Control Rights and Corporate Sustainability Around the World

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Abstract

We break apart the traditional components of corporate sustainability–Environmental, Social, and Governance (ESG)–to examine the importance of outside investors' control rights for firms' environmental performance. Using a global sample, we find that giving outside investors greater control rights improves environmental performance. Better governance yields the largest environmental improvements when firms are widely held and control is contestable. Across all firms, we find a strikingly strong positive impact on environmental performance when a female board member is appointed. Family-controlled firms, where outsiders have limited influence, have lower environmental performance relative to other firms.

Keywords: Environmental performance, Ownership structure, Sustainability, Corporate social responsibility, ESG, Corporate governance

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1. Introduction

Through capital markets, outside investors acquire securities with control rights giving them the potential power to influence firms' actions, such as making investments to improve environmental performance. In many settings outsiders have been unable to use this potential power, leaving firms controlled by insiders. But this has not stopped outsiders from trying to shift power in their direction through governance actions. In this paper we investigate whether both the location of control rights (in the hands of insiders or outsiders), and governance actions that enhance outsider power, meaningfully impact firms' environmental (E) performance.

In theory, control rights and governance should matter for environmental performance, as highlighted in the framework of Benabou and Tirole (2010). Consider a typical investment to improve environmental performance that requires a current cash outlay for some long-term benefit. This investment choice can either be controlled by an insider or by an outsider. Benabou and Tirole (2010) highlight two frictions that make the identity of the decision maker relevant for environmental performance: insider short-termism; and, the utility insiders and outsiders derive from non-pecuniary impacts of the investment.

Under the strong assumptions that there is negligible insider short-termism and that non-pecuniary benefits are higher for insiders than for outsiders, insiders seeking the non-pecuniary benefits will choose a higher level of environmental performance than outsiders would desire. In this case, increasing outsider control rights will reduce environmental performance.

In all other cases, the prediction is that increasing outsider control rights mitigates insider short-termism and thus increases environmental performance. Insiders are likely subject to short-termism due to compensation and career concerns or other factors (e.g., Stein, 1989). Short-termism also emerges when family owners are insiders, as family owners consume private benefits that similarly depend disproportionately on current cash flows (e.g., Kalcheva and Lins, 2007).

When, in addition, non-pecuniary benefits from environmental investments are higher for outsiders than for insiders, shifting the location of control rights to outsiders further increases environmental performance.

To determine the extent to which these control rights predictions ring true, we conduct an empirical analysis that examines the importance of control rights and governance mechanisms, breaking apart the traditional components of corporate sustainability. The literature often measures these components in aggregate and labels them ESG—Environmental, Social, and Governance. If control rights are fundamental, the full spectrum of governance (G) deserves special consideration.

For our empirical tests, we construct a sample of 3,487 non-U.S. firms from 41 countries over the 2004 to 2015 period. An international sample allows us to best identify the effect of control rights since it offers both within-country and cross-country variation of these rights. To classify the location of control rights, we first turn to a well-established measure of insider control rights: whether or not a firm is block controlled. For these firms, outside investors will mostly or fully lack control. 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 aggregate information from multiple sources to separate firms into three categories: firms controlled by a family, firms controlled by non-family blockholders, and widely-held firms without a controlling blockholder.

We next measure control rights using specific governance mechanisms that have the potential to enhance 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 as well as board characteristics related to CEO and board entrenchment. These governance mechanisms vary considerably across firms, time, and countries. We construct firm-specific environmental performance scores from data provided by Thomson Reuters ASSET4.

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 22%. The average percentage of widely-held firms is 73%.

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-controlled while including controls for a variety of other observable factors that may affect environmental performance directly. Relative to widely-held firms, we find that family ownership is negatively associated with environmental performance, with sizable magnitudes. All else equal, family-owned firms have an 8% to 13% lower environmental performance, depending on how environmental performance is measured.

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).

One specific governance mechanism we examine is the introduction of a 'majority voting' provision in which all directors need at least 50% investor support to hold a board seat. Investors are increasingly pushing for such voting provisions to gain more influence over director selection (Cunat, Gine, and Guadelupe, 2012; Ertimur, Ferri and Oesch, 2013). We find that, all else equal, firms with a majority voting provision have 8% to 10% greater environmental performance than firms that do not have such a rule.

