Control Rights and Corporate Sustainability
Around the World

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Abstract

We examine the impact of outside investors' control rights on firms' environmental performance by studying a large international sample of firms. We hypothesize that sustainability-oriented outside investors will have difficulty getting firms to achieve higher environmental performance levels if their control rights are relatively weak. Consistent with this hypothesis, we find firms that are family controlled have lower environmental performance relative to other firms. For widely-held firms, in which control is contestable, specific governance mechanisms which increase outsider investors' power improve environmental performance. Further, based on recent research linking corporate sustainability to gender, we test for gender effects within firms' boards and find that the presence of a female director significantly improves environmental performance. Notably, having a woman on the board more than offsets the negative environmental performance associated with family control. To the extent that sustainability-oriented investors seek to influence firms' environmental performance around the world, our findings suggest that their control rights play an important role and they will be most effective if they use them to elect female directors.

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JEL Classification: G15, G23, G32

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1. Introduction

Capital markets around the world are increasingly pricing environmental risks that are both firm-specific, such as oil spills, and systemic, such as climate change. But is there more to the capital market story than just the pricing and hedging of risks? That is, can finance help to actually reduce environmental risks?

Through capital markets outside investors acquire securities that give them power to directly influence firms' actions. But the extensive international corporate governance literature demonstrates that investor power is not the same across all firms, and where control rights are weak or absent, investors have limited influence. Thus, sustainability-oriented investors interested in reducing environmental risks need to understand the importance of control rights (and corporate governance in general) for environmental performance. This paper examines precisely this control-rights channel. Our paper breaks apart the traditional components of corporate sustainability, which are often measured in aggregate and labeled simply as ESG (Environmental, Social, and Governance). Prior work on sustainability (e.g., Liang and Renneboog (2017) and Lins, Servaes, and Tamayo (2017)) has generally controlled for governance or has abstracted away from it, rather than having directly focused on governance. If control rights are fundamental, then governance deserves special consideration.

To study the impact of outside investors' control rights on firms' environmental performance we use a sample of 3,487 non-U.S. firms from 41 countries over the 2004 to 2015 period. This international sample allows us to better identify the effect of control rights because we have both within-country and cross-country variation in control rights structures.

We first measure outside investors' control rights using a broad measure of control—differentiating between block-controlled firms and widely-held firms. Our expectation is that

insiders in controlled firms are in large part inured from the views of outsiders. Put another way, outsider investors' control rights will be very low or non-existent for block-controlled firms. As such, insiders in these firms can choose levels of environmental investments that are optimal for themselves, disregarding whether these choices are optimal for outside shareholders and other stakeholders. We combine information from several data sources (Orbis, Datastream, Global Family Business Index list of the largest family firms, and ASSET4), with the goal of separating firms in the following three categories: (1) firms controlled by a family; (2) firms controlled by non-family blockholders; and (3) widely-held firms without a controlling blockholder.

We next measure control rights using specific governance mechanisms that give outside investors power and have been the focus of much of the governance literature. We emphasize items related to outside shareholders' ability to shape the board of directors and items related to CEO and board entrenchment. This governance data is obtained from Thomson Reuters, MSCI, and BoardEx. The control rights obtained through these governance mechanisms give sustainability-oriented investors greater power to ensure that managers pay attention to environmental risks. These governance mechanisms vary considerably across block-controlled and widely-held firms, across time, and across countries.

To assess environmental performance, investors can access metrics from a number of commercial vendors that sell 'ESG' data packages. For our paper, we obtain firm-level environmental performance data from Thomson Reuters (ASSET4), as in prior research on the environmental performance of firms around the world (see, for example, Hsu, Liang, and Matos (2017) and Dyck, Lins, Roth, and Wagner (2018), among others). We use the proprietary-weighted environmental score (called a *z*-score) computed by ASSET4 and also use the individual environmental line items reported to investors by ASSET4 to construct an equally-weighted

environmental performance score. We combine these governance and environmental performance data with financial statement and stock market data from Worldscope.

Our initial tests focus on (the lack of) outside investor control rights when a firm is block controlled. By far the most prominent form of blockholding in our global sample is family ownership. The average percentage of family firms across countries is 32%. The average percentage of widely-held firms is 58%.

We test whether family control is associated with firms' environmental performance by regressing the environmental scores on an indicator measuring whether a firm is family-owned while including controls for size, industry, country, year, and a variety of other observable factors that may affect environmental performance directly. Relative to widely-held firms, we find that family ownership significantly and negatively impacts environmental performance. The magnitude is sizable. The regression coefficients indicate that, all else equal, family-owned firms have a 9% to 13% lower environmental performance, depending on which environmental score we use.

We next assess whether specific governance mechanisms that correspond to stronger outside investor control rights have any significant impact on firms' environmental performance. The premise in these tests is similar to that of prior studies of activist engagements in which an initial governance improvement in a target firm later helps achieve a specific performance outcome (see, e.g., Becht, Franks, Grant, and Wagner, 2017). We find that enhanced-control-rights mechanisms positively and significantly impact environmental performance. For example, in firms with a 'majority voting' provision, investors have more power, as directors need at least 50% investor support to hold a board seat. All else equal, firms with such a provision have 8% to 10% greater environmental performance than firms that do not have majority voting rules. We find

similar results using alternative measures of board independence or board and CEO entrenchment. The positive impact of these enhanced-control-rights mechanisms on firms' environmental performance is similar in magnitude to the negative impact of family ownership.

A natural concern with these tests is the endogeneity of governance attributes such as majority voting and board independence. As, for example, Hermalin and Weisbach (2003) emphasize, an omitted factor may affect both the level of board independence and corporate outcomes (in this case, firms' environmental performance). To control for time-invariant unobserved firm characteristics, we estimate firm fixed effects specifications for the four specific governance mechanisms for which there is meaningful time-series variation (e.g., we can compare a firms' environmental performance before and after it adopts majority-voting provisions). We continue to find that stronger control rights obtained through enhanced governance mechanisms positively and significantly impacts firms' environmental performance. In these firm fixed effect regressions the coefficients are somewhat smaller in magnitude, but generally have similar levels of statistical significance. These results are supportive of the hypothesis that better governance mechanisms impact firms' environmental performance.

We next examine whether governance mechanisms that plausibly enhance outsider control rights make any difference for the environmental performance of family-owned firms compared to other firms. As discussed, outside investors in family-controlled firms will generally have little or no power to shape the views of insiders regarding environmental performance: do specific governance mechanisms help? Or do these mechanisms primarily work for widely-held firms in which control is contestable? We address these questions by interacting the indicator for family control with each of the specific governance mechanisms. We find that almost all governance mechanisms have no effect on environmental performance in family-controlled firms. The only

exception is majority election provisions—these lessen the negative impact of family control on environmental performance. In contrast, in widely-held firms all of the specific governance mechanisms have a positive and significant impact on firms' environmental performance.

Based on recent research linking corporate sustainability to gender (see, e.g., Cronqvist and Yu (2017)), we also test whether the presence of a female director on the board influences firms' environmental performance. Cronqvist and Yu find that CEOs with daughters and female CEOs are associated with higher levels of ESG. The relation is particularly strong for the diversity component of ESG but is also present for the environmental component. We find that having at least one female director on the board has a larger positive impact on a firms' environmental performance than any of the control-rights variables we have studied. In terms of economic significance, the presence of a female director increases environmental performance by 15.3%.

Of course, the female director variable could simply be picking up the impact of improved governance arising from the specific governance mechanisms we have studied thus far. To help rule this out, we add each specific governance measure alongside the female director indicator. In all specifications, the coefficient estimate on the female director indicator continues to be negative and statistically significant. Importantly, the effect of each of the specific governance mechanism on firms' environmental performance remain the same in terms of size, magnitude, and significance as in the baseline tests. This suggests that the environmental impact of female board representation is complementary to the impact of control-rights mechanisms. Further, we also estimate a firm fixed effects model and the coefficient on the female director variable remains positive and strongly significant.

We next assess whether the negative impact of family control on firms' environmental performance is mitigated by having a woman on the board. Our previous tests show that specific

governance mechanisms generally do not lessen the impact of family ownership on environmental performance (with the exception of majority voting rules). Strikingly, even in family firms, having a woman on the board has a substantial and significant impact on firms' environmental performance, improving family-controlled firm's environmental performance by 12% to 13%. This is greater than the average negative impact of family control on firms' environmental performance, which varies from 6.7% to 12.6%. In other words, by adding a woman to the board of a family firm, the negative environmental performance associated with family control disappears.

In summary, the results in our paper show that sustainability-oriented investors that want to be most effective in their activism should push for enhanced corporate governance mechanisms in firms in which they are meaningful, that is, where control is contestable and outsiders are likely able to bring about change to firms' policies. Our results also provide a potential roadmap for sustainability-oriented investors that hold stakes in family firms for which we find that environmental performance is weak on average. We identify two factors that are strongly associated with improved environmental performance in these firms: majority voting provisions and the presence of at least one female on the board of directors.

