if institutional investors are chasing growth stocks or recent market winners (Yuan et al., 2007).

ESG Scores

Pagano (2018) details the importance of ESG scores to be able to incorporate elements of ethical behavior and integrity in business, managerial as well as investment decisions. With investment managers such as NN investment partners using proprietary ESG scores as an input for investment decision making, the ESG rating system used in empirical studies is highly relevant for the results and therefore the explanatory power. This paper makes use of Eikon Refinitiv's ESG composite scores as well as the three sub pillars, namely: Environmental, social and governance factors. The multi-pronged metric considers: Environment, Social Capital, Leadership & Governance, human Capital, business Model & Innovation scores (amongst others) and creates a composite metric meant to provide a comparative ESG score.

3.2.2. Test Variables: Measures of Institutional ownership Number of institutional investors

In accordance with the papers by Lin & Fu (2017); Liu (2014); Jiang & Liu (2014); Ferreira & Matos (2008); Cornett et al. (2007) as well as Healy et al. (1992), the number of institutional investors is a major determinant of the measure of institutional ownership. Therefore, the **number of institutional investors** is added to the model as it may have potential influence on the way the firm is governed from within. The coefficient is expected to be positive.

Proportion of Institutional ownership & Institutional Board members

Based on the substantial literature discussed in previous sections related to these explanatory variables, it is prudent to examine the effect of the **proportion of institutional ownership** on firm performance, specifically in the context of firms in the STOXX600. Again, a positive coefficient is expected.

3.2.3. Control Variables

The primary focus of this paper is to determine the effects of institutional ownership on firm performance and firm ESG ratings. Therefore, the internal corporate governance mechanisms as well as the industry, country, and other firm specific effects that each firm exhibit needs to be controlled for.

Executive stock ownership

In accordance with the 'convergence of interest' hypothesis, as the executive ownership of the firm's equity increases, managers should have more incentive to maximize shareholder value (Yuan et al., 2007). Chan et al. (2014) further details that by management having a higher level of ownership, it helps facilitate the 'entrenchment effect' as well as the 'incentive alignment effect'. Hartzell & Starks (2003) also finds that the pay-for-performance characteristic in some firms is positively related to high institutional ownership and the positive effects are exacerbated when compensation is in the firm of stock options. Therefore, if the level of ownership of the firm by management can affect firm performance, it is necessary to include as a control variable. Further studies such as Cornett et al., (2007); Ferreira & Matos (2008); Jiang & Liu (2014); and Lin & Fu (2017) utilize this as a control variable in their studies. A positive coefficient is expected to be seen in the results.

Proportion of independent directors

Cornett et al. (2007) reports significant and positive results between the proportion of independent board members and firm performance. An increase of one independent director on the board is associated with an increase in. ROA by 0.88% The study proposes that this is due to the reduction in agency conflicts by aligning the interests of shareholders and directors. This is also consistent with economic theory surrounding agency problems. Jiang & Liu (2014) also find similar results as the number (and hence proportion) of independent directors increase. A positive coefficient is therefore expected.

CEO Tenure

Cornett et al. (2007) further suggests that CEOs with little experience have lower effectiveness in creating shareholder value due to the longer time horizons to obtain an adequate understanding of the company. The paper further details that the longer the tenure of the firm's CEO tenure, the greater the understanding of the firm and industry and therefore resulting in improved performance. Peni (2014), in a sample of S&P 500 firms, studied CEO characteristics and found a positive association between CEO tenure (often associated with higher levels of experience) and firm performance. This being in the form of higher market valuation and financial performance. Huang & Hilary (2018) finds that CEO tenure improves firm performance due to higher on-the-job learning. However, the study finds this up to a certain point. Thereafter, firm performance suffers due to entrenchment effects. Irrespective of the direction in which a CEO's tenure affects firm performance, it is prudent to add as a control variable to improve the robustness of the model specification. This study expects a positive coefficient.

Board size

Guest (2009) examined the effect of board size on 2746 UK firms between 1981 and 2002 and found that board size has a significant negative impact on firm profitability. The study also details that the negative effect is more prominent for large firms as they often have the largest board size. The theoretical framework details that this is due to poor communication associated with larger boards as well as issues with decision-making due to many differing opinions. Larmou & Vafeas (2010) also find that smaller board sizes are associated with higher firm value and that reductions in board size are positively associated with annual stock returns. Cornett et al. (2007) also details several studies including Yermack (1996) that find negative relationships between board size and firms operating performance. This measure is therefore added as a control variable and a negative coefficient is expected.

Firm Leverage

The effect of overall leverage on firm performance has received widespread focus in empirical research. The economic theory as well as empirical evidence suggest that leverage may affect a firm's performance in different directions by increasing the interest burden (thus impacting the firms cash flows), magnifying the firm's operating risk as well as providing tax shields (Yuan et al., 2007). Further studies such as Ibhagui & Olokoyo (2018) show that there is a negative relationship between leverage and firm performance. Although the study finds that the magnitude of this negative relationship decreases as the firm size increases (i.e., the effect of leverage is most prominent in small-sized firms), the described threshold effects of size when discussing the effect of leverage on firm performance implies the existence of non-linearities between leverage and firm size. To account for the effect of size on firm performance, it is added as a separate control variable in this paper. This paper uses the leverage ratio (defined as total debt over total assets) as the proxy and a negative coefficient is expected.