We also examine a number of board characteristics as specific governance mechanisms. We focus on the governance impact arising from adding a female director to the board. Around

the world, regulators and investors have increasingly pushed for greater female involvement using both mandated quotas and firm-commitment pledges to increase female board representation under the premise that this will improve firm governance. For example, Adams and Ferreira (2009), Ahern and Dittmar (2012), and Kim and Starks (2016a) all show that increased female board representation significantly impacts governance. Our tests show that the presence of a female director is associated with 12% to 15% better environmental performance.

In addition, we evaluate the impact of other board characteristics that enhance outsiders' power including the percentage of the directors on the board that are independent, whether the board has split the role of CEO and chairman, and whether the board is not entrenched, which we define as not being 'old or stale' based on age and tenure. All of these governance characteristics predict greater environmental performance.

We also construct models that include all governance mechanisms at the same time. The negative effect of family control and the positive effect of each of the specific governance mechanisms on firms' environmental performance retain generally the same significance levels as in the baseline tests with coefficient estimates that are only slightly attenuated. Moreover, the point estimate for the governance impact of female board representation on firms' environmental performance remains the largest among the governance mechanisms we study and is virtually unaffected. This suggests that the governance impact of adding a woman to the board is complementary to the impact of traditional control-rights mechanisms.

Outside investors in family-controlled firms will generally have limited power to shape the views of insiders. This raises the next question we address: Do any of the specific governance mechanisms impact environmental performance in family-controlled firms? Or do these mechanisms primarily work for widely-held firms in which control is contestable?

In widely-held firms we find that all the specific governance mechanisms have a positive and significant impact on environmental performance. For family-controlled firms, however, most specific governance mechanisms are not significantly associated with environmental performance, with two exceptions. Majority voting provisions weakly lessen the negative impact of family control, while female board representation wipes the negative impact out completely. Specifically, our tests show that having at least one woman on the board is associated with a 12% to 13% greater environmental performance in family-controlled firms. This exceeds the average negative impact of family control on firms' environmental performance, which varies from 8% to 13%.

A natural concern with our tests is the endogeneity of governance mechanisms and board characteristics. 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). We address such concerns in two ways. First, to control for time-invariant unobserved firm characteristics, we estimate firm fixed effects specifications. These tests show that changes which enhance governance positively and significantly impact firms' environmental performance, consistent with our earlier findings.

Second, to further support a causal interpretation, we seek exogenous country-specific shocks to governance mechanisms that are not simultaneously shocks to firms' E performance. Canada and the UK provide good examples. As detailed in Doidge, Dyck, Mahmudi and Virani (2018), the Canadian Coalition for Good Governance (CCGG) successfully campaigned for firms to adopt a majority voting policy. In the UK, the 2011 Davies' *Women on Boards Review* recommended that FTSE 100 firms aim for a minimum 25% of female board representation, catalyzing significant subsequent changes in UK boards. We also identify countries in which there was a substantial increase in 'treatment' (i.e. firms either adopted majority voting or added a female director) over a one year period under the premise that such dramatic changes reflect

external pressures. For each of these sub-samples we estimate difference-in-difference models, comparing the subsequent environmental performance of firms affected by the treatment (adopted majority voting or added a female director) to otherwise similar unaffected firms. Our results show that a governance shock that expands outsiders' control rights improves firms' environmental performance, supporting a causal interpretation.

Finally, we ask whether the negative effect of family control is moderated when family owners place a greater premium on non-pecuniary environmental benefits. A plausible measure of the premium family owners place on such benefits is provided by country-level measures of attitudes towards the environment. We gather this data and then compare the impact of family ownership in countries where prevailing social norms are for high for the environment and where they are not. The negative impact of family ownership on environmental performance is concentrated primarily in countries that lack strong social norms regarding the environment. For example, in continental Europe, where society places a high value on environmental performance, family control is no longer associated with worse environmental performance.

Taken together, our analyses lead to several overarching conclusions. First, we find that family ownership is strongly associated with low environmental performance. The simplest interpretation for this finding is that short-termism is powerful, and this effect dominates any desire to solve long-term environmental issues. Second, we identify specific actionable governance mechanisms that lead to improved environmental performance, particularly in firms for which control is contestable with no dominant insiders. Third, we find a surprisingly strong positive impact of adding a woman to the board on firm environmental performance. It is the strongest in magnitude and significance even when we include other governance mechanisms. This impact could arise from the diverse skill sets new female directors bring, or from stronger innate preferences towards environmental performance. Fourth, our findings show governance (G) is

fundamentally important and should not merely be considered alongside environmental performance metrics.

