Sphere control and environmental performance

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Abstract

Corporate ownership in Sweden is characterized by a strong separation between ownership and control, and a high degree of concentration in the hands of few business spheres, which are defined as a group of shareholders that share similar interests, and thus belong to a sphere of influence. I study the relationship between sphere control and firm environmental performance in Sweden. This type of ownership structure is an interesting case to study, since they often share characteristics of both family control and institutional ownership. I find that sphere-controlled firms (sphere firms) outperform their non-sphere counterparts in terms of overall environmental performance, and this result holds for family and non-family spheres. When looking at how well firms manage their environmental risks i.e., factors that have a palpable impact on their overall risk exposure, sphere firms perform as well as non-sphere firms. On the other hand, sphere firms appear to be significantly better at seizing environmental opportunities, which are actions that are geared towards societal interest rather than shareholder interests. I further find that the use of dual-class shares enhances the environmental performance of sphere-controlled firms, whereas the degree of owners' diversification has no moderating effect. Finally, the presence of a second controlling owner seems to be negatively associated with overall environmental performance and environmental opportunities performance.

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1. Introduction

Corporate owners, by virtue of the control they exercise, can influence the strategic choices of their firms, of which decisions relative to corporate social responsibility (CSR) and environmental choices. In recent years, a large literature explored the relationship between corporate ownership and firm environmental performance.[2] The extant literature pays a particular attention to the degree of control (e.g., concentrated vs. dispersed), and often distinguishes between owners' types (e.g., family owners, institutional owners, etc.). Based on a recent review of the literature by Gillan, Koch, and Starks (2021), it appears that most of the work in the area focuses on institutional owners, and few studies take the perspective of family ownership.

From an agency stand point, concentrated ownership and control is perceived as less efficient compared to dispersed ownership, since controlling owners can extract private rents at the expense of minority shareholders (Fama and Jensen, 1983); and might divert resources from profitable projects to nonpecuniary consumption (Demsetz, 1983). Anderson and Reeb (2003) argue that large and poorly diversified shareholders, such as family owners, might forgo profit maximization when they fail to separate their financial preferences from those of outside shareholders. At the same time, as a consequence of their control, large controlling owners might have more incentives to monitor the management, contributing to the reduction of managerial expropriation (Demsetz, 1983; Demsetz and Lehn, 1985; Shleifer and Vishny, 1986). While family-controlled firms are expected to face less agency conflicts between the management and the owners due to heightened monitoring (Jensen and Meckling, 1976), concentrated ownership is associated with the risk of expropriation of minority investors and stakeholders by large shareholders (Shleifer and Vishny, 1997). Lastly, controlling owners such as families are usually perceived as long-term investors who face reputation concerns (Anderson and Reeb, 2003).

El Ghoul et al., (2016) oppose two views, and hypothesize that while controlling families can use their control to divert resources from CSR activities to other projects (expropriation view) reputation concerns and long-term horizons might incentivize them to invest in CSR activities. They find support for the expropriation view. Abeysekera and Fernando (2020) study

[2] See for example Abeysekera and CS Fernando (2020); El Ghoul et al. (2016); Cruz et al. (2014); Block and Wagner (2014); Berone et al. (2010); Deyer and Whetten (2006).

the effect of family control on environmental performance and find no significant differences between family and non-family firms when it comes to CSR activities that benefit both shareholder wealth and societal interests. Their evidence indicates that family firms engage significantly less in CSR activities that benefits society but not shareholders' wealth, and argue that due to their poor diversification, family firms have a higher incentive to serve financial interests rather than socioemotional interests. Finally, there is also evidence that some CSR actions, such as those that mitigate environmental risks, benefit shareholder wealth, while other CSR activities, such as those that go beyond any legal or risk rational, do not (Fernando, Sharfman & Uysal, 2017).

In this paper, I look at the relationship between business spheres' control and firm environmental performance in Sweden. A business sphere is defined as a group of shareholders that share similar interests, and thus belong to a sphere of influence. Traditionally, corporate ownership in Sweden is characterized by a strong separation between ownership and control, and a high degree of concentration in the hands of few business spheres. They can be controlled by a family (e.g., the Wallenberg sphere), or can be institutionally-controlled (e.g., the Handelsbanken sphere). According to Agnblad, Berglöf, Högfeldt, and Svancar (2001), spheres play a crucial role in the corporate governance of corporations in Sweden, and are a popular form of ownership.[3] Most spheres are family-controlled industrial groups that play an active role in the management of their portfolio firms. Owners in Sweden have traditionally retained corporate control through a mix of dual-class shares, pyramidal holdings, and cross-holdings (Agnblad et al, 2001; Cronqvist and Nilsson, 2003). In particular, family spheres organize their operations in multilevel pyramids where the families at the top use holding companies, in the form of closed end investment funds (CEIF), as intermediaries to control a portfolio of firms (Holmén & Högfeldt, 2009; Holmén and Knopf, 2004).[4] This allows the family at the helm to maintain substantial control over a diversified portfolio of firms while holding limited claims to cashflow rights as we ascend through the pyramid.

The Swedish case is interesting to study for several reasons. First, existing evidence suggests that despite the high concertation of ownership in Swedish firms, private benefits of control in Sweden are among the lowest compared to other countries (Dyck and Zingales, 2004;

[3] Seventy-two percent of the 304 Swedish listed firms in their sample are controlled by a family or a sphere.
[4] For instance, Investor AB is a CEIF controlled by the Wallenberg family, through which they control 22% of Ericsson AB, 47.5% of SAAB AB and 28% of Electrolux AB, among others.

Nenova, 2003), while Holmén and Knopf (2004) find little support for the expropriation of minority shareholders in the Swedish market for mergers. One explanation for the low levels of minority expropriation in the country could be the informal governance role played by reputational concerns to large owners and their potential impact on their social capital (Agnblad et al, 2001). Second, unlike the typical undiversified controlling owner, business spheres are more diversified through their pyramidal structures and their use of dual-class shares. La Porta, Lopez-de-Silanes, and Shleifer (1999) find that among 27 countries, Sweden is the leader in the use of dual-class shares, and ranks second in the use of pyramid structures. In a more recent study of twelve Western countries, Faccio and Lang's (2002) find that Sweden is still the leader in terms of dual-class shares use, and ranks sixth in the use of pyramid structures. Finally, Cronqvist and Nilsson (2003) find that over the period 1991-1997, 75% of the 309 firms in their Swedish sample use dual-class.

Taken together, the Swedish context gives rise to an interesting setting where the classical prediction of minority shareholders expropriation by a poorly diversified controlling owner is less plausible. Controlling owners, such as family business spheres, can diversify their investment portfolios by taking advantage of dual-class shares and pyramidal structures. In the context of environmental performance, this implies that they might be less inclined to forgo investments in environmental performance in favor of their financial wellbeing (i.e., shareholder value maximization). At the same time, the strong separation between ownership and control allows the retention of control by family owners over longer horizons. Since social prestige is an important aspect of their private benefits of control, concerns over their reputation becomes more relevant. As stated by Agnblad et al., (2001) "Social prestige is an important, even dominant, part of the total benefits associated with control of large corporations in Sweden. Many owner families try to build a legacy around themselves as good citizens and project themselves onto the public arena as important contributors to socially worthy causes like philanthropy, endowments, and research." In terms of environmental performance, concerns for family reputation should translate into overall better environmental performance, especially in taking advantage of environmental opportunities that benefit social capital.