Our results relate most directly to the literature on investor pressure for increased environmental performance at firms. Recent work such as Dimson, Karakas, and Li (2015) and Dyck et al. (2018) provides evidence that investors are able to actively push their environmental preferences into improvements in firms' environmental performance levels, but such work generally controls for some aspects of a firm's corporate governance rather than assessing whether strong governance is a pre-condition for successful environmental activism. We directly assess what happens when insiders are entrenched, and our results that entrenched family firms have

lower levels of environmental performance indicate that any environmental activism to date has not, on average, been fruitful for such firms.

These results have implications for institutional investors and regulators. One takeaway is the challenge that sustainability-oriented outsiders face in driving changes in family-owned firms by themselves, without regulatory controls or some other form of government intervention. In widely-held firms, our results indicate that sustainability-oriented investors benefit from corporate governance changes that reduce entrenchment, providing empirical support for a common practice of pushing first for governance before pushing for environmental changes.[1]

Our paper's focus on the control rights that outside investors possess is also related to recent work by Hart and Zingales (2017). In their paper they predict that environmental choices, in equilibrium, will crucially depend on the degree to which control of the firm is contestable. Their model shows that even if owners care about externalities (e.g., reducing global climate change or improving workers' status levels) they will not be able to get their firms to make such investments if there is an active market for corporate control, because then they will be replaced by other owners that do not share these beliefs. Their work suggests that when control is not contestable, we are most likely to observe the baseline preferences of owners, as they can impose their environmental preferences on firms without capital market consequences. We find that such preferences do seem to exist for family-controlled firms, and that they are not in the direction of a positive concern about tackling environmental externalities.

The paper proceeds as follows. Section 2 describes our sample, Section 3 tests the extent to which outside investors' control rights drive firms' environmental performance, Section 4 tests

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[1] As an example, a recent interview with the Vice President and the Senior Director for responsible investment practices at one of the largest Canadian pension plans, PSP, yielded the comment "governance is everything."

whether a board member's gender impacts a firm's environmental performance. Section 5 concludes.

2. Sample and Summary Statistics

2.1. Data Sources

We obtain data on firms' environmental performance from the Thomson Reuters ASSET4 ESG database. Thomson Reuters acquires information from annual reports, corporate sustainability reports, NGOs, and news sources for large, publicly traded companies from over 45 countries, at annual frequency. Thomson Reuters states that reported data items are chosen to maximize company coverage, timeliness of reporting, data availability, quality, and perceived materiality for investors. Consistent coverage of firms begins in 2004, with coverage for a few countries starting in 2009. We use data from the first year of coverage through year-end 2015 for our analysis.

ASSET4 evaluates firms' environmental commitments in three areas: Emission Reduction, Product Innovation, and Resource Reduction. Within each area, ASSET4 analysts identify specific line items (e.g., "Are the firm's greenhouse gas emissions/sales below the industry median in that year?"), with 70 items in total (see Appendix A for details).

There is no obvious 'right' weighting scheme of these line items that an investor should use. We use two weighting approaches for our main tests. As our first measure we use the proprietary-weighted aggregate scores that ASSET4 provides to investors (ASSET4 z-scores).[2] These rank-based scores range from 0 to 100 and measure the environmental performance relative to all other companies in a given year. For our second measure, we first transform all line items

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[2] The ASSET4 ESG database was first created in 2003. The data we use is based on their optimization released in 2014 which reports raw data only for 'strategic' items, which were collected beginning in 2003.

into indicator variables such that a 'one' corresponds to better environmental performance (e.g., a below-median greenhouse gas emission firm would get a 'one')[3] and construct an equally-weighted performance measure, where we weight all three environmental areas equally, and then sum across the areas to produce aggregate environmental performance scores.

For our broad control rights measure, we obtain detailed firm-level data on controlling blockholders from Thomson Reuters ASSET4, Datastream, Orbis (Bureau van Dijk), and the Global Family Business Index (obtained from Center for Family Business at the University of St. Gallen, Switzerland). We use the ownership information from these databases to group firms into the following three categories: (1) firms controlled by a family; (2) widely-held firms that are known to not have a controlling blockholder; and (3) firms controlled by non-family blockholders.

Beginning with family control, in each firm year we define a firm as being family controlled if any of the following conditions are met, across the four databases:

- Orbis identifies a family as the ultimate owner of the firm, where Orbis traces control by voting rights internationally and considers stakes held directly or indirectly, with a minimum controlling threshold of 25% (see also Lins, Volpin, and Wagner (2013)).

- Orbis identifies the ultimate owner to be a Nominee, Trust, or Trustee, and the firm has dual class shares (obtained from ASSET4).

- Datastream reports a minimum family stake of 20%, or Datastream reports a minimum family stake of 5% and the firm has dual class shares.

- The Global Family Business Index reports the firm as family controlled.

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[3] Specifically, for questions with a positive direction (i.e., a "yes" answer or a greater number is associated with better environmental performance), we translate the answers to Y/N questions into 0 (N) and 1 (Y); the answers to double Y/N questions into 0 (NN), 0.5 (YN or NY), and 1 (YY); and the answers to numerical questions into 0 (value is less (or equal) than zero; or value is less (or equal) than the median) and 1 (value is greater than zero; or value is greater than the median). For questions with a negative direction (i.e., a "no" answer or a lower number is associated with better environmental performance), the opposite coding applies.

For each firm, we impute intermittent years as family controlled if a firm is classified as family controlled in at least one earlier and one later year. We further extend family control both backwards and forwards in time if ASSET4 indicates that the votes of a firm's largest blockholder are within 5% of the year during which a firm is known to be family controlled and the largest blockholder's stake is at least 20%.

Next, in each firm year we define a firm as being widely held if any of the following conditions are met:

- Orbis classifies the firm as known to be widely held and the firm is not classified as family controlled by the previous rules (see again Lins, Volpin, and Wagner (2013)).

- ASSET4 indicates the largest blockholder's stake is below 50%, or does not report any largest blockholder stake, and the firm is not classified as family controlled.

Firms that are not family controlled or widely held we classify as other blockholder controlled.[4]

For our specific governance mechanism tests, we use data from BoardEx and Thomson Reuters to create several measures of governance. Majority Election is a dummy variable that equals one if the company's board members are generally elected with a majority vote, and zero otherwise. Board Independence is the number of independent directors scaled by board size. MSCI Entrenchment is a dummy variable that equals one if the board is entrenched and zero otherwise. We follow MSCI's definition (MSCI ESG Research, 2015) and measure board entrenchment if any of the following conditions exist: (more than 35% of the board has a tenure greater than 15 years; more than 4 directors have a tenure greater than 15 years; more than 4 directors are over 70 years old; or more than 22% of the board has a tenure greater than 15 years) and (more than 15%

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[4] This latter category includes controlling blockholders that are non-financial firms (themselves widely held), financial investors, governments, banks, and insurance firms.

of the directors are over 70 years old). CEO-Chair Duality is a dummy variable that equals one if the CEO and Chairman of the Board functions are combined, and zero otherwise. CEO Tenure is the number of years the CEO has been in office. Female Director is an indicator equal to one if there is at least one female on the board of directors in that firm year, and zero otherwise.

Finally, we obtain financial statement and stock market valuation data, institutional holdings, and cross-listed status from Worldscope, Datastream, Factset Ownership, ADR lists, and CRSP. Our final sample consists of 23,914 firm-year observations and covers 3,487 firms from 41 countries during the period 2004-2015.

2.2. Descriptive Statistics

There is significant variation in firms' environmental performance across countries, industries, and time. Table 1 provides basic summary statistics. As we describe below, in all of our tests we control for most of these sources of variation with fixed effects.

Panel A of Table 1 shows environmental scores for our entire sample. The mean (median) ASSET4 Environmental *z*-Score is 53.7 (56.3) and the mean (median) equally-weighted environmental score is 38.4 (35.8), where a perfect score would be 100 for each of the two measures. Panel B of Table 1 details average environmental scores by country across all 41 countries in the sample (we show data for the year 2012 to facilitate comparisons). The countries where firms have the highest environmental performance are all European (France, Finland, Spain, Sweden, for example, are ranked in the top five for the two measures of environmental performance). Countries where firms' environmental scores are lowest are concentrated in Asia, Australia, and Africa.[5]

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[5] We also find significant variation across industries (not reported). Unsurprisingly, the industries with the lowest environmental performance are mining (which includes oil and gas) and agriculture, forestry, and fishing (industries based on SIC divisions).

Panel B of Table 1 also shows, by country, the average fractions of firms that are family controlled, widely held, or controlled by other blockholders. Overall, 32% of the sample firms in 2012 are family controlled, 58% are widely held, and 10% are controlled by other blockholders. As expected, control rights vary substantially across countries. For example, Luxembourg, Mexico, and Turkey are the countries with the greatest fraction of family-controlled firms, whereas family-controlled firms are relatively rare in Australia, Ireland, Japan, and Taiwan. Widely-held firms are most common and represent more than 80% of all firms in Ireland, Taiwan, and the U.K., whereas widely-held firms comprise a quarter of all firms or less in Luxembourg, Mexico, Russia, and Turkey. Finally, non-family blockholder control is most frequent in Indonesia, Poland, and Russia. In all our multivariate analysis we include country fixed effects to ensure that any relation between environmental performance and control rights is identified by within-country variation.