Our findings contribute to the literature on corporate social responsibility in general (e.g. Hong and Kacperczyk, 2009; Edmans, 2011; Liang and Renneboog, 2017; Hong and Liskovich, 2016; Cronqvist and Yu, 2017; Hart and Zingales, 2017), the work by Dimson, Karakas, and Li (2015), Barber, Morse and Yasuda (2018), Dyck, Lins, Roth and Wagner (2018) that focuses specifically on the importance of investor power in driving CSR, and the work by Krueger (2015) and Ferrell, Liang and Renneboog (2016) that asks whether broad proxies for agency problems are linked to CSR. We complement these papers by bringing to the forefront specific actionable governance mechanisms such as majority voting provisions and adding a female director, and we quantify the gains in environmental performance from these specific governance choices. Our results clearly show the centrality of governance for investor power. These results have important implications for analyses that link stand-alone E measures to subsequent firm performance. The fundamental driver of E improvement is G, and thus firm performance changes could come from either E or embedded G.[1]

Further, we contribute to the broader literature on the importance of governance and family ownership. We complement existing work that explores the performance implications of majority voting rules (Cunat, Gine, and Guadelupe, 2012; Ertimur, Ferri, and Oesch, 2013; Doidge, Dyck, Mahmudi, and Virani, 2018) and female board participation (e.g. Adams and Ferreira, 2009; Adams and Funk, 2012; Ahern and Dittmar, 2012; Kim and Starks, 2016a) by showing the impact of these governance mechanisms for firms' environmental performance. Our paper also contributes to the extensive literature on the financial costs and benefits generated by control through insiders, and families more specifically (see, e.g. Morck, Wolfenzon, and Yeung, 2005,

[1] Governance has clear links to better firm performance (e.g. La Porta, Lopez-de-Silanes, Shleifer, and Vishny 2002; Denis and McConnell, 2003; Black, Jang and Kim, 2006; Gompers, Ishii and Metrick, 2010).

and Bennedsen, Nielsen, Perez-Gonzalez and Wolfenzon, 2007), which we extend by considering environmental performance.

2. Control Rights and Firms' Environmental Performance

In this section we develop hypotheses regarding connections between the location of control rights (i.e., do they reside with outsiders or insiders) and firms' environmental performance, building on the theoretical framework of Benabou and Tirole (2010). The nuances they ascribe to overall CSR performance apply directly to the stand-alone environmental component of CSR, leading to control rights and environmental (E) performance predictions. There are two frictions in their framework: managerial short-termism and the utility that controlling shareholders receive from non-pecuniary impacts of CSR investments.

Because of well-known compensation and career concerns (e.g., Stein, 1989; Edmans, Gabaix, and Jenter, 2017), Benabou and Tirole (2010) suggest managers place a disproportionate focus on current performance. The typical E investment requires a current cash outlay for some potentially value-enhancing long-term benefit. Thus, the greater this short-termism, the lower the managers' E investments. Short-termism also emerges when we consider family owners as the insiders, as family owners consume private benefits that similarly depend disproportionately on current performance. There is ample evidence to support the assumption that private benefits come from cash holdings or current cash flow and that, consistent with such a distortion, family insiders will be unwilling to make potential value-enhancing investments if those investments limit their private benefits.[2]

[2] For example, markets put a lower value on corporate cash holdings when firms have entrenched insider/family control, indicating a fear that such cash will be consumed for private benefits (Kalcheva and Lins, 2007). Similarly, transfer pricing schemes that involve trading between public companies overwhelmingly have private benefits created from current (rather than future) cash flows (Cheung, Rau, and Stouraitis, 2006; Desai, Dyck, and Zingales, 2007; Jiang, Lee, and Yue, 2010). Further, family-controlled firms have been shown to both underperform and be unwilling to make current investments particularly during periods where cash holdings are most valuable (Lemmon and Lins, 2003; Lins, Volpin, and Wagner, 2013).

Benabou and Tirole (2010) also posit another friction, that those with control rights can also receive non-pecuniary utility from E investments. They do not delve into the sources of that utility. This could be garden-variety non-pecuniary benefits such as the environmental investment endearing the manager to the community and the non-profit board she sits on. Behavioral economics research suggests that this utility also may arise from social norm pressures, innate preferences, or other factors.