To empirically test the relationship between business sphere control and firm environmental performance, I use the sum of the voting rights of all owners belonging to a sphere of influence, and define the main explanatory variable *sphere-control* as a dummy variable equal to one if the sphere controls 10% or more of the voting rights, and zero

otherwise. For the remainder of the paper, firms controlled by a sphere are referred to as *sphere firms*, and the remaining sample firms are referred to as *non-sphere firms*. To measure environmental performance, I rely on MSCI environmental ratings. The data contains information on ten key environmental risks and three key environmental opportunities, each with an exposure score and a management score. The total score for each key risk captures how well the firm manages it relative to its degree of exposure to it. While the total score for each key opportunity captures how well the firm exploits its environmental opportunities. I use the MSCI weighted environmental pillar score to proxy for the overall environmental performance of the firm. To capture the performance of the firm in managing environmental risks, I use the average total scores for the key environmental risks the firm is exposed to (*environmental risk performance*). Lastly, to measure how well a firm is taking advantage of its environmental opportunities, I use the averages total scores for the key environmental opportunities available to the firm (*environmental opportunities performance*).

I find that sphere firms have a higher overall environmental performance compared to non-sphere firms. Sample firms appear to perform similarly when it comes to managing environmental risks that have potential real consequences for overall firm's risk, regardless of the control structure in place. Whereas compared to non-sphere firms, sphere firms score 30% higher in their environmental opportunities' performance, which implies that they engage more in environmental activities that might provide social capital. Looking at the sub-sample of family firms only, I find that firms controlled by a family sphere still outperform non-sphere firms in terms of overall environmental performance, but there is no significant difference between the two groups in terms of managing environmental risks and opportunities. To deal with endogeneity issues I first estimate a two-stage instrumental variables (IV) model where use the average sphere control (voting) rights at the industry level to instrument for the endogenous variable *Sphere control.* Second, I estimate the main model using a matched sample of sphere firms and non-sphere firms, to mitigate the effects of unobservable factors. The matched sample is based on nearest neighbor propensity scores estimated using a Logit model, without replacement. Taken together, our endogeneity tests support the main results.

I also explore the moderating effects of dual-class shares, owners' industry diversification and the presence of a second controlling owner, on the relationship between sphere control and our different measures of environmental performance. I find that the higher environmental performance of sphere firms relative to non-sphere firms is driven by sphere firms that use

dual-class shares. Whereas the use of dual-class shares does not appear to have a moderating effect when the dependent variables are either environmental risks performance or environmental opportunities performance. The industry diversification of the controlling owner does not have any significant moderating effects, whereas the presence of a second controlling owner seems to play a significant moderating role, and offsets the difference between sphere firms and non-sphere firms in terms of overall environmental performance and environmental risks performance.

The remainder of the paper is organized as follows. Section 2 provides data description and summary statistics. Section 3 presents the empirical analysis. Section 4. Section 5 offers concluding remarks.

2. Data and summary statistics

The sample consists of non-financial firms listed in the Stockholm Stock Exchange (SSE Nasdaq OMX) over the period 2013 – 2019. After excluding firms headquartered outside of Sweden, and firms missing environmental, ownership or corporate data, the final sample consists of 205 unique firms and 841 firm-year observations.

2.1 Environmental performance

I use the MSCI ESG data, which provides information on corporate environmental, social and governance characteristics. I focus on the environmental pillar (E), which scores firms on 10 key environmental risks and 3 environmental opportunities (see Appendix 1 for details). Each key issue receives an exposure score and a management score ranging from zero to ten. For the environmental risks, the exposure score measures the level of risk faced by a company from a given environmental key factor, while the management score captures how well the company manages that risk. Environmental opportunities are assessed in a similar way, where an exposure score measure the relevance of the opportunity to the firm, and the management score captures the firm's capacity to exploit it. Each key issue receives a total score depending on how well a risk is managed. MSCI assigns weights to each key issue based on their materiality to the industry where the firm operates. The weighted total scores are pooled in four themes: (1) climate change, (2) pollution and waste management, (3) natural resources, and (4) environmental opportunities, and the weighted themes make up the aggregate environmental pillar score of a firm.

The first measure is *overall environmental performance*, which is the weighted environmental pillar score as computed by MSCI. However, given that the weights assigned to the key issues (and by extension to the themes and the pillar scores) are determined based on MSCI's evaluation of their materiality to a particular industry, not all themes and key issues contribute to the final score of the firm. Appendix 1 shows that in year 2019, the industrial machinery company SKF AB had theme scores of 10 for climate change, 9.6 for natural resources, 5.1 for pollution and waste management, and 6.4 for environmental opportunities. However, only two themes contributed to the final pillar score of the firm, even though SKF had varying degrees of exposure in five other key issues. This implies that using *overall environmental performance* alone might not fully or fairly capture a firm's actions vis-à-vis environmental issues.

I take advantage of the detailed data available to define two additional measures that take into account firm performance in all relevant key issues. I define the variables *environmental risks (opportunities) performance* as the average of the total scores of risks (opportunities) key issues to which the firm is exposed (i.e., a non-zero exposure score). For example, the *environmental risks (opportunities) performance* scores for SKF AB are 4.2 (6.4) (see Appendix 1 for detailed formulas). This bifurcation into risks and opportunities is in line with previous studies that distinguish between actions that mitigate firm environmental risk exposure (toxicity/concerns) and actions that go beyond any regulatory or risk rational (greenness/strengths) (e.g., Fernando et al., 2017; Abeysekera et al., 2020 and Chen et al., 2020).[5]

2.2 Ownership measures

Ownership data is from Modular Finance Holding (Holding henceforth), which provides high quality ownership and governance data on Swedish publicly traded firms. For each firm, I get information on the five largest owners by vote. The variables are owner's identity, type (family,

[5] Several studies on ownership and CSR used the KLD data which consisted of a set of six sub-indicators of environmental strengths and seven sub-indicators of environmental concerns each receiving a score of one if the firm meets or exceeds the KLD threshold for that sub-indicator, and zero otherwise (e.g., Fernando et al., 2017; Abeysekera et al., 2020; and Chen et al., 2020). In 2009, KLD was purchased by MSCI. Over the period 2009-2012, MSCI made changes to its ESG ranking methodology leading up to the data used in this study (see MSCI report "ESG Ratings History," 2017). Though MSCI retained many elements from the KLD database, the classification of key issues by MSCI post-2012 differs in several aspects from the KLD data used so far in the literature.