In Panel C of Table 1 we report summary statistics for firms grouped by whether they are family controlled, widely held, or controlled by another blockholder. Environmental performance measures are lowest among family-controlled firms and highest among widely-held firms. In terms of measures of corporate governance, while there is variation across the different control types, family-controlled firms rank relatively low on governance quality. The univariate summary statistics suggest there is a negative correlation between family control and strong specific governance mechanisms that enhance outsider investors' control rights. The exception is the presence of one or more female directors which is between 63 and 66% for all control types.

3. Do Outside Investors' Control Rights Drive Firms' Environmental Performance?

In this section, we assess whether there is global evidence that control rights are a driving force behind firms' environmental performance.

3.1. Control Rights and Firms' Environmental Performance

Our baseline tests examine the relation between blockholder control indicators, specific corporate governance mechanisms, and firms' environmental performance using the following specification:

$$Log\left(Score_{it}\right) = \alpha + \beta'X_{it-1} + \gamma'Y_{it-1} + \Lambda + \varepsilon_{it}, \tag{1}$$

where the dependent variable is the log of one of the environmental scores of firm i in year t, X_{it-1} are measures of blockholder control and governance in firm i in year $t-1$, Y_{it-1} are a set of firm-level controls in year $t-1$, and Λ are year, country, and industry fixed effects.[6] We use logs of environmental scores to obtain better distributional properties and to reduce the impact of outliers.[7] For firm-level control variables we use firm size (log of total assets), cash, asset tangibility, leverage, profitability, institutional ownership, and whether a firm is cross-listed on a major U.S. stock exchange. We include firm size as prior literature has shown it to be related to ownership structures, and larger firms may be subject to more external pressures. Hong, Kubik, and Scheinkman (2012) suggest that financial slack also explains environmental adoption. Following them, we include cash, asset tangibility, and leverage to capture credit constraints, and profitability to capture the impact of performance. Cross-listing captures broad ownership and governance structures. The percentage of institutional ownership is included as Dyck et al. (2018) find that institutional investors are a major factor in environmental performance around the world. As noted in Eq. 1, all right-hand side variables are lagged by one year. We cluster standard errors by country.

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[6] Environmental variables reflect data available to ASSET4 analysts that covers the firm's fiscal year. A score for fiscal year 2010, for example, would reflect items that occurred during the 2010 fiscal year as well as information contained in the company annual report and any company sustainability reports published after the fiscal-year end early 2011. Thus, our baseline model with 2010 environmental scores would have fiscal-year-2009 right-hand-side variables.

[7] Our main results are unaffected if we use the raw scores rather than the log scores.

Table 2 reports the results of these tests. In Panel A, we use the ASSET4 Environmental *z*-Scores to measure firms' environmental performance. Column 1 includes Family and Other to measure whether a firm is family controlled or controlled by another blockholder type, and columns 2 through 6 include the two blockholder control rights dummies and the five specific governance mechanisms one at a time. In all six models, the coefficient on Family is negative and statistically significant with *p*-values less than 1%, whereas the coefficient on Other never obtains statistical significance. This implies that family-controlled firms have worse environmental performance relative to widely-held firms. Turning to the results in column 2 through 6, four out of five governance measures are significantly associated with firms' environmental performance (*p*-values < 5%) and one measure (CEO-Chair Duality) is almost significant at conventional levels (with a *p*-value of 11%). Firms that elect directors based on majority voting rules and firms with a greater fraction of independent directors have significantly greater environmental performance. In contrast, entrenched firms (measured with MSCI Entrenched, CEO-Chair Duality, and CEO Tenure) have weaker environmental performance.

Our results are also economically meaningful. Focusing on the results in column 2, for example, family-controlled firms have a 9.1% lower environmental performance compared to the rest of the sample firms. Controlling for whether a firm is family- or other-blockholder-owned, firms that elect their directors based on majority election rules have an 8.2% greater environmental performance compared to firms that do not have such a rule in place.

As for the other control variables, we find that larger firms, more profitable firms, and firms with greater tangibility show stronger environmental performance. Consistent with Dyck et al. (2018), firms with more institutional ownership have higher environmental scores.

Using the Equally-weighted Environmental Scores as an alternative measure of environmental performance in Panel B of Table 2 confirms our initial results—family control is significantly negatively associated with firms' environmental performance and better specific governance mechanisms are significantly positively related to firms' environmental performance.

To more directly assess the impact of the various governance mechanisms, we introduce firm fixed effects specifications in Table 3, and only keep those observations where the governance variables are time-varying during the sample period. As before, environmental performance as the dependent variable is measured with the proprietary ASSET4 z-Scores in Panel A and with the equally-weighted scores in Panel B. CEO Tenure is subsumed by the combined firm and year fixed effects. This within-firm specification is relatively demanding in terms of model power as governance mechanisms are generally sticky over time. Nonetheless, it confirms our prior results—stronger (lagged) specific governance mechanisms are positively associated with firms' (future) environmental performance.

Overall, our results indicate that family-controlled firms, in which outside investors have few if any control rights, are choosing relatively low levels of environmental performance. These findings have implications for institutional investors and governments. In particular, one takeaway is the challenge that sustainability-oriented outsiders face in driving changes in family-owned firms by themselves, without regulatory controls or some other form of government intervention. Another conclusion is that successful activism aimed at the environmental performance of widely-held firms and firms controlled by other blockholders may not move the needle as much as successful environmental activism aimed at family-controlled firms. Given that one out of three firms in our sample is family-controlled, this indicates an economically significant roadblock from the perspective of sustainability-oriented outsiders.

Our results also speak to the importance of control rights for firms in which control can be considered as contestable because there is not a controlling blockholder. For these firms, sustainability-oriented investors are likely to find it beneficial to seek enhanced specific governance mechanisms in order to bolster a firm's environmental performance.

3.2. Does the Interaction Between Family Control and Enhanced Specific Governance Mechanisms Matter for Firms' Environmental Performance?

Our next tests examine whether specific governance mechanisms have a differential effect on firms' environmental performance in family-controlled firms compared to other firms. If a firm is controlled by a family it may be challenging for outsiders to pressure insiders through traditional governance channels. Hence, insiders may be relatively immune to such pressures. Or it could be that one or more specific governance mechanism seems to be an effective channel to improve environmental performance in family controlled firms. To assess this, we estimate the following regression specification:

$$Log\left(Score_{it}\right) = \alpha + \beta_1 Family_{it-1} + \beta_2 Gov_{it-1} + \beta_3 Family_{it-1} \times Gov_{it-1} + \gamma' Y_{it-1} + \Lambda + \varepsilon_{it}, \qquad (2)$$

where the dependent variable is the log of one of the environmental scores of firm i in year t, *Family$_{it-1}$* is a dummy variable equal to one if the firm is family controlled, and zero otherwise, Gov$_{it-1}$ are measures of specific governance mechanisms, Y_{it-1} are a set of firm-level controls, and Λ are year, country, and industry fixed effects. The overall effect of a particular governance mechanism in family-controlled firms is the sum of the coefficient estimates on the governance measure and the interaction of the governance measure with the family indicator variable. The statistical significance is calculated using an F-test on the sum of these two coefficient estimates.

For the widely-held/other firms, the effect of a particular governance mechanism is equal to the coefficient estimate on the stand-alone governance variable.

Table 4 reports the overall effects of our governance measures on firms' environmental performance in family-controlled firms and widely held/other firms. Panel A shows numbers when we measure environmental performance with the ASSET4 Environmental z-Score, and Panel B reports results for the Equally-weighted Environmental Scores.

Consistent with family firms being relatively immune to outside pressures through specific governance mechanisms, the overall estimates of the specific governance measures for family firms are statistically zero in eight out of ten models. The only governance measure that obtains statistical significance with a p-value of less than 10% is whether a firm's directors are elected by majority elections. In contrast, for the widely-held/other firms in our sample, the specific governance measures are all statistically significantly associated with firms' environmental performance. In terms of economic magnitude, for example, widely-held/other firms with majority-director-election rules have on average a 10.5% (8.9%) greater ASSET4 Environmental z-Scores (Equally-weighted Environmental Scores) compared to firms without majority director elections.

Overall, these tests show that enhanced corporate governance mechanisms in firms in which they are meaningful, that is, where outsiders are likely able to bring about change to firms' policies, are positively associated with firms' environmental performance.

4. Does it Matter Who Investors Elect to the Board of Directors?

The findings in the previous indicate that when outsiders have control rights, firms pay more attention to environmental performance. In this section we explore whether one particular

use of control rights, to ensure that at least one female director is on the board, incrementally affects firms' environmental performance.

4.1. Why a Female Board Member Might Influence a Firm's Environmental Performance

Cronqvist and Yu (2017) discuss the hypothesis that females care more than males about corporate social responsibility (CSR) and provide evidence that gender influences firms' CSR ratings in the US. Their specific test focuses on CEOs, showing that those who have daughters run firms that have higher CSR performance. They also show that firms with female CEOs have stronger CSR performance. Further, in sub-segment tests of CSR components, they find that the female-CSR relation is strongest for diversity-CSR issues but is also significant for issues related to the environment. They suggest this behavior arises as a result of greater 'other-regarding' or pro-social preferences for females (see, e.g. Andreoni and Vesterlund (2001), Schwartz and Rubel (2005), Adams and Funk (2012), DellaVigna, List, Malmendier, and Rao (2013), and Thaler (2016)).