Firm size

Although not a corporate governance measure, it is associated with performance in many studies. As mentioned in the section on firm leverage, Ibhagui & Olokoyo (2018) discussed that firm size provides some explanation for the sometimes-ambiguous relationship between leverage and firm performance. Therefore, for this reason (amongst others), the contingent role of firm size in determining the relationship between leverage and firm performance must be controlled for. Additionally, Yuan et al. (2007) describes that firm size may have a negative impact on firm performance as larger firms generally suffer from more agency problems. Consistent with the literature, firm size is expected to be negatively related to firm performance. The concern is what measure of firm size to use in the model specification. Dang et al. (2018) studied the measurement effect of using a basket of different measures of firm size and found varying results based on what measure of size was used. The study showed that different proxies for size capture different aspects of 'firm size'. Furthermore, the paper provides guidelines for what measure to use in different contexts. Following the stipulated guidelines, the most appropriate proxies for size in the context of firm performance are either enterprise value or total assets. This paper utilizes the total assets (denominated in euros) of the firm as a proxy for firm size. A negative coefficient is expected for firm performance and a positive coefficient is expected for ESG scores due to the increased pressure on large firms to meet global ESG standards.

Fama/French 3 factor control variables

Due to firm specific characteristics as well as industry and country effects, this paper uses the Fama-French 3 factor control variables for developed markets (excluding US). This considers any effect on firm performance that is associated with SMB (Small minus Big); HML (high minus low) and the market risk premium inherent in each firm's respective financial system. The Fama-french 3 and 5 factor control variables are widely used in empirical research. The relevance is detailed in Fama (1993).

4. Data and methodology

4.1. Data

This study examines the effect of institutional ownership on firm performance and ESG ratings for firms that have continuously remained in the STOXX Europe 600 from 2012 to 2021. Due to some variables being lagged, 2011 data is also considered. This criterion provides a sample of 285 unique companies which provides a strongly balanced dataset. The major reasoning behind choosing the STOXX 600 index is twofold: Firstly, literature for this topic in Europe is relatively scarce when compared to US counterparts. Therefore, when considering the topic for developed nations, the comparison between European and US firms may provide interesting similarities as well as potential differences. Secondly, firms in the STOXX 600 command interest from institutional investors due to their size (Cornett et al., 2007). Furthermore, since the firms are in prominent equity indices, they may be of particular interest to large institutional investors that manage indexed portfolios or use these portfolios as performance benchmarks.

Most of the data required has been obtained from FactSet as it is readily available. The main explanatory variable data (i.e., Institutional ownership test variables) has therefore been obtained from FactSet. ESG scores were obtained from the 'Thomson Reuters Eikon Refinitiv' database as FactSet's database on ESG turned out to be limited. The Eikon database provides composite ESG scores as well as scores for the three individual pillars (i.e., Environmental, Social, and governance). This will allow for a more detailed analysis on which pillars are affected most. Constituent data for the STOXX Europe 600 index has been obtained from the Wharton research data services (WRDS) through the Compustat- Capital IQ vendor. Data on the Fama-French 3 factor control variables were obtained from the Dartmouth data library. Lastly, remaining data that was missing from the above databases has been handpicked from the firm's official website as well as annual financial reports.

Firm year observations = Total number of firms (N) *sample period (t) *total number of variables (v) – number of missing observations.

This study: 285 unique firms*11 years*12 total variables -1425 lost observations = **36 195 total observations**. 1425 observations are lost due to 5 of the explanatory variables being lagged by 1 year. Therefore, we lose observations at the beginning of the sample period. Naturally, there will also be observations that are lost due to missing or unavailable data from the databases used.

4.2. Descriptive Statistics

Table 1Descriptive Statistics for 265 STOXX 600firms, 2011 - 2021

Variable	Obs	Mean	Std Dev	Min	Max
Dependent Variables		0.4.5.70	0.4000		
Model I -Firm Performance - EBITDA/TA	2,477	0.1659	0.1888	0.7208	3.2845
Model 2 - ESG Score	1,320	47.9709	22.8600	1.4863	93.5719
Test Variables					
Number of Institutional Investors	2,530	208.4391	131.3850	1	960
Proportion of Institutional ownership	3,025	0.5148	0.0430	0.4444	0.6077
Control Variables					
Executive ownership	2,428	0.0030	0.0024	0.0000	0.0100
Proportion of independent directors on					
Board	1,354	0.6215	0.2146	0.0333	1.0000
CEO Tenure (years)	1,900	5.8524	2.8122	0.2500	20.3500
Board Size	1,409	10.0816	3.6815	1	30
Firm Leverage - Total Debt/TA	2,610	0.2505	0.1835	0.0000	2.5359
Firm Size - TA (€ Millions)	2,786	25882.90	88997.16	0.4270	1167281
Fama/French 3 Factor controls				_	
SMB	3.025	-1.8818	4.9652	10.1100	5.4300
	- ,			-	
HML	3,025	-4.0836	13.5419	37.3100	15.0000
				-	
RM-RF	3,025	11.1091	12.8253	11.3900	28.6700
Total observations:					
Model 1 – Firm Performance	29,594				
Model 2 – ESG Scores	28,437				