When both outsiders and insiders do not receive non-pecuniary benefits from E investments, shifting control rights to outsiders increases E investments. This arises from outsiders addressing managerial short-termism. The resulting E investments are NPV enhancing. This corresponds to the 'win-win' view of CSR investments in Benabou and Tirole (2010).

When outsiders receive more non-pecuniary benefits than insiders from E investments, shifting the location of control rights to outsiders again increases E investments. In this case, the change arises from the utility outsiders derive from the non-financial impacts as well as from outsiders addressing managerial short-termism. Notably, the resulting E investments are not necessarily NPV enhancing, as the outsiders have an incentive to overinvest because of the weight they place on non-pecuniary factors. This situation corresponds to Benabou and Tirole's view of E investments as 'outsider-initiated corporate philanthropy.'

There is only one situation where we generate the reverse, in which giving outsiders more control rights will decrease E investments. This stems from the tradeoff insiders face as they consider both the value they derive from non-pecuniary benefits from E investments and their attendant short-termism costs. If short-termism costs are negligible, and the utility insiders derive from non-pecuniary impacts is high (see Masulis and Reza, 2015), we arrive at Benabou and Tirole's view of E investments driven by 'insider-initiated corporate philanthropy'—without outsider control, insiders will choose a higher level of E investment.

In summary, there are competing predictions for how control rights affect E performance. We now turn to the data to identify the relationship between control rights and E performance and, based on our findings, offer interpretations.

3. Sample and Summary Statistics

3.1 Variables and Data Sources

We obtain data on firms' environmental performance from the Thomson Reuters ASSET4 ESG database. ASSET4 is well suited for an international study, providing coverage of a large number of firms from around the world over an extensive time period. 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.[3]

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 Table 1A).

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

[3] While data providers differ in their methodologies for measuring E performance, Dyck et al. (2018) consider three different sources for E performance data – ASSET4, Bloomberg, Sustainalytics – and show that their findings are generally not affected by use of alternative sources. Similarly, Ferrell et al. (2016) also find that their results are robust to several alternative ESG data sources.

proprietary-weighted aggregate scores that ASSET4 provides to investors (ASSET4 *z*-scores).[4] 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 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')[5] 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.

To classify the location of control rights, we first turn to a well-established measure of insider control rights: whether or not a firm is block controlled. For these firms, outside investors will mostly or fully lack control rights. 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: firms controlled by a family; widely-held firms that are known to not have a controlling blockholder; and firms controlled by non-family blockholders.[6]

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:

[4] 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.

[5] 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.

[6] Hsu, Liang, and Matos (2017) focus in particular on the impact of state ownership (one type of non-family blockholder) on firms' environmental performance.

- 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.

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.[7]

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

To establish the strength of control rights held by outsiders, we examine specific governance mechanisms that give outside investors power and have been the focus of much of the governance literature. We emphasize outside investor power to shape the board of directors and board characteristics that impact that power.

We first measure investors' power to elect the board. Traditionally in director elections shareholders could vote either 'for' or 'withhold' their vote (which was equivalent to not voting), and in most cases the vote was for a slate of directors. Around the world investors have been asking stock exchange regulators as well as firms themselves to adopt majority voting policies whereby individual directors would be listed on the proxy, and where directors that failed to receive a majority of the votes cast, counting withhold votes as votes cast (negatively), would submit their resignation. These majority voting policies have the potential to significantly increase outside shareholders power over director selection (Cunat, Gine, and Guadelupe, 2012; and Ertimur, Ferri, and Oesch, 2013), and outsiders would be able to vote 'against' directors they do not want. Moreover, as outsiders have this power, boards have an incentive to consult outside shareholders before selecting directors for election. For our tests, 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.

Next we consider a variety of board characteristics correlated with outside investors having greater power. We follow Hermalin and Weisbach's (1998) model of corporate boards and measure board independence, predicting greater outside investor control rights when there are a greater percentage of independent board members (as opposed to executive board members). Board Independence is the number of independent board members scaled by the total number of board members.