4.2. Data and Research Design for Gender-based Tests

The specific testing of board of directors' gender effects is clearly subject to endogeneity concerns. These can arise as a result of simultaneous governance changes, for example, in the same year when majority voting is adopted the first female director might be elected. These could also arise as a result of changes in other firm characteristics, for example, firms could appoint one or more females to the board following good financial performance, or as firms become larger in size.

We address these issues in two ways. First, to address the possibility that the presence of women is correlated with specific governance mechanisms, we include the director gender measure along with each specific governance mechanism. If these variables continue to load, with similar coefficients and levels of significance, then it is difficult to argue that the measured impact

of at least one woman on the board arises from multi-collinearity. Second, we address the possibility that the results for the director gender derive from correlated changes at the firm level by repeating our earlier firm fixed effect specification and including in all specifications the same control variables that capture the impact of firm characteristics on environmental performance.

4.3. Female Representation on the Board and Environmental Performance

In our first tests to examine whether the gender of board members is associated with firms' environmental performance, we replicate the models of Table 2. In each model, we add an indicator variable that equals one if the firm has at least one female director on the board, and zero otherwise (Female Director). Table 5 shows the results of these regressions. Overall, the results are striking—having at least one female director on the board has a larger positive impact on a firms' environmental performance than any of the control-rights variables we have studied.

The coefficient estimate on Female Director in model 1 of Panel A is positive and significant at the 1% level (with a *t*-statistic greater than five). In terms of economic significance, firms with at least one female board member have a 15.3% greater environmental performance than firms with male directors only. We find similar results in Panel B. As discussed, the female director variable could simply be picking up the impact of improved governance arising from the specific governance mechanisms we have studied thus far. To help rule this out, we add each specific governance measure together with Female Director in models 2 through 6. In all specifications, the coefficient estimate on Female Director continues to be negative and statistically significant with *p*-values less than 1%. Importantly, the effect of each of the specific governance mechanism on firms' environmental performance remain the same in terms of size, magnitude, and significance as in the baseline tests in Table 2. This suggests that the impact of

female board representation is complementary to the impact of control-rights mechanisms analyzed earlier.

To help assess the robustness of this result, in model 7 we include all the specific governance mechanisms together with Female Director. Again, the coefficient on Female Director is significant at the 1%, while other governance mechanisms retain their sign and significance.

In Panel A of Table 6 we use a firm fixed effect specification that controls for time invariant unobserved firm characteristics potentially correlated with having a woman on the board. In models 1 and 3 we test whether adding at least one woman to the board or going from a board with at least one woman to no women impacts firms' environmental performance. In models 2 and 4 we limit the sample only to those firms where the change comes from adding at least one woman to the board. We do not expect that a firm that loses female representation on the board will quickly reduce its subsequent environmental performance; rather, because environmental performance depends on processes that are slow to change, we expect it to remain strong. We note that for both of these fixed effect tests we will not capture the impact of women on firms' environmental performance if the firm had at least one female director for every year in our sample period (e.g. firms from Norway).

Consistent with the results in Table 5, Panel A of Table 6 shows that changing female presence on the board strongly impacts environmental performance. The coefficient estimates in models 1 and 3 imply that a firm that changes its board gender composition (adding at least one woman to the board or going from a board with at least one woman to no women) improves its environmental performance by between 1.3% and 2.6%. The coefficient in models 2 and 4 shows a greater impact, with the introduction of (at least) one female director to the board increasing

environmental performance by between 2.0% and 4.6%. We note that this impact is similar in magnitude to that of introducing a majority voting provision.

4.4. Does Female Representation on the Board Affect Family-firm Environmental Performance

In Panel B of Table 6 we assess whether the negative impact of family control on firms' environmental performance is mitigated with a woman on the board. Our previous tests in Table 4 show that specific governance mechanisms generally do not lessen the impact of family ownership on firms' environmental performance (with the notable exception of majority voting). We note, however, that the summary statistics discussed earlier show that family firms are essentially the same as other types of firms in their fraction of firms that have at least one female board member (whereas their specific governance mechanisms are of lower quality). Does the presence of female board members within family firms make a difference?

Strikingly, Panel B of Table 6 shows that in family firms a woman on the board has a substantial and significant impact on firms' environmental performance, improving family-firm environmental performance by 12% to 13%. This is greater than the average negative impact of family control on firms' environmental performance which varies from 6.7% to 12.6% (see Table 2). In other words, by adding a woman to the board of a family firm, the negative environmental performance associated with family control disappears. Panel B also shows that having one or more female board members is associated with greater levels of environmental performance for widely-held firms, and that the effect is larger than the effect of majority voting rules and other governance mechanisms displayed in Table 2. These results have implications for investors and other parties interested in improving the environmental sustainability of firms around the world— use your voting power and any other control rights mechanisms that you have to increase female board representation.

5. Conclusion

Institutional investors are increasingly interested in corporate sustainability worldwide, and are exerting influence to push firms towards improving their environmental performance. This paper shows sustainability-minded investors will be more effective in achieving this objective if they consider their control rights and corporate governance in general. We test and find that control rights significantly influence the likelihood a firm has strong environmental performance. We measure outside investors' control rights first by differentiating between block-controlled firms and widely-held firms and second by identifying specific governance mechanisms related to outside shareholders' ability to shape the board of directors and items related to CEO and board entrenchment.

Relative to widely-held firms, we find that family-controlled firms have 9% to 13% lower levels of environmental performance. We also find that enhanced-control-rights mechanisms that give investors greater power, such as a majority voting provision, positively and significantly impact environmental performance. We next examine whether these governance mechanisms have an impact on the environmental performance of family firms or whether they help primarily for widely held firms in which control is contestable. We find that almost all governance mechanisms have no effect in family firms with the only exception being majority election provisions. These results show that sustainability-oriented investors should push for enhanced corporate governance mechanisms in firms in which they are meaningful, that is, where control is contestable and outsiders are likely able to bring about change to firms' policies.

Based on recent research linking corporate sustainability to gender, we also test whether the presence of a female director on the board influences environmental performance. Having at least one female director on the board has a larger positive impact on a firms' environmental

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performance (approximately 15% higher environmental scores) than any of the control-rights variables we have studied. Notably, in family firms we find that a woman on the board has a substantial and significant positive impact on firms' environmental performance. In fact, in family firms adding a woman to the board more than offsets the negative environmental performance associated with family control.

Taken together, our tests provide grounds for optimism for sustainability-oriented investors that hold stakes in family firms. We identify two factors that are strongly associated with improved environmental performance in these firms: majority voting provisions and the presence of at least one female on the board of directors. Using the power provided by majority voting to introduce female directors to the board is predicted to bring the greatest improvement in environmental performance.

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Table 1
Descriptive Statistics

This table shows summary statistics of environmental scores, control rights, and other key variables. Panel A shows environmental scores for the full sample. The ASSET4 Environmental z-score is a standardized score, calculated by and obtained from Thomson Reuters ASSET4 ESG, and measures firms' environmental performance relative to other companies in a given year. The Equally-weighted Environmental Score is the average of three category scores (Emission Reduction, Product Innovation, and Resource Reduction). The category scores are calculated as the sum of all indicator variables in each category divided by the number of reported items times 100. Appendix A describes the indicator variables used to calculate the environmental scores. Panel B shows country averages of environmental scores, control rights, and the number of observations for the year 2012 and the full sample. For each firm-year, we classify a firm as controlled by a family if any of the following conditions are met: 1) Orbis (Bureau van Dijk) identifies a family as the ultimate owner of the firm with a minimum controlling threshold of 25% (see also Lins, Volpin, and Wagner (2013); 2) Orbis identifies the ultimate owner to be a Nominee, Trust, or Trustee, and the firm has dual class shares (obtained from ASSET4); 3) Datastream reports a minimum family stake of 20%, or Datastream reports a minimum family stake of 5% and the firm has dual class shares; 4) the Global Family Business Index (obtained from Center for Family Business at the University of St. Gallen, Switzerland) reports the firm as family controlled. For each firm, we impute intermittent years as family controlled if a firm is classified as family controlled in at least one earlier and one later year. We further extend family control both backwards and forwards in time if ASSET4 indicates that the votes of a firm's largest blockholder are within 5% of the year during which a firm is known to be family controlled and the largest blockholder's stake is at least 20%. For each firm-year, we classify a firm as widely held if the firm is not classified as family controlled by the above rule and any of the following conditions are met: 1) Orbis classifies the firm as widely held; 2) ASSET4 indicates the largest blockholder's stake is less than 50% or does not report any largest blockholder stake. The remaining firms that are not family controlled or widely held we classify as controlled by another blockholder (other). Panel C shows summary statistics for firms grouped by whether they are family controlled, widely held, or have a different control structure (other). Majority Election is an indicator variable that equals one if the company's board members are generally elected with a majority vote, and zero otherwise. Board Independence is the number of independent board members scaled by the total number of board members. MSCI Entrenched is an indicator variable that equals one if the following conditions exist: (more than 35% of the board has a tenure greater than 15 years or more than 4 directors have a tenure greater than 15 years or more than 4 directors are over 70 years old or more than 22% of the board has a tenure greater than 15 years) and (more than 15% of the directors are over 70 years old). CEO-Chair Duality is an indicator variable that equals one if the CEO is also the Chairman of the board, and zero otherwise. CEO Tenure is the number of years the CEO had been in office. Female Director is an indicator variable that equals one if a firm has at least one female director, and zero otherwise. These data are from Thomson Reuters and BoardEx. Total Assets is in US$ million, Log (Total Assets) is the natural logarithm of total assets, Tangibility is property, plant, and equipment to total assets, Cash is cash and cash equivalents to total assets, Leverage is total debt to total assets, Profitability is net income plus after-tax interest expenses to total assets. Institutional Ownership is the total institutional ownership. Cross-list is an indicator variable that equals one if the firm is cross-listed on a major U.S. exchange, and zero otherwise. These data are obtained from Worldscope, Factset, ADR lists, and CRSP. The sample period is 2004-2015. All variables are winsorized at the 1st and 99th percentiles.