Table 1 above provides descriptive statistics for the two main models used in the regression analysis of this paper. The model for firm performance contains 29,594 observations in total with 2477 being from the proxy for firm performance (operating cash flow return on assets). The model for ESG Scores contains 28,427 observations in total with 1320 being from

the ESG scores themselves. This number is lower than the observations of the firm performance variable due to limitations with data from the Eikon database. As ESG data has been collected and used to create scores recently in comparison to other variables, the data has not been available for all firms across the entire sample period. However, a large enough sample has been extracted to allow for a meaningful analysis.

For the proxy of firm performance (EBITDA/TA), we see that the minimum is 0.72% whilst the largest is 3.28%. This relatively narrow difference implies that even small coefficients in the regression results could indicate a meaningful change in firm performance. ESG scores range from 1.49 for the worst performing to 93.57 for the best performing companies in terms of ESG scores. There is a standard deviation of 22.86 and a mean of 47.97 implying that there is a wide variety of firms included in the analysis.

Number of institutional owners range from 1 to 960. As stated previously, this paper hypothesizes that higher numbers of institutional investors are associated with better firm performance as well as higher ESG scores. The mean number is approximately 208 and with a standard deviation of 131, this implies that most firms have institutional owners closer to the minimum.

Proportion of institutional ownership ranges from 44.44% to 60.77%, with a mean of 51.48% and standard deviation of 4.30%. This indicates a substantial proportion of institutional ownership for firms in the sample. Seeing as these are firms within the STOXX 600, it makes sense that institutional investors will be attracted to them.

For the control variables, executive ownership ranges from 0% to 1% of total firm ownership. Previous literature has showed that when executives own even just 1% of the firm, firm performance can significantly improve (Chan et al, 2014). Proportion of independent directors range from 3% to 100% of the board with a mean of 62%. This implies that there are independent directors on the board of every firm in the sample. The board size ranges from 1 to 30 with a mean of 10. Therefore, the mean amount of independent board members is 6 with a mean of 10 in board size. CEO tenure ranges from 4 months to over 20 years with a mean of 5.8 years. Firm leverage ranges from firms with 0 debt financing to firms with over 250% debt to total assets. This indicates a broad range for the sample and will provide a more robust analysis. In terms of firm size (as represented by total assets), there is a broad range due to the nature of the STOXX 600. There are firms ranging from approximately 427 thousand euros in total assets to over 1 trillion euros in assets a mean size of approximately 25.8 billion euros.

4.3. Methodology

This paper utilizes standardized statistical means of hypothesis testing for the coefficient of each explanatory variable in the model specification. The hypotheses being tested is whether a firm's performance (and ESG scores) are a function of its institutional ownership characteristics and other control variables. We identify if the coefficient is statistically significant from zero and if so, is it positive or negative, and to what extent. However, it should be acknowledged here that the issue of endogeneity may be present. For example, it could be that institutional investors are attracted to firms with good performance as well as high ESG ratings. This paper attempts to address this by regressing the dependent variables (firm performance and ESG ratings) on the one-period lag of the institutional ownership characteristic variables. Incorporating a one-period lag allows for any changes in the institutional ownership of a firm (and by extension its corporate governance) to show the effect on firm performance and ESG ratings. Similar approaches were used by Yuan et al. (2007) and Cornett et al. (2007). However, if institutional ownership is consistent over time, utilizing a one-period lag does not effectively mitigate the issue of endogeneity.

This study makes use of a panel data multivariate regression analysis in which firm operating cash flow return on assets in each year is regressed against firm institutional ownership characteristics, internal corporate governance, and control variables. It is clear that there is potential for reverse causality and endogeneity issues to present themselves. As discussed above, it could be that institutions are attracted to firms with higher performance and ESG scores. This would imply a positive association even though the institutional ownership does not imply a direct causal effect on firm performance (and better ESG scores). To solve for this, this paper employs firm size as a control variable for operating performance. Furthermore, both measures of institutional ownership (i.e., the test variables) are lagged by 1 period. This provides sufficient time for effects of changes in corporate governance (due to the institutional investors) to manifest in firm performance and ESG ratings. This may also eliminate issues regarding simultaneity. It would be difficult to differentiate between the hypothesis that institutional investors improve firm performance (and ESG ratings), versus the hypothesis that institutional investors choose firms with better performance without the use of lags. Therefore, if institutional investors do indeed affect firm performance and ESG scores according to the hypotheses section above, they would do so prior to the year of improved performance. This paper will also make use of fixed effects in the empirical analysis to control for the respective potential bias.