institutional etc), percent cash flow rights and percent voting right. Holding directly aggregates owners by spheres of influence. In the case of family firms, this includes cash flow and voting rights owned by family members, family-controlled foundations and family-controlled firms. A similar approach is used for non-family spheres. In order to make sure that I identify spheres correctly, I cross-check the information from Holding with that provided in Sundin and Sundqvist (2015), which up to 2015, was the primary source of data in studies about ownership in Sweden (Martin and Högfeldt, 2009; Cronqvist and Nilsson, 2003; Holmen and Knopff, 2004; Agnblad et al. 2001 and Moursli, 2020). The variable *sphere-control* is a dummy variable equal to one if the firm is controlled by a sphere and zero otherwise. I use a threshold of 10% of voting rights (both direct and indirect) in the main analysis.[6]

2.3 Firm and governance control variables

I include several firm and governance controls that may affect environmental performance.[7] Accounting data is from Datastream and governance data is from Holding. I control for the natural logarithm of total assets to capture *firm size*, and the difference between the year of establishment and the fiscal year to measure *firm age*. I use the ratio of research development to total sales as a proxy for *growth opportunities*. Return on assets (*ROA*) is defined as the ratio of net income before extraordinary items to total assets, and the market to book ratio (MTB) is the ratio of the market value of assets relative to the book value of assets. The market value of assets is the sum of total assets and market capitalization minus the book value of equity. *Leverage* is defined as the ratio of total debt to total assets, and *turnover* is the ratio of trading volume relative to total shares outstanding. To reduce the impact of outliers, all firm-level variables are winsorized at the top and bottom percentiles.

In terms of governance variables, I control for *board size* which is the number of board members excluding employee representatives and CEOs who do not sit on the board. *Board independence* is a dummy variable equal to one if the ratio of independent directors to board size is larger or equal to 50%, and zero otherwise. D*ependent CEO/Chair* is a dummy variable equal to one if the CEO and/or the chair of the board have ties to the controlling owners.

[6] The 10% cutoff is commonly used in the literature (e.g., La Porta et al., 2000; Faccio and Lang, 2002; El Ghoul et al., 2016; Carney and Child 2013; Moursli and Nguyen, 2021). Cronqvist and Nilsson (2003) use a threshold of 25% for control in Sweden. In unreported tables, I use 20% as a threshold to define control, and results are unchanged.

[7] The control variables included are commonly used in the literature on corporate ownership and firm environmental performance (see e.g., Berrone et al.,2010; El Ghoul et al.,2016 and Abeysekera et al., 2020).

Control dispersion is the adjusted Herfindahl index of differences in the voting rights of the five largest owners. Finally, *institutional ownership* is the percentage of voting rights in the hands of institutional investors. Variable definitions is provided in Appendix 2.

2.4 Summary statistics and univariate analysis

Table 1 provides a summary of the sample by industry (Panel A) and year (Panel B).[8] With 20% of the sample firms, industrial goods and services is the largest industry, followed by the health care sector (14%) and the real-estate sector with (12%). From columns (2) and (3), we see that the largest shareholder in the average firm holds 22.1% of the cash flow rights and 31.2% of the voting rights, highlighting the wedge between ownership and control in Swedish listed companies. Columns (4) and (5) indicate that 66% of the firms are family-controlled and 42% are sphere-controlled. Family control dominates across all industries, whereas sphere control dominates in six out of fifteen industries. Panel B indicates that the number of firms per year is lowest over the period 2013 – 2015. This low number is explained both by the limited coverage of MSCI ESG ratings for Swedish listed firms prior to 2014, and the lack of data on key issues for a portion of the firms covered. Finally, columns (2)-(5) show that both family control and the separation between ownership and control have persisted over time.

Table 2 provides summary statistics on key variables in Panel A, tests of differences in means between sphere firms and non-sphere firms in Panel B, and Pearson correlation coefficients in Panel C. From Panel A we see that the average firm scores 5.243 in *overall environmental performance*, 3.224 in *environmental risk performance* and 1.889 in *environmental opportunities performance.* This indicates that, on average, sample firms perform slightly above the mean in terms of overall environmental performance, they perform less well in managing their environmental risks, and perform even lower in taking advantage of environmental opportunities. The average firm age is 57 years, with a maximum of 330 years, a ROA of 6%, a MTB ratio of 2.2, and a leverage ratio of 25%. In terms of firm governance, the average firm has 7.5 board members. The majority of the firms have independent boards, 60% of the firms have dependent CEO/Chair, and 15% have a second shareholder who controls at least 10% voting rights.

[8] I use the Nasdaq OMX industry classification which is based on the Industry Classification Benchmark (ICB).

From Panel B, univariate tests comparing sphere firms to non-sphere firms show that firms controlled by a sphere have a significantly higher environmental performance, manage their environmental risks better and exploit environmental opportunities more. Sphere firms are also significantly larger and older, which is in line with the Swedish corporate context, where established business spheres control conglomerates of large firms with a long life-span. In terms of accounting measures, sphere-controlled firms have significantly lower MTB, exhibit lower growth and a higher performance (ROA). In terms of governance, firms controlled by a sphere have larger boards and lower ratios of institutional ownership. Control dispersion between the five largest shareholders is almost twice as high in sphere firms compared to non-sphere firms. The ratio of firms with a dependent management is 30% lower in non-sphere firms than in firms controlled by spheres.

Finally, results in Panel C show that overall environmental performance has a positive and significant correlation to firm size, board size, stock turnover and control dispersion, but correlates negatively to market-to-book and institutional ownership. Environmental risks performance is positively correlated to firm size, firm age, ROA and board size, but is negatively correlated to institutional ownership. Finally, while environmental opportunities performance is positively related to firm size, firm age, and ROA, it is negatively related to leverage, market-to-book and R&D/total assets.

3 Empirical analysis

3.1 Multivariate analysis

To explore the relationship between environmental performance and ownership structure, I estimate the following two-way fixed effects model with time and industry fixed effects:

$$Environmental\ performance = \alpha + \beta\ Sphere\ control + \gamma\ Controls + \ \theta\ Fixed\ effects + \ \varepsilon \qquad (1)$$

where the dependent variable is either *overall environmental performance, environmental. risks performance* or *environmental opportunities perf*ormance. The main explanatory variable is *Sphere control*, which is a dummy variable equal to one if the largest owner controls 10% or more of the votes, and zero otherwise. *Controls* is a vector of firm control variables (firm size, firm age, MTB, ROA, leverage, growth and turnover) and governance control variables (board size, control dispersion, board independence, dependent management, and institutional

ownership). I control for time and industry fixed effects in all models. In all regressions I use bootstrapped standard errors.[9]

Table 3 reports the regression results for model (1). In column (1), the coefficient associated with *Sphere control* is positive and highly statistically significant, indicating that sphere firms have a higher overall environmental performance compared to non-sphere firms. The coefficient of 0.421, evaluated at the mean of environmental performance (5.243) implies that it is 8% higher in sphere firms. Results in column (2) indicate that there is no statistically significant difference between the two groups. This can be interpreted as evidence that sample firms perform similarly when it comes to managing environmental risks that have potential real consequences for overall firm's risk, regardless of the control structure in place. In terms of environmental opportunities performance, column (3) shows that the coefficient associated with the variable *Sphere control* is positive and highly statistically significant. When evaluated at the mean, the estimated coefficient implies that sphere firms score 30% higher in their environmental opportunities' performance, which implies that they engage more in environmental activities that might provide social capital compared to non-sphere firms.