Panel A: Environmental Scores

	Number of Indicators	Mean	Median	SD	Obs
A. ASSET4 Environmental *z*-Score					
Overall Score		53.7	56.3	31.5	23,914
B. Equally-weighted Environmental Score					
Emission Reduction	28	44.6	42.9	22.2	23,914
Product Innovation	25	31.1	23.5	24.2	23,914
Resource Reduction	17	45.9	46.4	24.8	23,914
Overall Score	70	38.4	35.8	21.3	23,914

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Panel B: Summary Statistics by Country

Country	Environmental Scores		Control Rights			Obs	
	ASSET4 *z*-Score	Equally-weighted Score	Family	Widely Held	Other	Year 2012	Full Sample
Australia	32.8	28.1	0.13	0.84	0.02	277	2,129
Austria	61.4	47.5	0.38	0.50	0.13	16	182
Belgium	57.2	44.3	0.42	0.58	0.00	24	246
Brazil	56.2	43.7	0.39	0.39	0.22	79	523
Canada	40.0	32.5	0.20	0.79	0.01	229	1,967
Chile	41.2	33.7	0.41	0.36	0.23	22	146
China	31.3	26.6	0.29	0.54	0.17	123	801
Colombia	37.6	32.1	0.18	0.55	0.27	11	64
Denmark	68.3	50.7	0.28	0.72	0.00	25	248
Egypt	18.3	18.1	0.36	0.45	0.18	11	65
Finland	81.4	62.1	0.20	0.72	0.08	25	273
France	81.7	63.1	0.51	0.47	0.02	90	904
Germany	68.7	54.8	0.32	0.67	0.01	75	804
Greece	56.0	44.9	0.47	0.53	0.00	17	196
Hong Kong	36.6	30.5	0.46	0.35	0.19	106	924
India	50.2	42.3	0.33	0.50	0.18	80	530
Indonesia	46.3	36.6	0.29	0.43	0.29	28	197
Ireland	49.2	41.6	0.13	0.87	0.00	15	151
Israel	42.1	33.7	0.53	0.47	0.00	15	103
Italy	60.8	50.1	0.27	0.67	0.07	45	455
Japan	63.4	51.6	0.06	0.94	0.00	384	4,139
Luxembourg	56.0	41.3	0.63	0.25	0.13	8	63
Malaysia	41.5	33.8	0.38	0.52	0.10	42	279
Mexico	45.4	35.8	0.77	0.19	0.04	26	197
Netherlands	66.7	51.7	0.19	0.81	0.00	36	356
New Zealand	44.2	34.2	0.20	0.70	0.10	10	131
Norway	68.1	52.0	0.18	0.76	0.06	17	179
Philippines	43.9	34.9	0.21	0.68	0.11	19	126
Poland	35.0	30.3	0.21	0.42	0.38	24	158
Portugal	73.4	57.5	0.58	0.42	0.00	12	125
Russia	46.7	36.2	0.53	0.22	0.25	32	245
Singapore	41.9	35.3	0.14	0.68	0.18	44	424
South Africa	50.2	39.4	0.16	0.76	0.08	119	584
South Korea	60.8	48.1	0.34	0.63	0.03	99	577
Spain	75.4	57.5	0.31	0.64	0.05	42	452
Sweden	75.3	57.1	0.42	0.53	0.04	45	512
Switzerland	57.3	45.3	0.32	0.66	0.02	59	564
Taiwan	46.9	37.5	0.06	0.94	0.00	126	721
Thailand	53.4	42.8	0.21	0.63	0.17	24	152
Turkey	57.9	44.7	0.63	0.25	0.13	24	158
U.K.	60.6	45.8	0.18	0.81	0.00	278	2,864
Overall	53.2	42.2	0.32	0.58	0.10	2,783	23,914

Panel C: Summary Statistics by Control Type

	Family (N=5,437)			Widely Held (N=17,242)			Other (N=1,235)		
	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
ASSET4 E z-Score	48.6	44.7	31.1	55.4	60.7	31.7	52.0	55.3	29.0
Equally-weighted E Score	35.7	32.4	20.8	39.3	36.9	21.5	38.0	37.8	19.0
Majority Election	0.49	0.00	0.50	0.50	1.00	0.50	0.53	1.00	0.50
Board Independence	0.44	0.44	0.22	0.54	0.57	0.26	0.38	0.36	0.21
MSCI Entrenched	0.20	0.00	0.40	0.06	0.00	0.24	0.05	0.00	0.21
CEO-Chair Duality	0.25	0.00	0.43	0.15	0.00	0.36	0.15	0.00	0.36
CEO Tenure	6.27	4.40	6.30	4.86	3.60	4.70	3.86	2.80	4.47
Female Director	0.66	0.00	0.47	0.63	0.00	0.48	0.63	0.00	0.48
Log(Total Assets)	8.56	8.56	1.47	8.67	8.51	1.83	9.41	9.35	1.69
Tangibility	0.29	0.25	0.23	0.31	0.26	0.26	0.35	0.32	0.29
Cash	0.22	0.16	0.20	0.20	0.14	0.20	0.17	0.12	0.16
Leverage	0.25	0.24	0.17	0.23	0.22	0.18	0.23	0.21	0.17
Profitability	0.07	0.06	0.08	0.05	0.05	0.08	0.06	0.05	0.08
Institutional Ownership	0.19	0.16	0.14	0.25	0.20	0.18	0.12	0.10	0.09
Cross-list	0.07	0.00	0.25	0.10	0.00	0.30	0.15	0.00	0.36

Table 2
Control Rights, Corporate Governance, and Firms' Environmental Performance

This table reports regression estimates of environmental scores on control rights, measures of corporate governance, and control variables. The dependent variables are the natural logarithm of environmental scores. The ASSET4 Environmental z-score is a standardized score, calculated by and obtained from Thomson Reuters ASSET4 ESG, and measures firms' environmental performance relative to other companies in a given year. The Equally-weighted Environmental Score is the average of three category scores (Emission Reduction, Product Innovation, and Resource Reduction). Appendix A describes the indicator variables used to calculate the environmental scores. All other variables are described in Table 1. The data are from the Thomson Reuters ASSET4 database, Orbis, Datastream, Worldscope, BoardEx, Factset, ADR lists, and CRSP, and are obtained for the years 2004-2015. All variables are winsorized at the 1st and 99th percentiles. All right-hand side variables are lagged by one year. Standard errors are clustered at the country-level and t-statistics are reported in parentheses. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: ASSET4 Environmental z-Scores

	Dependent Variable: ASSET4 Environmental z-Scores $_t$					
	(1)	(2)	(3)	(4)	(5)	(6)
Family $_{t-1}$	-0.126***	-0.124***	-0.092***	-0.094***	-0.103***	-0.108***
	(-3.55)	(-3.45)	(-3.08)	(-3.26)	(-3.62)	(-3.58)
Other $_{t-1}$	0.022	0.021	0.040	0.019	0.019	0.049
	(0.63)	(0.58)	(1.08)	(0.50)	(0.50)	(1.27)
Log (Total Assets) $_{t-1}$	0.242***	0.238***	0.228***	0.233***	0.233***	0.232***
	(12.86)	(12.69)	(10.11)	(10.16)	(10.19)	(9.42)
Cash $_{t-1}$	-0.084	-0.086	-0.026	-0.023	-0.018	-0.022
	(-1.09)	(-1.12)	(-0.61)	(-0.55)	(-0.40)	(-0.41)
Tangibility $_{t-1}$	0.167**	0.171**	0.226***	0.224***	0.231***	0.241***
	(2.26)	(2.39)	(3.57)	(3.50)	(3.66)	(3.63)
Leverage $_{t-1}$	-0.145	-0.143	-0.235***	-0.238***	-0.240***	-0.234***
	(-1.32)	(-1.29)	(-3.32)	(-3.42)	(-3.46)	(-3.20)
Profitability $_{t-1}$	0.306**	0.314**	0.270**	0.275**	0.266**	0.290***
	(2.58)	(2.63)	(2.40)	(2.38)	(2.34)	(2.84)
Institutional Ownership $_{t-1}$	0.214**	0.196**	0.102	0.170*	0.164	0.155
	(2.44)	(2.13)	(1.03)	(1.74)	(1.65)	(1.50)
Cross-list $_{t-1}$	-0.053	-0.064	-0.068	-0.063	-0.060	-0.055
	(-1.40)	(-1.67)	(-1.62)	(-1.60)	(-1.52)	(-1.35)
Majority Election $_{t-1}$		0.100***				
		(3.95)				
Board Independence $_{t-1}$			0.248***			
			(3.93)			
MSCI Entrenched $_{t-1}$				-0.096**		
				(-2.45)		
CEO-Chair Duality $_{t-1}$					-0.049	
					(-1.57)	
CEO Tenure $_{t-1}$						-0.007**
						(-2.64)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs	23,914	23,914	18,300	18,300	18,300	13,447
Adjusted R^2	0.438	0.441	0.469	0.467	0.467	0.489