Several regression models are conducted. Firstly, with **Model 1**, firm performance is regressed against institutional ownership variables. In **Model 2**, firm composite ESG scores are regressed against institutional ownership variables. For **Model 3**, several variations of the model specification are conducted for each of the three ESG categories (i.e., environmental, social, and governance) included in the composite ESG score. This is done to obtain an overall view of the potential effect of institutional ownership on firm ESG scores, but also allow for a more detailed analysis into the potential effect on each of the three dimensions. This is to provide a more robust analysis of the results. For models 1 and 2, numerous statistical methods were used ranging from standard regression analysis, to conducting the models in first differences and clustered standard errors, as well as fixed effects and clustered standard errors.

Model 4 is also created to allow for the interaction between firm performance and ESG scores. Therefore, this study firstly shows how the institutional ownership test variables influence firm performance (with model 1). Secondly, it shows how institutional ownership can affect firm ESG scores directly (with model 2/3). Thereafter the fourth model shows that firm performance influences firm ESG scores. Therefore, we can then say that institutional ownership affects firm ESG scores indirectly as well.

Variations of the following two models are to be applied for the regression analysis for firm performance and ESG scores:

Model 1: Institutional ownership and firm performance:

 $\begin{aligned} &FirmPerf_{i,t} \\ &= \beta_0 + \beta_1 lnNumInstitInves_{i,t-1} + \beta_2 ProportInstOwn_{i,t-1} + \beta_3 ExecutiveOwn_{i,t-1} \\ &+ \beta_4 ProportIndepDirect_{i,t-1} + \beta_5 lnCEOTenure_{i,t} \\ &+ \beta_6 lnBoardSize_{i,t} + \beta_7 FirmLev_{i,t} + \beta_8 lnFirmSize_{i,t} + \beta_9 SMB_{i,t} + \beta_{10} HML_{i,t} \\ &+ \beta_{11} RM - RF_{i,t} + \alpha_{i,t} + \mu_{i,t} \end{aligned}$

Model 2 & 3: Institutional ownership and firm ESG scores:

ESGScore_{i,t}

 $= \beta_0 + \beta_1 lnNumInstitInves_{i,t-1} + \beta_2 ProportInstOwn_{i,t-1} + \beta_3 ExecutiveOwn_{i,t-1} + \beta_4 ProportIndepDirect_{i,t-1} + \beta_5 lnCEOTenure_{i,t}$

- + $\beta_6 lnBoardSize_{i,t} + \beta_7 FirmLev_{i,t} + \beta_8 lnFirmSize_{i,t} + \beta_9 SMB_{i,t} + \beta_{10} HML_{i,t}$
- + $\beta_{11}RM RF_{i,t} + \alpha_{i,t} + \mu_{i,t}$

Model 3 includes the scenarios where firms' category specific ESG scores (i.e., scores for 'Environment', 'Social', and 'Governance') are regressed against institutional ownership variables. The effects of institutional ownership on specific scores can then be analysed.

Model 4: Interaction between firm performance and ESG scores

$$\begin{split} & \textit{ESGScore}_{i,t} \\ &= \beta_0 + \beta_1 \textit{lnFirmPerf}_{i,t-1} + \beta_2 \textit{lnNumInstitInves}_{i,t-1} + \beta_3 \textit{ProportInstOwn}_{i,t-1} \\ &+ \beta_4 \textit{ExecutiveOwn}_{i,t-1} + \beta_5 \textit{ProportIndepDirect}_{i,t-1} + \beta_6 \textit{lnCEOTenure}_{i,t} \\ &+ \beta_7 \textit{lnBoardSize}_{i,t} + \beta_8 \textit{FirmLev}_{i,t} + \beta_9 \textit{lnFirmSize}_{i,t} + \beta_{10} \textit{SMB}_{i,t} + \beta_{11} \textit{HML}_{i,t} \\ &+ \beta_{12} \textit{RM} - \textit{RF}_{i,t} + \alpha_{i,t} + \mu_{i,t} \end{split}$$

Table 2 below lists the right-hand side variables used in the regression analysis.

Table 2

Variable Definitions	
Explanatory Variable	Symbol
In (Number of Institutional investors holding stock in the firm)	lnNumInstitInves
(Lagged one year)	
Proportion of institutional ownership	ProportInstOwn
(Lagged one year)	
Firm performance (only for model 4)	FirmPerf
(Lagged one year)	
Control Variables	
Executive stock ownership	ExecutiveOwn
(Lagged one year)	
Proportion of independent directors on the board	ProportIndepDirect
(Lagged one year)	
ln (CEO Tenure) - (years)	InCEOTenure
ln (Board Size)	lnBoardSize
Firm leverage - (Total debt/Total assets)	Leverage
Ln (Firm Size) - (Natural log of total assets)	FirmSize
Small minus big	SMB
High minus low	HML
Market risk premium	RM-RF

5. Results

Model 1: Institutional ownership & Firm performance 5.1.