We create a measure that captures overall board entrenchment, and thus likely stronger insider control, by combining two governance indicators. Tenure provides one indicator of an individual board members' entrenchment. In the UK, for example, when board members are on the board more than 9 years they are no longer considered independent and can no longer serve on key board committees that require independence such as the audit and compensation committees (UK Corporate Governance Code 2016). Age provides another indicator of a lack of independence. We combine these two, categorizing boards as 'Old or Stale' using an indicator variable that equals one if either at least 50% of directors have tenure greater than 9 years or at least 20% of the directors are over 70 years old, and zero otherwise. We expect 'Old or Stale' boards to more frequently side with insiders.[8]

We also construct a measure of CEO-Chair Duality that equals one if the CEO is also the chairman of the board, and zero otherwise. The implicit assumption here is that insider power is greater when these roles are combined, although the empirical evidence on this phenomenon is mixed (see, for example, Boone, Field, Karpoff, and Raheja, 2007; Coles, Daniels, and Naveen, 2008; Linck, Netter, and Yang, 2008).

Finally, we consider board diversity as a specific governance mechanism, captured by female board representation. Around the world, a large number of regulators and investors have pushed for more female involvement in a variety of ways including 'hard' measures such as regulatory mandates that specify gender quotas and 'soft' measures including regulatory initiatives demanding firms comply-or-explain against gender targets as well as investor coalition requests for enhanced female board representation. As Adams and Ferreira (2009) describe, this push stems from two beliefs, both related to governance: first, board quality will be improved by drawing from the broader talent pool that includes women; second, as they note "[…] because they do not belong

[8] For robustness, we also estimate models using an alternative MSCI (2013) entrenchment index, which uses alternative parameters to define board entrenchment. The results, in Appendix Table A2, are unchanged.

to the 'old boys club,' female directors could more closely correspond to the concept of the independent director emphasized in theory." (p. 292).

There is evidence that increased female board representation significantly impacts governance. Adams and Ferreira (2009), for example, study US firms and find greater board attendance and a higher sensitivity of CEO turnover to financial performance when women are on the board. In a Norwegian sample, Ahern and Dittmar (2012) find that women added to the board are less likely than male board members to be insiders (and thus more independent), and have higher levels of education and are younger and have less experience. Kim and Starks (2016a) focus on director skills sets in US firms and find that female directors bring skill diversity to the board, and in particular sets of expertise currently missing, one of which is corporate governance. [9]

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.

3.2 Descriptive Statistics

In Panel A of Table 1 we report summary statistics of firms' environmental performance, specific governance mechanisms, and other characteristics, grouping firms by whether they are family controlled, widely held, or controlled by another block holder.

There is significant variation in firms' environmental performance across countries, industries, and time. As we describe below, in all of our tests we control for most of these sources of variation with fixed effects. Environmental scores for our entire sample are such that the mean

[9] The evidence of the impact of adding females to the board and increasing board diversity on firm performance is mixed. Adams and Ferreira (2009), Ahern and Dittmar (2012), and Adams, Akyol, and Verwijmeren (2018) find negative effects, while others report positive impacts (e.g. Kim and Starks (2016b) find diversity increases performance related to M&A decisions).

(median) ASSET4 Environmental *z*-Score is 53.7 (56.1) and the mean (median) equally-weighted environmental score is 37.8 (34.8), where a perfect score would be 100 for each of the two measures. Environmental performance measures are lowest among family-controlled firms and highest among widely-held firms.

In terms of corporate governance metrics, there is significant variation across firms, providing power for our empirical tests. Majority voting, for example, is present in roughly half of firms. The average percentage of the board that is independent is 50%. In one fifth of firms, the CEO is also chair of the board, and similarly one fifth of firms has an old or stale board. And almost two thirds of firms have at least one female board member. Comparing these specific governance mechanisms across blockholder groups, we find that family-controlled firms have weaker governance across the measures of independence, old or stale board composition, and CEO-chair duality.

In Panel B, we report, by country, the average environmental performance of firms as well as the average fractions of firms that are family controlled, widely held, or controlled by other blockholders (data are for 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.[10]

Regarding control, overall 22% of the sample firms are family controlled, 73% are widely held, and 5% are controlled by other blockholders. As expected, control rights vary substantially across countries. For example, Luxembourg, Mexico, and Turkey are the countries with the

[10] 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).

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 UK, 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.

4. Do 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.

4.1 Standard Measures of 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:

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

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.[11] We use logs of environmental scores to obtain better distributional properties and to reduce the impact of

[11] 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.

outliers.[12] For firm-level control variables we use firm size (log of 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. 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.