While 66% of the firms in the sample are family controlled, and 42% are sphere controlled, 90% of the spheres are family spheres. Given the preponderance of family control, it is not clear if the results are driven by sphere control or by family control. To shed light on this issue, I re-estimate the main model for the sub-sample of family-owned firms i.e., firms where the largest shareholder is a family. The main explanatory variable is equal to one when a firm is controlled by a family sphere and zero otherwise. Results from columns (4)-(6) show that firms controlled by family spheres still have a higher overall environmental performance compared to other family-owned firms, while their management of environmental risks appears to be similar to the rest of the sample firms. Interestingly, there is no statistically significant difference in terms of environmental opportunities performance between firms controlled by family spheres and family-owned firms, which indicates that they engage comparably in activities that can enhance their social capital. In order to rule-out the possibility that our effect might be driven by controlling non-family spheres, I exclude them from the sample and re-estimate the main model. Results are reported in columns (7) – (9), and support the initial findings.

[9] In robustness checks, I use standard errors clustered by firm or by year and industry. See section 3.4.

3.2 Endogeneity of sphere control

The evidence so far indicates that sphere control has a positive impact on both the overall environmental performance of firms and on their environmental opportunities' performance, and that there is no significant difference between sphere firms and non-sphere firms in terms of environmental risk performance. While controlling for firm and governance characteristics, time and industry fixed effects help mitigate some omitted heterogeneity, if corporate control and environmental performance are driven by unobserved firm characteristics, our results might be affected by omitted variables. It is also possible that our results are driven by reverse-causality. To address these endogeneity concerns, I use an instrumental variable approach and a sample matching approach.

First, I estimate a two-stage instrumental variables (IV) model where in the first stage I regress *Sphere control* on the instrumental variable and the full set of controls. In the second stage I regress different measure of environmental performance on the predicted *Sphere control* variable and the full set of controls. In the spirit of Laeven and Levine (2008), Lin et al (2011) and El Ghoul et al (2016), I use the average sphere control (voting) rights at the industry level to instrument for the endogenous variable *Sphere control.* Using control data for the five largest owners for each firm to compute the average control rights of spheres for each industry.[10] Column (1) of Table 4 shows first stage results, and indicates that our instrument predicts well sphere control. Results from the second stage in columns (2)-(4) confirm that firms controlled by spheres have a higher overall environmental performance and environmental opportunities performance.

Second, I estimate the main model from columns (1)-(3) in Table 3 using a matched sample of sphere firms and non-sphere firms, to mitigate the effects of unobservable factors. The matched sample is based on nearest neighbor propensity scores estimated using a Logit model, without replacement. Results are reported in Table 5. In columns (1)-(3) the propensity score is calculated on firm size, MTB and industry, while in columns (4)-(6), they are calculated using firm size, MTB, industry, leverage, ROA, growth, board size, control dispersion (HI) and institutional ownership. The results suggest that even when we match sphere firms with non-

[10] Results are unchanged if I use the industry average control rights of spheres for the largest owners. I get similar results if I instrument for family-sphere control.

sphere firms that share similar characteristics, sphere control has a positive impact on firms' overall environmental performance and environmental opportunities performance. Taken together, our endogeneity tests support the main results in Table 3.

3.3 Moderating effects

In Sweden, the use of dual-class shares is a popular way for owners to retain corporate control. While 49% of our sample firms use dual-class shares, their use increases to 66% among sphere firms and to 62% among family firms. As highlighted by Holmén and Högfeldt (2009), the use of pyramidal ownership and dual-class shares allows owners to retain control over a diversified portfolio of firms for lower cash-flow rights that decrease down the pyramid. This allows owners to concentrate control and hold more diversified portfolios compared to large owners that are poorly diversified. It also diverges from the observed tendency of family owners to hold poorly diversified portfolios (e.g., Anderson and Reeb, 2003). As such, owners with concentrated ownership and lowly diversified portfolios see their wealth more tightly connected to the firm, and might not have a share-holder maximization view.

To evaluate the moderating effect of dual-class shares on the relationship between sphere control and environmental performance, I estimate the main model from Table 3 and include an interaction between the variable *dual-class* and *sphere control*. D*ual-class* is a dummy variable equal to one if the largest owner uses dual-class shares and zero otherwise. Results are reported in Panel A of Table 6. Column (1) shows that the higher environmental performance of sphere firms relative to non-sphere firms is driven by sphere firms that use dual-class shares. From column (2), the use of dual-class shares does not appear to impact environmental risk performance. Whereas results in column (3) indicate that sphere firms perform higher in terms of environmental opportunities compared to non-sphere firms, and this effect is not significantly impacted by the use dual-class shares.

To capture a different aspect of owner diversification, in Panel B, report results for a model where I interact *sphere control* and the variable *diversified owner*, which is an indicator variable equal to one if an owner owns shares in firms operating in different industries, and zero otherwise. While the coefficients associated with the interaction term are statistically insignificant, indicating that owner diversification has no moderating role in the relationship between sphere control and all measure of environmental performance; diversified owners

seem to have perform worse in terms of managing environmental risks, and this effect is highly statistically significant.

Finally, I explore the case where we have multiple large owners, which can be consequential to the extent of minority shareholder expropriation and to monitoring. Bennedsen and Wolfenzon (2000) model the choice of ownership structure by firm founders. Their model predicts that founders will prefer ownership structures with multiple large owners, one that favors the formation of coalitions among them, improves monitoring, and lowers the extraction of private benefits. Maury and Pajuste (2005) study large shareholder incentives to either coalesce in monitoring the controlling owner, or collude to extracte private benefits. They find that the extraction of private benefits of control by large owners is attenuated when the voting rights among them is more balanced, especially in family-controlled firms. In Panel C, I report results for a model where I interact *sphere control* and the variable *second controlling owner*, which is an indicator variable equal to one if the second largest owner controls 10% or more of the voting rights, and zero otherwise. Interestingly, the presence of a second controlling owner seems to play a significant moderating role, and offsets the difference between sphere firms and non-sphere firms in terms of overall environmental performance and environmental risks performance.

3.4 Additional robustness checks

In this section I check the robustness of the results from estimating the main model, using alternative specification and modeling choices. Results are reported in Table 7. Estimation result using 20% as a threshold to define the variable Sphere control (columns (1) – (3)), including financial firms in the sample (columns (4)-(6)), using standard errors clustered by year and industry (columns (7)-(9)), using standard errors clustered by firm (columns (10)-(12)), and using OLS robust standard errors (columns (13)-(15)). Overall, we see that our main results from Table 3 are robust.