Table 3

Firm performance regressed against test and control variables

		Regression 2	
		(First	Regression 3
	Regression	differences &	(Fixed effects
	1	Clustered	& Clustered
	(Standard)	standard	standard
Explanatory Variable		errors)	errors)
Test Variables			
In (Number of Institutional Investors) (lagged one year)	0.0919	0.0229	0.0295
	(12.29)***	(2.74)***	(2.73)***
Properties of Institutional ownership (lagged one year)	0.0506	0.0446	0.2040
Proportion of institutional ownership (lagged one year)	-0.0390	-0.0440	-0.2040
	(-0.48)	(-0.30)	(-2.07)**
Control Variables			
Executive ownership (lagged one year)	5.2886	6.1404	2.5416
	(3.63)***	(2.74)***	(0.73)
	~ /		
Proportion of independent directors (lagged one year)	-0.0202	0.0106	-0.0148
	(-1.22)	(0.59)	(-0.70)
ln (CEO Tenure)	0.0148	0.0149	0.0130
	(2.65)***	(1.69)*	(1.89)*
In (Board Size)	0.0125	0.0251	0.0373
Eli (Doard Size)	(1.21)	(-1, 35)	(-1, 34)
	(1.21)	(-1.55)	(-1.54)
Firm Leverage	0.0229	-0.0116	0.0597
	(1.09)	(-0.22)	(1.16)
Ln (Firm Size)	-0.0534	-0.0510	-0.0470
	(-18.50)***	(-3.16)***	(-3.47)***
SMB	0.0004	0.0007	0.0006
SIMD	(0.55)	-0.0007	-0.0000
	(0.55)	(-1.47)	(-1.55)
HML	0.0000	0.0000	0.0003
	(2.20)**	(-0.21)	(1.75)*
	()	<pre></pre>	
RM-RF	0.1018	0.0002	0.0001
	(1.26)	(3.26)***	(1.77)*
R-squared (adjusted)	0.3666	0.1298	0.2565

*Significant at the 10% level **Significant at the 5% level ***Significant at the 1% level

Table 3 summarizes the regression results of Model 1 (i.e., institutional ownership and firm performance) and finds mixed results for the test as well as control variables.

Each of the 3 columns corresponds to a variation of the standard regression model described in the model specification. Regression 1 corresponds to the standard model specified in the methodology section, regression 2 shows the results of running the model in first differences and with clustered standard errors, and finally, regression 3 shows the results of running the model with fixed effects and with clustered standard errors. Multiple models were used to provide robustness to any results interpreted and to deal with concerns regarding autocorrelation as well as heteroskedasticity. Several diagnostic tests were performed and by using the variance inflation factor (VIF), there was no evidence of multicollinearity. Text in bold represent significant results and the number of asterisks correspond to various levels of significance.

The results show that the first of the test variables '**Number of institutional investors**' is significant at the 1% level of significance in all 3 regression specifications. Regression 1 results show that a 1% increase in the number of institutional owners is associated with an increase in firm performance by 0.0009 in the following year, ceteris paribus. A 10% increase in the number of institutional owners would therefore be associated with an increase in firm performance of 0.0038. Similarly, regression 2 and 3 finds that an increase in the number of institutional owners by 1% is associated with an increase in firm performance by 0.0002 and 0.0003 respectively, ceteris paribus. This result is promising as it implies a direct and positive effect of the number of institutional investors on the firm performance. This finding is consistent with most of the literature surrounding this topic and is consistent with the studies conducted by Cornett et al. (2007); Ferreira & Matos (2008) as well as Lin & Fu (2017).

However, in contrast, the results for the second test variable '**Proportion of institutional ownership**' showed insignificant results for regression 1 and 2, but interestingly, showed significant results in regression 3 but with a negative coefficient. This result implies that a 1% increase in the proportion of institutional ownership is associated with a decrease in firm performance of 0.2040 in the following year, ceteris paribus. This result contradicts the studies mentioned above as well as Jiang & Liu (2014). It should be noted that the result is only significant in regression specification 3 and so the result may not be as reliable as it is with the 'number of institutional owners' test variable.

Based on the theoretical and empirical framework surrounding this topic such as Cornett et al. (2007); Ferreira & Matos (2008); Jiang & Liu (2014); and Lin & Fu (2017), these studies have shown that the control variables used in this study influence firm performance and therefore should be added to maintain the robustness of the model specification as well as any interpretation of the results.

'Executive ownership' in the firm shows significant and positive results in regression 1 and 2 (at the 1% level of significance) but insignificant results for regression 3. This implies that an increase in executive ownership by 1% is associated with an increase in firm performance in the following year by 5.23% and 6.14% for regression 1 and 2 respectively (ceteris paribus). It should be noted that an increase in executive ownership by 1% is highly unlikely as the mean for the sample of STOXX 600 companies is 0.3% and the maximum value being 1%. Nevertheless, the results show a value enhancing effect for firms with higher executive ownership. The results of regression 1 and 2 are consistent with the 'convergence of interest' hypothesis as well as the 'entrenchment effect' and 'incentive alignment effect' described in the literature section. The results are also consistent with studies like Chan et al. (2014) as well as Yuan et al. (2007) who showed a positive association with firm performance and higher levels of executive ownership.