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, columns 2 through 6 include the two blockholder control rights dummies and each of the specific governance mechanisms one at a time, and column 7 includes all measures at the same time.

Insiders are in charge if the family dummy is equal to one. Our Table 2 results show that the coefficient on Family is negative and statistically significant with *p*-values less than 1% in all models, whereas the coefficient on Other never obtains statistical significance. This implies that family-controlled firms have worse environmental performance relative to widely-held firms.

The results in column 2 through 5 allow us to explore the impact of plausibly increased control rights for outside shareholders based on more traditional mechanisms studied in the governance literature. For three out of four of these governance measures, increases in outsider control rights obtained from these mechanisms is significantly associated with firms'

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

environmental performance (p-values < 5%). Firms that elect directors based on majority voting rules and firms with a greater fraction of independent directors have significantly higher environmental performance while firms with old or stale boards have lower environmental performance. The coefficient on CEO-Chair Duality is not significant at conventional levels (p-value of 11%). In column 6 we test for the impact of board gender as a governance mechanism. Having at least one woman on the board significantly increases firms' E performance.

These governance mechanisms have economically meaningful impacts. Family-controlled firms have a 12.7% lower environmental performance compared to the rest of the sample firms. When we control for other governance differences across firms in columns 2 through 7, we find that the negative impact of family ownership on E performance never drops below 7.9%. Turning to the specific governance mechanisms, we find that firms that elect their directors based on majority election rules have an 10% greater environmental performance compared to firms that do not have such a rule in place. A one standard deviation increase in board independence is associated with a 2.54% (=.1*.254) increase in E performance, and having an 'old or stale' board decreases E performance by 5.2%. Finally, our board gender tests show the strongest governance impact. Firms with at least one female board member have 15.5% higher environmental performance.

In the final column we include all governance mechanisms in one specification. We do this to identify whether the results from specific governance mechanisms reflect collinearity with other governance mechanisms. For instance, the board gender effects may arise as a result of simultaneous governance changes (e.g., in the same year when majority voting is adopted the first female director might be elected). In column 7 we find little evidence of collinearity. We obtain similar significance levels and coefficients for each specific governance mechanism with only slightly attenuated magnitudes. Each of the governance mechanisms has a stand-alone impact on

E performance. Notably, as in the univariate governance mechanism tests, gender has the strongest impact, increasing firms' E performance as before by 14.4%.

These strong estimates for the impact of gender could arise, as mentioned, because of different skills sets that female directors bring to their boards. Kim and Starks (2016a) find that female directors of US boards have significantly stronger sustainability expertise, and that such expertise is lacking on most boards. The behavioral economics literature provides another explanation that may be complementary. This research suggests that females in general (not specifically female board members) have stronger 'other regarding' preferences than men and thus could seek to improve a firm's environmental performance for this reason (Andreoni and Vesterlund, 2001; Adams and Funk, 2012; Thaler, 2016; Cronqvist and Yu, 2017).

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.

4.2 Do Specific Governance Mechanisms Affect Family-controlled 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 an indicator 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 3 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, increasing board independence, making a board less entrenched (less 'old or stale'), and eliminating CEO-Chair duality have no significant impact on E performance in family owned firms. Two governance mechanisms, however, do impact E performance: adopting majority voting and adding a woman to the board. In terms of economic significance, majority elections are associated with a 6% to 9% higher environmental performance and introducing a woman to the board is associated with a 12% to 13% greater environmental performance in family-

controlled firms. Interestingly, the positive female board effect is greater than the average negative impact of family control on firms' environmental performance, which varies from 8% to 13%. In other words, by adding a woman to the board of a family firm, the negative environmental performance associated with family control disappears.

Focusing on 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% greater ASSET4 Environmental *z*-Scores compared to firms without majority director elections. Further, widely-held/other firms with a female director have on average a 13-16% higher environmental scores.

5. Further Tests Addressing Causality

Further analysis is required to support the interpretation that control rights are causing changes in firms' environmental performance. For example, one possibility is that families choose to control firms in industries with low average environmental performance. This could lead to the empirical result that family firms have low environmental performance but not reflect anything specifically about the lack of outsider control rights in family firms (although the inclusion of industry fixed effects in all of our models should lessen this concern). Another possibility is that some omitted factor influences firms to both improve outside investors' control rights and to improve E performance.