4 Conclusion

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Appendix 1: MSCI ESG scores illustration

The MSCI ESG data provides information on corporate environmental, social and governance characteristics. The table below shows a sample of the environmental pillar score for the company SKF AB in year 2019 (missing values are replaced with zero). The environmental pillar score consists of 10 key environmental risks (rows (1) – (10)) and 3 environmental opportunities (rows (11) – (13)). Each key issue (column (1)) receives an exposure score (column (2)) and a management score (column (3)) ranging from 0 to 10. For the environmental risks, the exposure score measures the level of risk faced by a company from a given environmental key factor, while the management score captures how well the company manages that risk. Environmental opportunities are assessed in a similar way, where an exposure score measure the relevance of the opportunity to the firm, and the management score captures the firm's capacity to exploit it. Each key issue receives a total score (column (4)) depending on how well a risk is managed. MSCI assigns weights to each key issue (column (5)) based on their materiality to the industry where the firm operates. The weighted total scores are pooled in four themes (columns (6) – (7)): (1) climate change, (2) pollution and waste management, (3) natural resources, and (4) environmental opportunities, and the weighted themes (column (8)) make up the aggregate environmental pillar score of a firm (column (10)) – (Source: MSCI ESG Score Index Guide).

Environmental key issues					**Environmental themes**			**Environmental pillar**		
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
Key issues	Exposure score	Management score	Total score	Weight	Themes	Score	Weight	Pillar	Score	Weight
(1) Carbon emissions	2.8	6.3	10	0	Climate change	10	0	Environmental pillar	5.8	38
(2) Energy efficiency	2.3	0	0	0						
(3) Product carbon footprint	5.3	0	0	0						
(4) Financing environmental impact	0	0	0	0						
(5) Water stress	3.5	6.4	9.9	0	Natural resources use	9.6	0			
(6) Biodiversity & land use	3.9	0	0	0						
(7) Raw materials sourcing			0	0						
(8) Toxic emissions & waste	8.1	6.2	5.1	19	Pollution and waste management	5.1	19			
(9) Packaging materials & waste	0	0	0	0						
(10) Electronic waste	0	0	0	0						
(11) Opportunities in clean-tech	5.2	6.8	6.4	19	Environmental opportunities	6.4	19			
(12) Opportunities in green building	0	0	0	0						
(13) Opportunities in renewable energy	0	0	0	0						

Overall environmental performance (Environmental pillar score) = 5.8 (The aggregate environmental pillar score as computed by MSCI (column (10)).

Environmental risks performance = $\frac{10+0+0+9.9+0+5.1}{6} = 4.2$ (For the environmental risk key issues (rows (1) – (10)) that have an exposure score different from zero (column (2)).

Environmental opportunities performance = $\frac{6.4}{1} = 6.4$ (For the environmental opportunities key issues (rows (11) – (12)) that have an exposure score different from zero (column (2)).

Appendix 2: Variable definition

Variable name	Variable definition	Data source
Overall environmental performance	The weighted environmental pillar score as calculated by MSCI (see column 10 in Appendix 1)	MSCI ESG Score
Environmental risk performance	The average of the total scores of environmental risks key issues (rows (1) - (10) in Appendix 1) to which the firm is exposed i.e., a non-zero exposure score (column (2) in Appendix 1)	MSCI ESG Score
Environmental opportunities performance	The average of the total scores of environmental opportunities key issues (rows (11) - (13) in Appendix 1) to which the firm is exposed i.e., a non-zero exposure score (column (2) in Appendix 1)	MSCI ESG Score
Sphere control	An indicator variable equal to one if the largest owner is a business sphere and controls 10% or more of the voting rights, and zero otherwise. In robustenss test i use the 20% treshold instead.	Modular Finance Holding
Family control	An indicator variable equal to one if the largest owner is a family and controls 10% or more of the voting rights, and zero otherwise. In robustenss test i use the 20% treshold instead.	Modular Finance Holding
Industry average sphere control	The average sphere control (voting) rights at by industry.	Modular Finance Holding
Leverage	The ratio of total debt to total assets. Total debt is the sum of long- and short-term debt, where debt refers to all interest bearing and capitalized leased obligations.	Datastream
Total assets	The book value of assets (in SEK).	Datastream
Market-to-book ratio (MTB)	The ratio of the market value of assets to the book value of assets. The market value of equity is the book value of assets plus the market capitalization minus book value of equity.	Datastream
Return on assets (ROA)	The ratio of net income before extraordinary items to total assets.	Datastream
R&D/Total sales	The ratio of research and development expenses (R&D) to total assets, and is a measure of growth opportunities.	Datastream
Stock turnover	The ratio of trading volume to the total number of shares outstanding.	Datastream
Firm age	The age of the firm since inception.	Datastream
Board size	The total number of directors in the board, excluding employee representatives and CEOs who do not sit on the board.	Modular Finance Holding
Control dispersion (HI)	The Herfindal index for the five largest owners by vote: $[(\text{Vote } 1 - \text{Vote } 2)^2 + (\text{Vote } 2 - \text{Vote } 3)^2 + (\text{Vote } 3 - \text{Vote } 4)^2 + (\text{Vote } 4 - \text{Vote } 5)^2]/100$	Modular Finance Holding
Independent directors (%)	The ratio of independent directors relative to the size of the board.	Modular Finance Holding
Dependent CEO /Chair	An indicator variable equal to one if the CEO and/or the Chairman of the board are dependent vis-a-vis the largest shareholder.	Modular Finance Holding
Institutional ownership	The sum of the voting rights of insitutional owners (excluding institutional owners when they are the controlling owners).	Modular Finance Holding
Dual-class shares	An indicator variable equal to one if the largest owner uses dual-class shares, and zero otherwise.	Modular Finance Holding
Diversified owner	An indicator variable equal to one if an owner owns shares in firms operating in different industries, and zero otherwise.	NASDAQ OMX
Second controlling owner	An indicator variable equal to one if the second largest owner controls 10% or more of the voting rights, and zero otherwise.	Modular Finance Holding

Table 1: Summary statistics by industry and year

	(1)	(2)	(3)	(4)	(5)
Panel A: Industry		**Ownership rights**	**Control rights**	**Voting rights ≥ 10%**	
	N	Mean	Mean	Family	Sphere
Technology	18	0.143	0.223	0.644	0.203
Telecommunications	8	0.226	0.287	0.541	0.541
Health Care	29	0.215	0.313	0.562	0.333
Real Estate	26	0.295	0.386	0.825	0.386
Automobiles and Parts	4	0.215	0.272	0.529	0.471
Consumer Products and Services	17	0.197	0.306	0.672	0.422
Media	2	0.158	0.329	0.625	0.625
Retail	9	0.248	0.311	0.841	0.636
Travel and Leisure	10	0.149	0.222	0.667	0.051
Food, Beverage and Tobacco	4	0.188	0.223	0.640	0.400
Personal Care, Drug and Grocery Stores	5	0.389	0.427	0.545	0.682
Construction and Materials	19	0.182	0.323	0.683	0.537
Industrial Goods and Services	42	0.227	0.312	0.656	0.429
Basic Resources	10	0.212	0.346	0.608	0.686
Energy	2	0.204	0.204	0.636	0.000
Total	205	0.221	0.312	0.666	0.422
Panel B: Year		**Ownership rights**	**Control rights**	**Voting rights ≥ 10%**	
	N	Mean	Mean	Family	Sphere
2013	33	0.214	0.365	0.667	0.727
2014	82	0.192	0.300	0.707	0.537
2015	90	0.209	0.310	0.644	0.478
2016	104	0.216	0.315	0.635	0.423
2017	161	0.220	0.305	0.677	0.391
2018	192	0.232	0.311	0.661	0.365
2019	179	0.232	0.312	0.670	0.374
Total	841	0.221	0.312	0.666	0.422

This table provides sample distribution by industry in Panel A and by year in Panel B. Column (1) sows firm distribution, in column (2) I report the average ownership rights, and in column (3) the average voting rights. In columns (4) and (5), I show the percentage of firms with a controlling family or sphere, respectively. Industry classification follows the Nasdaq OMX Industry Classification Benchmark (ICB). Control is defined as voting rights larger or equal to 10%.