'**CEO tenure**' shows significant and positive results for all 3 regressions with regression 1 being significant at the 1% level and regression 2 and 3 being significant at the 10% level. This implies that if CEO tenure is increased by 1%, this is associated with an increase in firm performance by 0.00014, 0.000149 and 0.00013 for regression 1, 2 and 3 respectively (ceteris paribus). This shows a positive association and is consistent with studies such as Peni (2014) and Huang & Hilary (2018) which show similar results. This being due to the CEO's having more experience and therefore a better understanding of the firm as well as industry. It should be noted that previous studies have shown the positive association up to a certain point, but thereafter firm performance suffers due to the 'entrenchment effect'. However, for the purposes of this study this variable is added as a control and any further examination is beyond the scope.

'**Firm size**' shows significant and negative results for all three regressions at the 1% level of significance. This implies that a 1% increase in firm size is associated with a decrease in firm performance by 0.000534, 0.000510 and 0.000470 for regression one, two and three respectively (ceteris paribus). This result is consistent with Yuan et al. (2007) who proposed that the negative relationship is due to larger firms suffering from more agency problems. Ibhagui & Olokoyo (2018) also advocated for including firm size as a control variable due to the sometimes-ambiguous relationship between leverage and firm performance. However, after including '**firm leverage**' as a control variable, the regression analysis shows insignificant results for all three regressions.

Lastly, the regression analysis for '**Proportion of independent directors**' and '**Board size**' show insignificant results for all three regressions. The theoretical and empirical framework create an expectation that board size would have a negative relationship with firm performance due to potentially poor communication with large boards and indecisiveness due to multiple opinions (Yermack, 1996; Guest, 2009). Cornett et al. (2007) and Jiang & Liu (2014) also found that the proportion of independent directors has a positive relationship with firm performance. However, the analysis of the regressions of this paper shows inconclusive results.

Overall, due to the positive and significant results of one of the test variables at the 1% level of significance as well as significant results for several control variables, it is concluded that certain characteristics of institutional ownership (in this case the number of institutional owners) positively affects firm performance.

Model 2: Institutional ownership & Firm ESG scores (Composite) 5.2.

Table 4

Firm ESG score regressed against test and control variables

variables	Regression	Regression 2 (First differences &	Regression 3 (Fixed effects
Explanatory Variable	(Standard)	standard errors)	standard errors)
Test Variables	0.0621	-0.1619	-0.1039
Ln (Number of Institutional Investors) (lagged one year)	(0.78)	(-0.83)	(0.79)
Proportion of Institutional ownership (lagged one year)	2.3480	6.1550	2.9491
	(-1.85)*	(2.07)**	(-2.01)**
Control Variables	14.8882	65.5128	42.8518
Executive ownership (lagged one year)	(1.00)	(1.19)	(1.30)
Proportion of independent directors (lagged one year)	-0.0727	-0.4841	0.0601
	(-0.41)	(-0.79)	(0.16)
ln (CEO Tenure)	-0.0656	0.0325	0.1580
	(-1.16)	(0.17)	(1.04)
Ln (Board Size)	0.0202	-0.0439	-0.2776
	(0.19)	(-0.10)	(-0.67)
Firm Leverage	-0.0228	0.0079	0.0415
	(-0.10)	(0.01)	(0.09)
Ln (Firm Size)	-0.0059	-0.1405	0.4755
	(-0.24)	(-0.76)	(3.54)***
SMB	-0.1236	0.0271	0.0002
	(-1.58)	(1.47)	(0.02)
HML	-0.0036	-0.0062	-0.0023
	(-1.12)	(-1.43)	(-0.67)
RM-RF	0.0034	-0.0007	0.0003
	(1.41)	(-0.25)	(0.13)
R-squared (adjusted)	0.0268	0.024	0.0007

*Significant at the 10% level **Significant at the 5% level ***Significant at the 1% level

Table 4 summarizes the regression results of Model 2 (i.e., institutional ownership and firm composite ESG Scores) and finds mostly insignificant results for one of the test variables as well as control variables. This model uses the same institutional ownership test variables as well as control variables to ascertain their relationship on firm ESG scores (composite).

Like the previous model, we use three regressions to conduct the analysis. We use a standard regression model, a model in first differences and with clustered standard errors and a third model with fixed effects and clustered standard errors. This allows for a more robust analysis, to solve for issues related to autocorrelation as well as heteroskedasticity and to identify if results are maintained with different models. Again, the variance inflation factor (VIF) is used to test for multicollinearity and there was no evidence found.

For the test variable 'Number of institutional owners', all three regressions show insignificant results. However, for the test variable 'Proportion of institutional ownership', positive and significant results were found in all 3 regressions at the 10% and 5% level of significance for regressions 1 and 2/3 respectively. The results therefore indicate that an increase in proportion of institutional ownership of 1% is associated with an increase in firm ESG scores by 2.3480, 6.1550, and 2.9491 in the following year for regression 1, 2 and 3 respectively (ceteris paribus). This positive relationship is also consistent with the recent studies conducted by Martínez & Lozano (2021); Velte (2020); and Buchanan et al. (2018). However, the study by Martínez & Lozano (2021) found that a critical mass of about 43% institutional ownership is usually required. This makes sense in the context of this paper as the minimum institutional ownership in the sample is 44.44% with a mean of 51.48%. Therefore, the entire sample has an institutional ownership proportion in excess of the proposed critical mass. The rest of the control variables show insignificant results for all regressions except for firm size in regression 3 which shows positive and significant results at the 1% level of significance. This result implies that a 1% increase in firm size is associated with firm ESG scores increasing by 0.4755%, ceteris paribus. This may be due to larger firms experiencing more pressure to perform well in the context of ESG initiatives as well as more resources to utilize for ESG related changes. This result is consistent with the study conducted by Gregory (2022) in which a uniform positive relationship was found between firm size and ESG ratings. However, after controlling for the sector and the agency providing the ratings, it was found that for many combinations, there was no significant relationship. This may indicate that this is a new focus area and more empirical studies need to be conducted before a conclusion is found.