5.1 Selection Issues

To address the first concern — that selection potentially determines the family firm results — we split SIC divisions into plausibly 'dirty' and 'clean' industries, and look for differences in these sub-samples. If selection were driving the results, the negative effect of family on E performance would be concentrated in dirty industries.

We use two different criteria to split the industries. First, we take advantage of the fact that the SASB has categorized industries by the degree to which environmental performance scores are material. 'Dirty' industries, according to SASB standards, include the SIC industry Divisions 'Agriculture, Forestry, Fishing,' 'Mining,' and 'Services.' Second, we use the ASSET4 z-scores themselves, categorizing as 'dirty' the four Divisions (out of 9) that have the lowest average E scores. These SIC industry Divisions are 'Agriculture, Forestry, Fishing,' 'Mining,' 'Services,' and 'Retail Trade.' We report in Appendix Table A3 the details of the mapping, summary statistics by SIC Division and the regression results.

We find no difference in the likelihood of having family ownership in 'dirty' versus 'clean' industries. Further, repeating the empirical specification of Table 2, we find a similar negative impact of family control on E performance in both 'dirty' and 'clean' industries. These results suggest that family firms' lower environmental performance does not arise from families selecting to control firms in dirty industries.

5.2 Omitted Variables and Firm Fixed Effects

To address the concern that our results are driven by omitted variables, we first introduce firm fixed effects specifications. These specifications control for time-invariant unobservable firm characteristics. These regressions, as before, also include time varying observable firm characteristics that could also drive E performance.

We estimate these models in Table 4. For these tests we keep only those observations where the governance variables are time-varying during the sample period. This within-firm specification is relatively demanding in terms of model power as governance mechanisms are generally sticky over time. The Table 4 tests confirms our prior results—stronger (lagged) specific governance mechanisms are positively associated with firms' (future) environmental performance. We continue to find strong statistical significance (*p*-value is greater than 5% in all cases). Not

surprisingly, the implied economic impact of the governance mechanisms is somewhat attenuated but still sizable.

5.3 Causality and Quasi-exogenous Shocks

To further assess causality, we seek exogenous shocks to governance mechanisms that are not simultaneously shocks to firms' E performance. Broadly speaking there are two types of such shocks: 'hard' regulatory mandates that require firms to change governance mechanisms; and, 'soft' regulatory mandates or investor group pressures that induce a substantial number of firms to change governance mechanisms. After reviewing available data for the countries in our sample, we focus our attention on majority voting adoption and female board representation. For these governance mechanisms we are able to identify potentially exogenous shocks (we refer to these as 'quasi-exogenous' shocks) for some countries in our sample. There are no such shocks for family ownership and we could not find compelling exogenous shocks for the other governance mechanisms.

Canada provides a good example of a majority voting adoption shock and thus offers a laboratory to test whether 'forced' changes in majority voting lead to subsequent changes in firms' E performance. As detailed in Doidge et al. (2018), the driving force behind firms' adoption of majority voting was the creation of the Canadian Coalition for Good Governance (CCGG) that had as its first major campaign a request for firms to adopt a majority voting policy. Starting from a situation in which very few firms had majority voting in Canada, in 2005 and 2006 the CCGG contacted firms through letters and phone calls, requesting they adopt this change. Over the next two years, Doidge et al. (2018) report substantial increases in firm adoption, with regressions and a fuzzy RDD supporting a causal interpretation that majority voting adoption was driven by the CCGG. Also of importance, at this time the CCGG investor group took no steps to request that firms increase their environmental performance.

We test whether this shock that increased majority voting adoption leads to subsequent increases in firms' E performance in Panel A of Table 5. To that end, we use a difference-in-differences specification spanning the 2004 to 2009 period, that is, two years before and two years after the firms' majority voting adoption years (2006 and 2007). We define treated firms as those that adopted majority voting in 2006 or 2007. Control firms are those that did not change their majority voting policy during the 2004 to 2009 period. We require that treated and control firms have at least one observation before and after the adoption years. Further, to make sure the results are not driven by other major changes in the firm, we exclude any firms in which there was a change in family control or other-blockholder ownership control. All specifications include year fixed effects (which is possible as firms adopt majority voting in either 2006 or 2007) and firm fixed effects to control for time-invariant firm characteristics.