Table 2: Summary statistics

Panel A: Descriptive statistics	**N**	**Mean**	**Median**	**SD**	**Min**	**Max**
Env. Score	841	5.243	5.100	1.978	0	10
Env. Risk Performance	841	3.224	2.100	2.674	0	10
Env. Opp Performance	841	1.889	1.750	2.110	0	7.800
Leverage	841	0.253	0.245	0.173	0	0.749
Total assets (mil)	841	30258	9182	55260	67	511595
MTB	841	2.221	1.567	2.039	0.467	12.333
ROA	841	0.059	0.061	0.112	-0.528	0.393
R&D/Total sales	841	0.024	0	0.061	0	0.401
Turnover	841	0.663	0.505	0.640	0.024	4.834
Firm age	841	57.404	41	49.6	0	330
Board size	841	7.551	8	1.424	3	13
Control dispersion (HI)	841	9.673	3.322	15.654	0.005	88.930
Independent directors (%)	841	0.873	0.875	0.121	0.400	1
Dependent CEO /Chair	841	0.593	1	0.492	0	1
Institutional ownership	841	0.153	0.141	0.089	0	0.462

Panel B: Univariate comparison of means	**Sphere controlled firms (N=355)**		**Non-sphere firms (N=486)**		
	Mean	**SD**	**Mean**	**SD**	**Mean difference**
Env. Score	5.775	1.928	4.854	1.923	-0.920***
Env. Risk Performance	3.950	2.917	2.693	2.345	-1.256***
Env. Opp Performance	2.301	2.357	1.588	1.855	-0.712***
Leverage	0.247	0.145	0.257	0.190	0.010
Total assets (mil)	49125.42	71237.8	16476.75	33671.73	-32648.67***
MTB	1.870	1.265	2.477	2.423	0.607***
ROA	0.0625	0.071	0.057	0.135	-0.005
R&D/Total sales	0.017	0.002	0.029	0.074	0.012**
Turnover	0.677	0.730	0.652	0.567	-0.025
Firm age	67.256	57.320	50.207	41.710	-17.048***
Board size	7.897	1.609	7.298	1.213	-0.598***
Control dispersion (HI)	13.568	18.613	6.828	12.343	-6.739***
Independent directors (%)	0.862	0.127	0.881	0.117	0.018**
Dependent CEO /Chair	0.690	0.463	0.523	0.500	-0.167***
Institutional ownership	0.140	0.078	0.162	0.095	0.023***

This table reports descriptive statistics for the regression variables in Panel A, and tests of differences in means between firms with a controlling sphere and non-sphere firms in Panel B. Panel C shows Pearson correlation coefficients. The sample consists 205 unique firms and 841 firm-year observations over the period 2013 – 2019. All accounting variables are winsorized at the top and bottom percentiles. Variable definitions and data sources are provided in Appendix 2. ***, **, * refer to statistical significance at the 1%, 5% and 10% significance levels.

Table 2 continued,

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) Env. Score	1.000														
(2) Env. Risk Performance	0.368***	1.000													
(3) Env. Opp Performance	-0.150***	0.029	1.000												
(5) Total assets (mil)	0.079**	0.178***	-0.094***	1.000											
(4) Leverage	0.053*	-0.054*	0.087***	0.160***	1.000										
(6) MTB	-0.078**	-0.037	-0.075**	-0.117***	-0.324***	1.000									
(7) ROA	0.020	0.066**	0.065**	-0.070**	-0.123***	0.195***	1.000								
(8) R&D/Total sales	-0.022	-0.041	-0.086***	-0.039	-0.112***	0.284***	-0.473***	1.000							
(9) Turnover	0.142***	0.179***	-0.064*	-0.005	-0.124***	0.006	-0.030	0.123***	1.000						
(10) Firm age	0.061*	0.247***	0.224***	0.100***	0.050	-0.161***	0.058*	-0.109***	-0.023	1.000					
(11) Board size	0.096***	0.260***	-0.017	0.362***	-0.064**	-0.090***	-0.004	-0.041	0.090***	0.265***	1.000				
(12) Independent directors (%)	-0.003	0.022	-0.039	-0.009	-0.064**	0.058*	-0.040	0.016	0.135***	0.070**	0.208***	1.000			
(13) Control dispersion (HI)	0.086***	0.003	-0.023	-0.057*	-0.055*	-0.085***	0.039	-0.087***	-0.160***	0.115***	-0.033	-0.320***	1.000		
(14) Family managment	-0.027	0.014	-0.015	0.032	-0.009	-0.066**	0.088***	-0.095***	-0.208***	0.008	-0.025	-0.405***	0.192***	1.000	
(15) Institutional ownership	-0.106***	-0.156***	0.014	-0.017	-0.043	0.092***	-0.024	0.051	-0.053*	-0.149***	0.014	0.183***	-0.394***	-0.088***	1.000