Overall, it can be concluded that the proportion of institutional ownership has a positive relationship with firm overall ESG scores.

5.3. Model 3: Institutional Ownership & Firm category specific scores

Table 5

Firm Individual ESG scores regressed against test and control variables

Explanatory Variable	Environmental	Social	Governance
Test Variables			
Ln (Number of Institutional Investors) (lagged			
one year)	0.0816	0.0096	0.2425
	(1.23)	(0.16)	(3.65)***
Proportion of Institutional ownership (lagged one	1 0007	2 1252	2 0025
year)	1.988/	3.1352	3.0935
	(-1.69)*	(2.96)***	(-2.63)***
Control Variables			
Executive ownership (lagged one year)	12.5394	5.4162	13.0787
	(1.83)*	(1.77)*	(1.76)*
Proportion of independent directors (lagged one			
year)	0.4594	0.1587	0.5810
	(2.96)***	(1.12)	(3.80)***
ln (CEO Tenure)	0.0120	0.0128	-0.0358
	(0.23)	(0.27)	(-0.69)
Ln (Board Size)	0.6492	0.4221	0.0202
((6.91)***	(4.94)***	(0.22)
Firm Leverage	0.0589	0 3569	0 1653
	(0.31)	(2 05)**	(0.87)
	(0.31)	(2.03)	(0.87)
Ln (Firm Size)	0.0617	0.0347	0.0544
	(2.85)***	(1.76)*	(-2.52)**
SMB	-0.0186	-0.0203	-0.1131
	(-2.71)***	(-3.25)***	(-1.66)*
HMI	-0.0037	-0.0011	0.0002
******	(-1.42)	(-0.46)	(0.0002)
	(1.74)	(0.70)	(0.07)
RM-RF	0.0027	0.0035	0.0041
	(1.17)	(1.66)*	(1.77)*
R-squared (adjusted)	0.1031	0.0707	0.0633

*Significant at the 10% level

**Significant at the 5% level

***Significant at the 1% level

Table 5 summarizes the regression results of Model 3 (i.e., institutional ownership and firm category specific ESG scores). Each column represents the results for the regression analysis for the relevant ESG category (i.e., Environmental, Social and Governance). For this model, fixed effects and clustered standard errors were used. This solves for issues related to autocorrelation as well as heteroskedasticity. The variance inflation factor (VIF) was used to rule out the presence of multicollinearity.

For the test variable 'Number of institutional owners', regressions against the environmental score and social score show insignificant results. However, the regression for the governance score shows a positive and significant result at the 1% level of significance. This implies that an increase in the proportion of institutional ownership of 1% is associated with an increase in the governance score in the following year by 0.2425% ceteris paribus. Since the governance score is a measure of how well a company is run and that it acts in the best interests of its stakeholders, this makes sense as institutional owners have been shown to improve internal corporate governance mechanisms which in turn improves the governance ESG score. This can be explained by the reduction in agency costs that this paper has also showed to improve firm performance. This is consistent with the vast literature surrounding the effect of institutional ownership on firm corporate governance.

'**Proportion of institutional ownership'** shows positive significant results for all category specific ESG scores at the 10% level of significance for the environmental score and at the 1% level of significance for the social and governance score. This implies that an increase in proportion of institutional ownership of 1% is associated with an increase in the environmental score of 1.9887%, social score of 3.1352% and governance score of 3.0935% in the following year ceteris paribus. We can therefore conclude that higher levels of institutional ownership are associated with higher category specific ESG scores. Several control variables also show significant results. 'Executive ownership' shows significant and positive results for all 3 categories' scores at the 10% level of significance. This implies that an increase in executive ownership is associated with improved ESG scores in the following year. 'Proportion of independent directors' also shows positive and significant results for environmental and governance scores at the 1% level of significance. Lastly, firm size shows positive and significant results for all three scores at varying levels of significance.

Overall, with model 3 and the analysis of the effect of institutional ownership on firm category specific ESG scores, it can be concluded that institutional ownership does have a positive impact on ESG scores, and this is most prominent on governance scores.