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Panel B: Equally-weighted Environmental Scores

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable: Equally-weighted Environmental Scores $_t$					
Family $_{t-1}$	-0.093***	-0.091***	-0.067**	-0.071***	-0.076***	-0.086***
	(-3.24)	(-3.15)	(-2.66)	(-2.90)	(-3.15)	(-3.76)
Other $_{t-1}$	0.001	-0.001	0.019	0.002	0.002	0.030
	(0.02)	(-0.02)	(0.64)	(0.06)	(0.06)	(1.00)
Log (Total Assets) $_{t-1}$	0.210***	0.207***	0.197***	0.201***	0.201***	0.200***
	(13.77)	(13.78)	(11.41)	(11.52)	(11.55)	(10.48)
Cash $_{t-1}$	-0.035	-0.037	0.021	0.023	0.027	0.023
	(-0.52)	(-0.55)	(0.55)	(0.59)	(0.68)	(0.46)
Tangibility $_{t-1}$	0.156***	0.160***	0.198***	0.197***	0.202***	0.215***
	(2.89)	(3.04)	(4.26)	(4.20)	(4.38)	(4.35)
Leverage $_{t-1}$	-0.137	-0.135	-0.198***	-0.201***	-0.202***	-0.210***
	(-1.66)	(-1.62)	(-3.80)	(-3.91)	(-3.95)	(-3.83)
Profitability $_{t-1}$	0.245**	0.251**	0.222**	0.225**	0.219**	0.237**
	(2.39)	(2.45)	(2.21)	(2.19)	(2.16)	(2.55)
Institutional Ownership $_{t-1}$	0.140**	0.124*	0.049	0.104	0.100	0.094
	(2.21)	(1.86)	(0.68)	(1.44)	(1.37)	(1.20)
Cross-list $_{t-1}$	-0.018	-0.027	-0.024	-0.019	-0.017	-0.018
	(-0.69)	(-1.00)	(-0.78)	(-0.65)	(-0.58)	(-0.55)
Majority Election $_{t-1}$		0.082***				
		(3.89)				
Board Independence $_{t-1}$			0.203***			
			(4.03)			
MSCI Entrenched $_{t-1}$				-0.061**		
				(-2.25)		
CEO-Chair Duality $_{t-1}$					-0.035	
					(-1.57)	
CEO Tenure $_{t-1}$						-0.006**
						(-2.68)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs	23,914	23,914	18,300	18,300	18,300	13,447
Adjusted R^2	0.507	0.510	0.542	0.539	0.539	0.563

Table 3
Corporate Governance and Firms' Environmental Performance: Firm Fixed Effects

This table reports firm fixed effects regression estimates of environmental scores on control rights, measures of corporate governance, and control variables. The dependent variables are the natural logarithm of environmental scores. The ASSET4 Environmental z-score is a standardized score, calculated by and obtained from Thomson Reuters ASSET4 ESG, and measures firms' environmental performance relative to other companies in a given year. The Equally-weighted Environmental Score is the average of three category scores (Emission Reduction, Product Innovation, and Resource Reduction). We drop firms if the measure of corporate governance (Majority Election, Board Independence, MSCI Entrenched, and CEO-Chairman Duality) is time invariant. Appendix A describes the indicator variables used to calculate the environmental scores. All other variables are described in Table 1. Controls as in Table 2 are included but nor reported. The data are from the Thomson Reuters ASSET4 database, Orbis, Datastream, Worldscope, BoardEx, Factset, ADR lists, and CRSP, and are obtained for the years 2004-2015. All variables are winsorized at the 1st and 99th percentiles. All right-hand side variables are lagged by one year. Standard errors are clustered at the country-level and t-statistics are reported in parentheses. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: ASSET4 Environmental z-Scores

	Dependent Variable: ASSET4 Environmental z-Scores			
	(1)	(2)	(3)	(4)
Majority Election	0.043***			
	(3.32)			
Board Independence		0.098*		
		(1.82)		
MSCI Entrenched			-0.017	
			(-1.02)	
CEO-Chair Duality				-0.034***
				(-2.86)
Controls	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Obs	11,751	16,783	2,817	3,235
Adjusted R^2	0.849	0.862	0.862	0.862

Panel B: Equally-weighted Environmental Scores

	Dependent Variable: Equally-weighted Environmental Scores			
	(1)	(2)	(3)	(4)
Majority Election	0.026***			
	(3.33)			
Board Independence		0.066*		
		(1.79)		
MSCI Entrenched			-0.021*	
			(-1.80)	
CEO-Chair Duality				-0.015
				(-1.44)
Controls	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Obs	11,751	16,783	2,817	3,235
Adjusted R^2	0.897	0.910	0.910	0.910

Table 4
Control Rights Interacted with Corporate Governance and Firms' Environmental Performance

This table shows overall effects of various corporate governance measures on firms' environmental performance for firms with different broadly-measured control rights (family-controlled vs. widely held/other). Each regression model includes an indicator variable for whether a firm is controlled by a family, the governance measure in question, an interaction term between the family indicator and the governance measure, and controls. For each column in this table, the reported coefficient estimate on Family is the sum of the coefficient estimates on the governance measure and the interaction between family indicator variable and governance measure; and statistical significance is calculated using an F-test on the sum of these two coefficients. The reported coefficient on Widely Held/Other is the coefficient estimate on the standalone governance variable. The dependent variables are the natural logarithm of environmental scores. The ASSET4 Environmental z-score is a standardized score, calculated by and obtained from Thomson Reuters ASSET4 ESG, and measures firms' environmental performance relative to other companies in a given year. The Equally-weighted Environmental Score is the average of three category scores (Emission Reduction, Product Innovation, and Resource Reduction). Appendix A describes the indicator variables used to calculate the environmental scores. All other variables are described in Table 1. Controls as in Table 2 are included but not reported. The data are from the Thomson Reuters ASSET4 database, Orbis, Datastream, Worldscope, BoardEx, Factset, ADR lists, and CRSP, and are obtained for the years 2004-2015. All variables are winsorized at the 1st and 99th percentiles. All right-hand side variables are lagged by one year. Standard errors are clustered at the country-level and p-values are reported in parentheses. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: ASSET4 Environmental z-Scores

Governance Measures	Dependent Variable: ASSET4 Environmental z-Scores				
	Majority Election	Board Independence	MSCI Entrenched	CEO-Chair Duality	CEO Tenure
	(1)	(2)	(3)	(4)	(5)
Family	0.083*	0.126	-0.045	0.007	-0.006
	(0.081)	(0.180)	(0.431)	(0.891)	(0.205)
Widely Held/Other	0.105***	0.276***	-0.144**	-0.077**	-0.008***
	(0.000)	(0.000)	(0.031)	(0.039)	(0.003)
Controls	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Obs	23,914	18,300	18,300	18,300	13,447
Adjusted R^2	0.441	0.469	0.468	0.467	0.489

Panel B: Equally-weighted Environmental Scores

Governance Measures	Dependent Variable: Equally-weighted Environmental Scores				
	Majority Election	Board Independence	MSCI Entrenched	CEO-Chair Duality	CEO Tenure
	(1)	(2)	(3)	(4)	(5)
Family	0.063*	0.109	-0.027	-0.002	-0.006
	(0.082)	(0.198)	(0.530)	(0.955)	(0.113)
Widely Held/Other	0.089***	0.228***	-0.093**	-0.052*	-0.006***
	(0.000)	(0.000)	(0.036)	(0.067)	(0.007)
Controls	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Obs	23,914	18,300	18,300	18,300	13,447
Adjusted R^2	0.510	0.542	0.540	0.539	0.563