Table 3: Sphere control and firm environmental performance

VARIABLES	(1) Env. Perf	(2) Env. Risk Performance	(3) Env. Opp Performance	(4) Env. Perf	(5) Env. Risk Performance	(6) Env. Opp Performance	(7) Env. Perf	(8) Env. Risk Performance	(9) Env. Opp Performance
Sphere control (≥ 10%)	0.421***	0.118	0.558***	0.663***	0.147	0.146	0.429***	0.074	0.527***
	(0.135)	(0.144)	(0.159)	(0.202)	(0.217)	(0.160)	(0.155)	(0.123)	(0.145)
Total assets (log)	0.394***	0.411***	0.051	0.261***	0.410***	0.161**	0.404***	0.374***	0.025
	(0.054)	(0.059)	(0.049)	(0.080)	(0.068)	(0.076)	(0.064)	(0.054)	(0.064)
Leverage	0.413	-0.522	0.715*	0.806	-1.106**	1.527***	0.243	-0.579	0.668*
	(0.406)	(0.427)	(0.413)	(0.542)	(0.496)	(0.524)	(0.432)	(0.414)	(0.371)
MTB	0.074*	0.089***	0.042	0.045	0.055	0.114**	0.078*	0.085***	0.046*
	(0.043)	(0.033)	(0.026)	(0.065)	(0.054)	(0.052)	(0.046)	(0.032)	(0.024)
ROA	-0.107	-0.378	1.121**	0.214	-0.139	1.391	-0.191	-0.307	1.012*
	(0.750)	(0.527)	(0.476)	(1.210)	(0.852)	(0.864)	(0.570)	(0.587)	(0.566)
R&D/Total sales	-4.558***	-1.301	4.615***	-4.119	-0.768	5.472***	-4.708***	-1.483	3.991***
	(1.374)	(1.621)	(1.126)	(2.617)	(2.130)	(2.088)	(1.341)	(1.515)	(1.044)
Turnover	0.246**	-0.030	-0.229***	0.346***	-0.103	-0.113	0.234*	-0.068	-0.134
	(0.096)	(0.124)	(0.082)	(0.113)	(0.170)	(0.094)	(0.124)	(0.143)	(0.088)
Firm age	-0.001	0.005***	0.007***	-0.000	0.004***	0.008***	-0.000	0.005***	0.007***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Board size	-0.143***	0.031	0.134**	-0.155***	0.012	0.104	-0.143**	0.041	0.142***
	(0.046)	(0.047)	(0.056)	(0.054)	(0.071)	(0.072)	(0.057)	(0.051)	(0.052)
Ratio of independent directors	0.226	0.065	-1.355***	0.805	0.428	-1.745***	0.277	0.151	-1.288**
	(0.562)	(0.601)	(0.460)	(0.690)	(0.857)	(0.504)	(0.488)	(0.717)	(0.500)
Control dispersion (HI)	0.002	-0.004	-0.022***	0.004	-0.006	-0.018***	0.001	-0.003	-0.021***
	(0.004)	(0.006)	(0.004)	(0.005)	(0.006)	(0.004)	(0.004)	(0.004)	(0.005)
Dependent CEO /Chair	-0.141	-0.005	-0.385***	-0.258	-0.114	-0.451**	-0.134	0.021	-0.348***
	(0.132)	(0.134)	(0.121)	(0.173)	(0.214)	(0.191)	(0.140)	(0.117)	(0.125)
Institutional ownership	0.529	-1.807***	-0.396	0.228	-2.435***	-0.019	0.456	-1.961***	-0.496
	(0.619)	(0.668)	(0.666)	(0.845)	(0.740)	(0.674)	(0.647)	(0.695)	(0.658)
Constant	0.558	-2.447***	-0.861	1.470	-1.484	-2.299**	0.495	-2.125***	-0.789
	(0.716)	(0.706)	(0.750)	(0.970)	(1.005)	(1.009)	(0.689)	(0.772)	(0.632)
Observations	841	841	841	571	571	571	807	807	807
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.321	0.637	0.496	0.291	0.608	0.517	0.316	0.619	0.477

This table reports OLS regression results for the main model, where the main explanatory variable is Sphere control, which is an indicator variable equal to one if the largest owner of the firm has 10% or more of the voting rights, and zero otherwise. Results for the full sample are shown in columns (1)-(3), those for the sub-sample of family firms are shown in columns (4)-(6)), and in columns (7)-(9) we show results for the full sample excluding firms controlled by a non-family sphere. The dependent variable in columns (1), (4) and (7) is overall environmental performance score as computed by MSCI. In columns (2), (5) and (8) the dependent variable is environmental risks performance, while in columns (3), (6) and (9) the dependent variable is environmental opportunities performance. All accounting variables are winsorized at the top and bottom percentiles. I control for year and industry fixed effects in all specifications. Industry classification follows the Nasdaq OMX Industry Classification Benchmark (ICB). Values in parenthesis are bootstrapped standard errors, and ***, **, * refer to statistical significance at the 1%, 5% and 10% significance levels. Variable definition is in Appendix 2.

Table 4: Instrumental variables model

VARIABLES	(1) First stage	(2) Env. Perf	(3) Env. Risk Performance	(4) Env. Opp Performance
Industry average sphere control	0.046***			
	(0.001)			
Sphere control (≥ 10%) - Predicted		0.426***	0.119	0.674***
		(0.119)	(0.150)	(0.123)
Total assets (log)	0.040***	0.393***	0.411***	0.035
	(0.008)	(0.047)	(0.048)	(0.092)
Leverage	-0.015	0.414	-0.522	0.749
	(0.055)	(0.317)	(0.493)	(0.640)
MTB	0.004	0.074***	0.089***	0.042
	(0.003)	(0.019)	(0.027)	(0.035)
ROA	-0.089	-0.107	-0.378	1.124*
	(0.077)	(0.390)	(0.492)	(0.609)
R&D/Total sales	0.047	-4.560***	-1.301	4.588***
	(0.166)	(1.240)	(1.532)	(1.466)
Turnover	0.038*	0.246**	-0.030	-0.227***
	(0.020)	(0.100)	(0.133)	(0.052)
Firm age	-0.000	-0.001	0.005***	0.008***
	(0.000)	(0.001)	(0.001)	(0.001)
Board size	-0.002	-0.143**	0.031	0.136
	(0.006)	(0.060)	(0.029)	(0.096)
Ratio of independent directors	0.029	0.227	0.066	-1.330***
	(0.070)	(0.551)	(0.607)	(0.366)
Control dispersion (HI)	-0.001***	0.002	-0.004	-0.022***
	(0.000)	(0.003)	(0.006)	(0.004)
Dependent CEO /Chair	0.043***	-0.141	-0.005	-0.400***
	(0.014)	(0.127)	(0.107)	(0.114)
Institutional ownership	-0.016	0.530	-1.807***	-0.389
	(0.064)	(0.519)	(0.648)	(0.570)
Constant	-0.854***	5.306***	3.131***	0.563*
	(0.066)	(0.894)	(1.201)	(0.329)
Observations	841	841	841	841
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
R-squared	0.874	0.347	0.651	0.516

This table reports results for a 2SLS regression model for the full sample. The endogenous variable is Sphere control, which is an indicator variable equal to one if the largest owner of the firm has 10% or more of the voting rights, and zero otherwise. The instrument used in first stage is the average sphere control (voting) rights in the industry. Results from the first stage are reported in column (1). Second stage results are reported in columns (2)-(4), where the main explanatory variable is the predicted value for the endogenous variable from the first stage. The dependent variable in column (2) is overall environmental performance score as computed by MSCI. In column (3), the dependent variable is environmental risks performance, while in column (4) the dependent variable is environmental opportunities performance. All accounting variables are winsorized at the top and bottom percentiles. I control for year and industry fixed effects in all specifications. Industry classification follows the Nasdaq OMX Industry Classification Benchmark (ICB). Values in parenthesis are bootstrapped standard errors, and ***, **, * refer to statistical significance at the 1%, 5% and 10% significance levels. Variable definition is in Appendix 2.