5.4. Model 4: Interaction between firm performance and ESG Scores

Table 6				
Firm Composite ESG scores regressed against firm				
performance and control variables				
	Fixed effects & Clustered			
Explanatory Variable	standard errors			
Test Variables				
Firm Performance (lagged one year)	1 7045			
	(1.98)**			
	× /			
Ln (Number of Institutional Investors) (lagged one year)	-0.0372			
	(-0.29)			
Proportion of Institutional ownership (lagged one year)	0 1717			
roportion of montational of mership (hagged one year)	(1.71)*			
Control Variables	10,1001			
Executive ownership (lagged one year)	48.1881			
	(1.45)			
Proportion of independent directors (lagged one year)	0.4601			
	(1.20)			
ln (CEO Tenure)	0.2784			
	(1./6)*			
Ln (Board Size)	-0.3798			
	(-0.81)			
Firm Leverage	0.7305			
	(1.49)			
Ln (Firm Size)	0.2651			
()	(1.90)*			
SMB	0.0018			
	(0.15)			
HML	-0.0021			
	(-0.56)			
	× ′			
RM-RF	-0.0006			
	(-0.22)			
K-squared (adjusted)	0.0633			

Table 6 summarizes the regression results of Model 4 (i.e., regressing firm ESG scores against firm performance as well as the institutional ownership test variables and controls). The results indicate that higher firm performance is associated with higher ESG composite scores in the following year at the 5% level of significance. Ceteris paribus, an increase in firm performance by 1% improves firm ESG scores by approximately 1.7% in the following year. 'Proportion of institutional ownership' also shows positive and significant results at the 10% level of significance. This is consistent with the results of model 2 and 3. Similarly to model 2 and 3, the 'Number of institutional owners' test variable shows insignificant results. CEO tenure as well as firm size show positive and significant results at the 10% level of significance. This may be due to CEOs with longer tenure having a better understanding of the business and can therefore understand the value chain holistically to make changes. Furthermore, larger firms may also have more resources to invest in ESG projects and may also be the subject of more scrutiny regarding their ESG considerations. All other controls show insignificant results.

Overall, Model 4 shows that firm performance has a positive association with ESG scores. The combination of model 1 which showed that institutional ownership is positively associated with firm performance, as well as model 2/3 which showed institutional ownership being positively associated with firm ESG scores, it can be concluded that institutional ownership influences firm performance and that then influences ESG scores. Therefore, institutional ownership also influences ESG scores indirectly. We also see a direct impact of institutional ownership on firm ESG scores in model 2, 3, and 4 which show positive and significant coefficients.

When considering the results of all 4 models used, the following conclusions regarding hypotheses 1 and 2 are made:

For **Hypothesis 1**, the effect of institutional ownership on firm performance is found to be met (model 1). That is, the test variable 'Number of institutional investors' was shown to have a positive association with firm performance in all 3 regressions and 'Proportion of institutional investors' was shown to have a positive association in regression 3.

For **Hypothesis 2**, the effect of institutional ownership on firm ESG scores is found to be met partially as one of the test variables i.e., 'Proportion of institutional ownership' was found to have a positive association with firm ESG composite scores as well as the category specific scores in all 3 regressions (model 2 & 3). Both these results, although partially mixed between the two test variables, imply that these measures of institutional ownership are associated with significant positive changes on firm performance as well as firm ESG scores (both composite and category specific).

6. Conclusion

With the continued rise of institutional investors' ownership in large corporations (such as those included within the STOXX 600) there is a rise in the prevalence of the willingness of these institutions to use their ownership rights to steer corporate governance in a way that prioritizes shareholder value by reducing agency costs. In recent years, there has also been speculation that institutional investors may also use their ownership rights to steer firms towards a higher focus on ESG considerations as this can also improve firm performance.

The results of this paper confirm a positive relation between institutional ownership and firm performance, as well as firm ESG scores. Specifically, this paper finds a significant positive relationship between the number of institutional investors and firm operating cash flow return on assets. Furthermore, the results indicate a significant positive relationship between the proportion of institutional ownership and firm composite ESG scores. The study shows even more significant results for the category specific ESG scores with a more prominent relationship seen with the governance scores of firms. Lastly, the results presented in this paper show that firm performance also affects firm ESG scores. Therefore, it can be concluded that institutional ownership directly affects firm ESG scores through the proportion of ownership as well as indirectly through firm performance. This study therefore concludes that both hypotheses are satisfied at least with respect to one of the test variables in each model. These results are consistent with the literature that was used as a framework for this study.

Any further studies related to the impact of institutional ownership on firm corporate governance and especially in the context of ESG considerations will be beneficial to academics, firm stakeholders, and investors alike.

7. Limitations

The model has included several control variables to account for their effect on firm performance and ESG scores. It further attempts to alleviate concerns for selection bias by utilizing all firms that have remained in the STOXX 600 over the last 10 years. However, this has the potential to introduce survivorship bias as only the companies that have remained in the index are used in the analysis. Therefore, firms that have been removed from the index (for

any number of reasons) are excluded from the sample. Limitations should also be noted when attempting to address reverse causality and endogeneity. Therefore, the possibility that institutional investors are attracted to firms that already have good performance and high ESG scores cannot be ruled out. Several methods have been employed to try and overcome this which have been discussed in the methodology section. It should be further noted that firm performance (and ESG scores) may also be affected by unobservable factors beyond those included in the model specifications i.e., omitted variable bias.

8. References

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