Table 5
Female Directors, Control Rights, and Firms' Environmental Performance

This table reports regression estimates of environmental scores on control rights, whether a firm has one or more female directors, measures of corporate governance, and control variables. The dependent variables are the natural logarithm of environmental scores. The ASSET4 Environmental *z*-score is a standardized score, calculated by and obtained from Thomson Reuters ASSET4 ESG, and measures firms' environmental performance relative to other companies in a given year. The Equally-weighted Environmental Score is the average of three category scores (Emission Reduction, Product Innovation, and Resource Reduction). Appendix A describes the indicator variables used to calculate the environmental scores. All other variables are described in Table 1. Controls as in Table 2 are included but not reported. The data are from the Thomson Reuters ASSET4 database, Orbis, Datastream, Worldscope, BoardEx, Factset, ADR lists, and CRSP, and are obtained for the years 2004-2015. All variables are winsorized at the 1st and 99th percentiles. All right-hand side variables are lagged by one year. Standard errors are clustered at the country-level and *t*-statistics are reported in parentheses. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: ASSET4 Environmental *z*-Scores

	Dependent Variable: ASSET4 Environmental *z*-Scores						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female Director	0.153***	0.150***	0.147***	0.152***	0.152***	0.163***	0.155***
	(5.67)	(5.57)	(5.44)	(5.66)	(5.73)	(5.42)	(5.22)
Family	-0.108***	-0.106***	-0.097***	-0.098***	-0.107***	-0.110***	-0.093***
	(-3.78)	(-3.71)	(-3.32)	(-3.47)	(-3.84)	(-3.73)	(-3.28)
Other	0.024	0.023	0.042	0.024	0.024	0.045	0.057
	(0.69)	(0.64)	(1.24)	(0.66)	(0.67)	(1.24)	(1.51)
Majority Election		0.074***					0.057**
		(2.84)					(2.09)
Board Independence			0.223***				0.144**
			(3.68)				(2.32)
MSCI Entrenched				-0.092**			-0.044
				(-2.37)			(-1.20)
CEO-Chair Duality					-0.043		-0.048
					(-1.44)		(-1.63)
CEO Tenure						-0.007**	-0.006**
						(-2.67)	(-2.08)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	18,300	18,300	18,300	18,300	18,300	13,454	13,454
Adjusted R^2	0.473	0.475	0.475	0.474	0.473	0.497	0.500

Panel B: Equally-weighted Environmental Scores

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent Variable: Equally-weighted Environmental Scores						
Female Director	0.123***	0.120***	0.118***	0.122***	0.122***	0.124***	0.117***
	(6.65)	(6.48)	(6.39)	(6.67)	(6.72)	(5.72)	(5.43)
Family	-0.080***	-0.078***	-0.070***	-0.073***	-0.079***	-0.088***	-0.074***
	(-3.30)	(-3.24)	(-2.87)	(-3.08)	(-3.33)	(-3.88)	(-3.34)
Other	0.005	0.004	0.020	0.005	0.005	0.028	0.038
	(0.18)	(0.13)	(0.72)	(0.16)	(0.17)	(0.94)	(1.25)
Majority Election		0.060***					0.051**
		(2.85)					(2.29)
Board Independence			0.184***				0.125**
			(3.77)				(2.49)
MSCI Entrenched				-0.058**			-0.027
				(-2.13)			(-1.06)
CEO-Chair Duality					-0.030		-0.034
					(-1.41)		(-1.44)
CEO Tenure						-0.005**	-0.005**
						(-2.70)	(-2.16)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	18,300	18,300	18,300	18,300	18,300	13,454	13,454
Adjusted R^2	0.546	0.547	0.548	0.546	0.546	0.570	0.573

Table 6
Female Directors and Firms' Environmental Performance: Firm Fixed Effects and Interactions

This table reports regression estimates of environmental scores on control rights, whether a firm has one or more female directors, and control variables. Panel A shows firm fixed effects regression results. In models 1 and 3 we test whether adding at least one woman to the board or going from a board with at least one woman to no women impacts environmental performance. In models 2 and 4 we limit the sample only to those firms where the change comes from adding at least one woman to the board. Panel B shows overall effects of Female Director on firms' environmental performance for firms with different broadly-measured control rights (family-controlled vs. widely held/other). Each regression model in Panel B includes an indicator variable for whether a firm is controlled by a family, an indicator variable for whether a firms has at least one female director, and an interaction term between the family indicator and Female Director. For each column in this panel, the reported coefficient estimate on Family is the sum of the coefficient estimates on Female Director and the interaction between the family indicator variable and Female Director; and statistical significance is calculated using an F-test on the sum of these two coefficients. The reported coefficient on Widely Held/Other is the coefficient estimate on the standalone Female Director variable. The dependent variables are the natural logarithm of environmental scores. The ASSET4 Environmental z-score is a standardized score, calculated by and obtained from Thomson Reuters ASSET4 ESG, and measures firms' environmental performance relative to other companies in a given year. The Equally-weighted Environmental Score is the average of three category scores (Emission Reduction, Product Innovation, and Resource Reduction). We drop firms if Female Director is time invariant. Appendix A describes the indicator variables used to calculate the environmental scores. All other variables are described in Table 1. Controls as in Table 2 (model 1 of Panel A) are included but not reported. The data are from the Thomson Reuters ASSET4 database, Orbis, Datastream, Worldscope, BoardEx, Factset, ADR lists, and CRSP, and are obtained for the years 2004-2015. All variables are winsorized at the 1st and 99th percentiles. All right-hand side variables are lagged by one year. Standard errors are clustered at the country-level, t-statistics (Panel A) and p-values (Panel B) are reported in parentheses. ***, **, * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Firms Switching from Having (or Not-Having) Female Directors on the Board

	Dependent Variables:			
	ASSET4 Environmental z-Scores		Equally-weighted Environmental Scores	
	(1)	(2)	(3)	(4)
Female Director	0.026**	0.046***	0.013*	0.020*
	(2.56)	(3.12)	(1.85)	(1.89)
Controls	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Obs	9,719	4,645	9,719	4,645
Adjusted R^2	0.852	0.833	0.904	0.891

Panel B: Overall Effects of Female Director by Control Type

	Dependent Variables:	
	ASSET4 Environmental z-Scores	Equally-weighted Environmental Scores
	(1)	(2)
Family	0.130***	0.116***
	(0.001)	(0.000)
Widely Held/Other	0.161***	0.125***
	(0.000)	(0.000)
Controls	Yes	Yes
Country Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Obs	18,300	18,300
Adjusted R^2	0.477	0.549

We create environmental indicator variables based on the Thomson Reuters ASSET4 ESG environmental indicator values. Indicator values are the answers to Y/N questions, double Y/N questions, and numerical questions. We translate the answers to these questions into indicator variables. More specifically, for questions with a positive direction (i.e., a "yes" answer or a greater number is associated with better environmental performance), we translate the answers to Y/N questions into 0 (N) and 1 (Y); the answers to double Y/N questions into 0 (NN), 0.5 (YN or NY), and 1 (YY); and the answers to numerical questions into 0 (value is less (or equal) than zero; or value is less (or equal) than the median; see also column "Translation Numeric Values") and 1 (value is greater than zero; or value is greater than the median; see also column "Translation Numeric Values"). For questions with a negative direction (i.e., a "no" answer or a lower number is associated with better social performance), the opposite coding applies. The data are from the ASSET4 ESG database.