Table 5: Sample matching

	Matched on: Size, MTB, Industry			Matched on: Size, MTB, industry, leverage, ROA, growth, board size, control dispersion (HI) and institutional ownership		
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Env. Performance	Env. Risk Performance	Env. Opp Performance	Env. Performance	Env. Risk Performance	Env. Opp Performance
Sphere control (≥ 10%)	0.526***	0.194	0.532***	0.520***	0.225	0.502***
	(0.163)	(0.168)	(0.145)	(0.137)	(0.162)	(0.153)
Constant	0.496	-1.761*	-1.160	0.849	-1.619	-1.693*
	(0.997)	(0.985)	(0.923)	(0.798)	(0.992)	(0.870)
Observations	606	606	606	628	628	628
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Governance controls	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.296	0.600	0.466	0.339	0.610	0.487

This table reports results for OLS regression models for the main model using a sub-sample of matched firms. The main explanatory variable is Sphere control, which is an indicator variable equal to one if the largest owner of the firm has 10% or more of the voting rights, and zero otherwise. The matched sample is based on nearest neighbor propensity scores estimated using a Logit model, without replacement. In columns (1)-(3) the propensity score is calculated on firm size, MTB and industry, while in columns (4)-(6), they are calculated using firm size, MTB, industry, leverage, ROA, growth, board size, control dispersion (HI) and institutional ownership. The dependent variable in columns (1) and (4) is overall environmental performance score as computed by MSCI. In columns (2) and (5), the dependent variable is environmental risks performance, while in columns (3) and (6) the dependent variable is environmental opportunities performance. All accounting variables are winsorized at the top and bottom percentiles. I control for year and industry fixed effects in all specifications. Industry classification follows the Nasdaq OMX Industry Classification Benchmark (ICB). I control for firm and governance variables in all specifications (unreported to save space). Values in parenthesis are bootstrapped standard errors, and ***, **, * refer to statistical significance at the 1%, 5% and 10% significance levels. Variable definition is in Appendix 2.

Table 6: Interaction effects

VARIABLES	(1) Env. Performance	(2) Env. Risk Performance	(3) Env. Opp Performance
Panel A: Dual-class shares			
Sphere control (≥ 10%)	0.100	-0.066	0.532***
	(0.191)	(0.144)	(0.190)
Dual-class shares	0.124	0.100	-0.151
	(0.164)	(0.112)	(0.147)
Sphere control x Dual-class shares	0.556**	0.311	0.088
	(0.264)	(0.203)	(0.242)
Constant	0.837	-2.290***	-0.821
	(0.703)	(0.868)	(0.592)
Adjusted R-squared	0.327	0.638	0.496
Panel B: Diversified owner			
Sphere control (≥ 10%)	0.766***	-0.159	0.419**
	(0.221)	(0.270)	(0.195)
Diversified owner	-0.282*	-0.413***	-0.234*
	(0.163)	(0.127)	(0.136)
Sphere control x Diversified owner	-0.310	0.549*	0.288
	(0.304)	(0.308)	(0.246)
Constant	0.151	-2.378***	-0.837
	(0.752)	(0.730)	(0.534)
Adjusted R-squared	0.325	0.639	0.497
Panel C: Second controlling owner			
Sphere control (≥ 10%)	0.210	0.074	0.925***
	(0.171)	(0.169)	(0.171)
Second controlling owner (≥ 10%)	-0.348**	0.159	-0.051
	(0.138)	(0.145)	(0.136)
Sphere control x Second controlling owner	0.553*	0.096	-0.911***
	(0.282)	(0.236)	(0.243)
Constant	0.548	-2.583***	-0.464
	(0.744)	(0.831)	(0.602)
Adjusted R-squared	0.324	0.637	0.512
Observations	841	841	841
Firm controls	Yes	Yes	Yes
Governance controls	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes

This table reports OLS regression results for the main model including interaction terms. The main explanatory variable is *Sphere control*, which is an indicator variable equal to one if the largest owner of the firm has 10% or more of the voting rights, and zero otherwise. In Panel A, we report results for a model where the variable *Sphere control* is interacted with the variable *Dual-class shares*, which is an indicator variable equal to one if the largest owner uses dual-class shares, and zero otherwise. Panel B shows results for a model where we interact *Sphere control* with the variable *Diversified owner*, which is an indicator variable equal to one if an owner owns shares in firms operating in different industries, and zero otherwise. In Panel C we report we report results for a model where the variable *Sphere control* is interacted with the variable *Second controlling*, which is an indicator variable equal to one if the second largest owner controls 10% or more of the voting rights, and zero otherwise. The dependent variable in column (1) is overall environmental performance score as computed by MSCI. In column (2) the dependent variable is environmental risks performance, while in column (3) the dependent variable is environmental opportunities performance. All accounting variables are winsorized at the top and bottom percentiles. I include year and industry fixed effects in all specifications. Industry classification follows the Nasdaq OMX Industry Classification Benchmark (ICB). I control for firm and governance variables in all specifications (unreported to save space). Values in parenthesis are bootstrapped standard errors, and ***, **, * refer to statistical significance at the 1%, 5% and 10% significance levels. Variable definition is in Appendix 2.

Table 7: Robustness

	Control treshold 20%			Including financial firms			Standard errors clustered by year and insutry			Standard errors clustered by firm			OLS robust standard errors		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
VARIABLES	Env. Performance	Env. Risk Performance	Env. Opp Performance	Env. Performance	Env. Risk Performance	Env. Opp Performance	Env. Performance	Env. Risk Performance	Env. Opp Performance	Env. Performance	Env. Risk Performance	Env. Opp Performance	Env. Performance	Env. Risk Performance	Env. Opp Performance
Sphere control (≥ 10%)				0.386***	0.094	0.559***	0.421***	0.118	0.558***	0.421	0.118	0.558**	0.421***	0.118	0.558***
				(0.120)	(0.130)	(0.132)	(0.118)	(0.130)	(0.181)	(0.288)	(0.188)	(0.279)	(0.141)	(0.139)	(0.136)
Sphere control (≥ 20%)	0.396***	0.157	0.461***												
	(0.135)	(0.137)	(0.149)												
Constant	0.499	-2.420***	-1.000	-0.053	-2.435***	-0.577	0.813	0.458	-0.124	0.813	0.458	-0.124	0.813	0.458	-0.124
	(0.603)	(0.680)	(0.632)	(0.706)	(0.764)	(0.520)	(0.534)	(0.758)	(0.522)	(1.066)	(0.969)	(1.072)	(0.644)	(0.772)	(0.617)
Adjusted R-squared	0.319	0.637	0.492	0.337	0.658	0.511	0.321	0.637	0.496	0.321	0.637	0.496	0.321	0.637	0.496
Observations	841	841	841	944	944	944	841	841	841	841	841	841	841	841	841
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Governance controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table reports OLS regression results for the main model. Columns (1)-(3) show results for the main model using as the main explanatory variable Sphere control (≥20%), which is an indicator variable equal to one if the largest owner of the firm has 20% or more of the voting rights, and zero otherwise. Columns (4)-(6) reports results for the main model including financial firms in the sample. Columns (7)-(9) shows results for the main model using standard errors clustered by year and industry. In columns (10)-(12) standard errors are clustered by firm, and in columns (13)-(15) I report results using OLS robust standard errors. The dependent variable in columns (1), (4), (7), (10) and (13) is overall environmental performance score as computed by MSCI. In columns (2), (5), (8), (11) and (14) the dependent variable is environmental risks performance, while in columns (3), (6), (9) (12) and (15) the dependent variable is environmental opportunities performance. All accounting variables are winsorized at the top and bottom percentiles. I control for year and industry fixed effects in all specifications. Industry classification follows the Nasdaq OMX Industry Classification Benchmark (ICB). I control for firm and governance variables in all specifications (unreported to save space). Values in parenthesis are bootstrapped standard errors, and ***, **, * refer to statistical significance at the 1%, 5% and 10% significance levels. Variable definition is in Appendix 2.