		Description	Direction	Question Type	Translation Numeric Values
A.	Emission Reduction				
1)	Biodiversity Controversies	Is the company under the spotlight of the media because of a controversy linked to biodiversity?	Negative	Y/N	
2)	Biodiversity Impact	Does the company report on initiatives to protect, restore or reduce its impact on native ecosystems and species, biodiversity, protected and sensitive areas?	Positive	Y/N	
3)	Cement CO2 Emissions	Total CO2 and CO2 equivalents emission in kilograms per tonne of cement produced.	Negative	Number	Median
4)	Climate Change Risks and Opportunities	Is the company aware that climate change can represent commercial risks and/or opportunities?	Positive	Y/N	
5)	CO2 Reduction	Does the company show an initiative to reduce, reuse, recycle, substitute, phased out or compensate CO2 equivalents in the production process?	Positive	Y/N	
6)	Discharge into Water System	Total weight of water pollutant emissions in tonnes divided by net sales or revenue in U.S. dollars.	Negative	Number	Median
7)	Environmental Compliance	All real or estimated penalties, fines from lost court cases, settlements or cases not yet settled regarding environmental controversies in U.S. dollars.	Negative	Number	Zero
8)	Environmental Expenditures	Does the company report on its environmental expenditures or does the company report to make proactive environmental investments to reduce future risks or increase future opportunities?	Positive	Y/N	
9)	Environmental Management Systems	The percentage of company sites or subsidiaries that are certified with any environmental management system.	Positive	Number	Median
10)	Environmental Partnerships	Does the company report on partnerships or initiatives with specialized NGOs, industry organizations, governmental or supragovernmental organizations that focus on improving environmental issues?	Positive	Y/N	
11)	Environmental Restoration Initiatives	Does the company report or provide information on company-generated initiatives to restore the environment?	Positive	Y/N	
12)	F-Gases Emissions	Does the company report on initiatives to recycle, reduce, reuse or phase out fluorinated gases such as HFCs (hydrofluorocarbons), PFCs (perfluorocarbons) or SF6 (sulphur hexafluoride)?	Positive	Y/N	
13)	Greenhouse Gas Emissions	Total CO2 and CO2 equivalents emission in tonnes divided by net sales or revenue in U.S. dollars.	Negative	Number	Median
14)	Hazardous Waste	Total amount of hazardous waste produced in tonnes divided by net sales or revenue in U.S. dollars.	Negative	Number	Median
15)	Implementation	Does the company describe the implementation of its emission reduction policy through a public commitment from a senior management or board member? AND Does the company describe the implementation of its emission reduction policy through the processes in place?	Positive	Double Y/N	
16)	Improvements	Does the company set specific objectives to be achieved on emission reduction?	Positive	Y/N	
17)	Innovative Production	Does the company report on the concentration of production locations in order to limit the environmental impact during the production process? OR Does the company report on its participation in any emissions trading initiative? OR Does the company report on new production techniques to improve the global environmental impact (all emissions) during the production process?	Positive	Y/N	
18)	Monitoring	Does the company monitor its emission reduction performance?	Positive	Y/N	
19)	NOx and SOx Emissions Reduction	Does the company report on initiatives to reduce, reuse, recycle, substitute, or phase out SOx (sulphur oxides) or NOx (nitrogen oxides) emissions?	Positive	Y/N	
20)	Ozone-Depleting Substances Reduction	Does the company report on initiatives to reduce, substitute, or phase out ozone-depleting (CFC-11 equivalents, chlorofluorocarbon) substances?	Positive	Y/N	
21)	Policy	Does the company have a policy for reducing environmental emissions or its impacts on biodiversity? AND Does the company have a policy for maintaining an environmental management system?	Positive	Double Y/N	
22)	Spill Impact Reduction	Does the company report on initiatives to reduce, avoid or minimize the effects of spills or other polluting events (crisis management system)?	Positive	Y/N	
23)	Spills and Pollution Controversies	Is the company directly or indirectly (through a supplier) under the spotlight of the media because of a controversy linked to the spill of chemicals, oils and fuels, gases (flaring) or controversy relating to the overall impacts of the company on the environment?	Negative	Y/N	
24)	Transportation Impact Reduction	Does the company report on initiatives to reduce the environmental impact of transportation of its products or its staff?	Positive	Y/N	
25)	VOC Emissions Reduction	Does the company report on initiatives to reduce, substitute, or phase out volatile organic compounds (VOC) or particulate matter less than ten microns in diameter (PM10)?	Positive	Y/N	
26)	Waste	Total amount of waste produced in tonnes divided by net sales or revenue in U.S. dollars.	Negative	Number	Median
27)	Waste Recycling Ratio	Total recycled and reused waste produced in tonnes divided by total waste produced in tonnes.	Positive	Number	Median
28)	Waste Reduction	Does the company report on initiatives to recycle, reduce, reuse, substitute, treat or phase out total waste, hazardous waste or wastewater?	Positive	Y/N	
B.	Product Innovation				
1)	Animal Testing	Is the company endorsing guidelines on animal testing (e.g., the EU guideline on animal experiments)? OR Has the company established a programme or an initiative to reduce, phase out or substitute for animal testing?	Positive	Y/N	
2)	Eco-Design Products	Does the company report on specific products which are designed for reuse, recycling or the reduction of environmental impacts?	Positive	Y/N	

3)	Energy Footprint Reduction	Does the company describe initiatives in place to reduce the energy footprint of its products during their use?	Positive	Y/N	
4)	Environmental Asset Management	Does the company report on assets under management which employ environmental screening criteria or environmental factors in the investment selection process?	Positive	Y/N	
5)	Environmental Labels and Awards	Has the company received product awards with respect to environmental responsibility? OR Does the company use product labels (e.g., FSC, Energy Star, MSC) indicating the environmental responsibility of its products?	Positive	Y/N	
6)	Environmental Products	Does the company report on at least one product line or service that is designed to have positive effects on the environment or which is environmentally labelled and marketed?	Positive	Y/N	
7)	Environmental Project Financing	Is the company a signatory of the Equator Principles (commitment to manage environmental issues in project financing)? OR Does the company claim to evaluate projects on the basis of environmental or biodiversity risks as well?	Positive	Y/N	
8)	Environmental R&D	Does the company invest in R&D on new environmentally friendly products or services that will limit the amount of emissions and resources needed during product use?	Positive	Y/N	
9)	Environmental R&D Expenditures	Total amount of environmental R&D costs (without clean up and remediation costs) divided by net sales or revenue in U.S. dollars.	Positive	Number	Median
10)	GMO Free Products	Does the company make a commitment to exclude GMO ingredients from its products or retail offerings?	Positive	Y/N	
11)	Hybrid Vehicles	Is the company developing hybrid vehicles?	Positive	Y/N	
12)	Implementation	Does the company describe the implementation of its environmental product innovation policy?	Positive	Y/N	
13)	Improvements	Does the company set specific objectives to be achieved on environmental product innovation?	Positive	Y/N	
14)	Labelled Wood Percentage	The percentage of labelled wood or forest products (e.g., Forest Stewardship Council (FSC)) from total wood or forest products.	Positive	Number	Median
15)	Liquefied Natural Gas	Does the company develop new products and services linked to liquefied natural gas?	Positive	Y/N	
16)	Monitoring	Does the company describe, claim to have or mention the processes it uses to accomplish environmental product innovation?	Positive	Y/N	
17)	Noise Reduction	Does the company develop new products that are marketed as reducing noise emissions?	Positive	Y/N	
18)	Organic Products	Does the company report or show initiatives to produce or promote organic food or other products?	Positive	Y/N	
19)	Policy	Does the company have an environmental product innovation policy (eco-design, life cycle assessment, dematerialization)?	Positive	Y/N	
20)	Product Impact Controversies	Is the company under the spotlight of the media because of a controversy linked to the environmental impact of its products or services?	Negative	Y/N	
21)	Product Impact Minimization	Does the company reports about take-back procedures and recycling programmes to reduce the potential risks of products entering the environment? OR Does the company report about product features and applications or services that will promote responsible, efficient, cost-effective and environmentally preferable use?	Positive	Y/N	
22)	Renewable Energy Supply	Total energy distributed or produced from renewable energy sources divided by the total energy distributed or produced.	Positive	Number	Median
23)	Renewable/Clean Energy Products	Does the company develop products or technologies for use in the clean, renewable energy (such as wind, solar, hydro and geo-thermal and biomass power)?	Positive	Y/N	
24)	Sustainable Building Products	Does the company develop products and services that improve the energy efficiency of buildings?	Positive	Y/N	
25)	Water Technologies	Does the company develop products or technologies that are used for water treatment, purification or that improve water use efficiency?	Positive	Y/N	

C.	Resource Reduction				
1)	Cement Energy Use	Total energy use in gigajoules per tonne of clinker produced.	Negative	Number	Median
2)	Energy Efficiency Initiatives	Does the company report on initiatives to use renewable energy sources? AND Does the company report on initiatives to increase its energy efficiency overall?	Positive	Double Y/N	
3)	Energy Use	Total direct and indirect energy consumption in gigajoules divided by net sales or revenue in U.S. dollars.	Negative	Number	Median
4)	Environmental Resource Impact Controversies	Is the company under the spotlight of the media because of a controversy linked to the environmental impact of its operations on natural resources or local communities?	Negative	Y/N	
5)	Environmental Supply Chain Management	Does the company use environmental criteria (ISO 14000, energy consumption, etc.) in the selection process of its suppliers or sourcing partners? AND Does the company report or show to be ready to end a partnership with a sourcing partner, if environmental criteria are not met?	Positive	Double Y/N	
6)	Green Buildings	Does the company have environmentally friendly or green sites or offices?	Positive	Y/N	
7)	Implementation	Does the company describe the implementation of its resource efficiency policy through a public commitment from a senior management or board member? AND Does the company describe the implementation of its resource efficiency policy through the processes in place?	Positive	Double Y/N	
8)	Improvements	Does the company set specific objectives to be achieved on resource efficiency? AND Does the company comment on the results of previously set objectives?	Positive	Double Y/N	
9)	Land Use	Does the company report on initiatives to reduce the environmental impact on land owned, leased or managed for production activities or extractive use?	Positive	Y/N	
10)	Materials	Total amount of materials used in tonnes divided by net sales or revenue in U.S. dollars.	Negative	Number	Median
11)	Materials Recycled and Reused Ratio	The percentage of recycled materials of the total materials used.	Positive	Number	Median
12)	Monitoring	Does the company monitor its resource efficiency performance?	Positive	Y/N	
13)	Policy	Does the company have a policy for reducing the use of natural resources? AND Does the company have a policy to lessen the environmental impact of its supply chain?	Positive	Double Y/N	
14)	Renewable Energy Use	Total energy generated from primary renewable energy sources divided by total energy.	Positive	Number	Median
15)	Toxic Chemicals	Does the company report on initiatives to reduce, reuse, substitute or phase out toxic chemicals or substances?	Positive	Y/N	
16)	Water Recycling	Does the company report on initiatives to reuse or recycle water? OR Does the company report on initiatives to reduce the amount of water used?	Positive	Y/N	
17)	Water Use	Total water withdrawal in cubic meters divided by net sales or revenue in U.S. dollars.	Negative	Number	Median