The specifications in columns 1 and 2 compare changes in treated firms (those that adopted majority voting in the context of external pressure) relative to changes in control firms that either did not adopt majority voting in this period or had already adopted it. Control firms capture any secular trend to increase E performance. Focusing on the interaction of the treated firm dummy with the Post Majority Election Adoption variable, we find a positive and significant coefficient. In terms of economic significances, the effects on E performance of the plausibly exogenous change in governance is sizable with increases between 19% and 26% (depending on environmental score used; also note, Canadian firms had very low scores to start with).

These results based on the Canada sub-sample support a causal interpretation from control rights to firms' E performance. We build on this same approach to identification and select countries where a substantial number of firms adopt majority director election rules in a short time period. For these tests, we adopt a stringent selection criteria, requiring that the percentage of firms that have majority voting increases by at least 20 percentage points in a single year. Ten countries

meet this criteria. We posit that such dramatic changes in a short time period are likely driven by some external push from investor groups, regulators or both. In Appendix Table A4 we list the country, year, and percentage change in majority voting. We also cite specific sources of pressure to adopt majority voting rules in countries for which we can obtain them. We note that by limiting the number of countries and the years we focus on, we address the concern that the majority voting effects derive from some omitted variable.

We follow a similar empirical approach in columns 3 and 4 of Table 5, performing a difference-in-differences analysis around the two years before and two years after the quasi-exogenous shocks to adopt majority voting. Treated firms are again the firms that adopted majority voting following the shock and control firms are those that did not change their majority voting policy during the time period considered. The adoption of majority voting is again associated with a positive and significant increase in firms' E performance. The estimated economic impact is an increase in firms' E performance of 8% to 10% (depending on E score) in the two years following the adoption of a majority voting provisions. The results are similar to those of the Canadian sub-sample and are consistent with our prior findings in Tables 2 through 4.

We next turn to quasi-exogenous shocks to female board representation. Exogenous pressures to encourage firms to increase female board representation include regulator-mandated female quotas, introduced first in Norway, and as of 2018 in place in a number of largely European countries. Exogenous pressures also come from investor group demands, often accompanied by softer regulatory pressures to increase disclosures about policies regarding diversity.

In countries that adopted quotas to increase the percentage of female board members, we note that a large majority of the treated firms already had at least one female director to start with, resulting in little power for these empirical tests. In the case of Norway, which had low female representation before passage of the quota legislation, we cannot conduct tests because the quota

was passed in 2003 and we have no data on E performance before this time period. In general, mandated quota tests lack power in our sample.

For our first tests of external-pressure-driven changes in female board representation we turn to the UK, for which female board representation was initially low, and where there was a powerful push to increase female board representation (that was not a quota) that was successful. In the UK, early in 2011 Lord Davies published his Women on Boards review. This report made 10 recommendations regarding disclosure and policies on diversity, including a recommendation that FTSE100 firms should have 25% female board representation within 4 years. The effort was supported by investor groups such as the Association of British Insurers which disclosed that it would now start monitoring female board representation.

For our tests, we follow the same empirical approach as with Canada. We use a difference-in-differences specification spanning the 2009 to 2015 period, that is, two years before and two years after the firms' majority voting adoption years (2012 and 2013). We define treated firms as those that adopted majority voting in 2012 or 2013. Control firms are those that did not change their status of having at least one female director during the 2009 to 2015 period (they either had a female in all years or in none of the years). We require that treated and control firms have at least one observation before and after the adoption years. We verify that for the UK firms in our sample, the externally driven pressure did make a difference, with 19% more firms with at least one female on the board in 2013 compared to 2011.

We present results in Table 5, panel B columns 1 and 2. The key variable of interest is the Post Female Board Representation indicator variable that we interact with the treated firms' indicator variable for those firms that add one or more female directors to the board. The positive and significant coefficient on the interaction term in both columns 1 and 2 provides support for a

causal interpretation that adding a woman to a board increases firms' E performance. The implied economic impact is 7% to 16% higher environmental performance.[13]

As before, to increase the sample size for our quasi-exogenous shock tests, we identify countries that experience a substantial increase in having at least one female board member in a short period of time. Here we use a threshold increase of 10 percentage points in a given year (this represents a substantial one year increase, as the majority of sample firms (63%) have a female director). This criteria yields nine countries in total, including the UK.

We report the results of these difference-in-differences tests in columns 3 and 4. For this larger sample, results are similar. Adding a woman to the board as a result of a plausibly exogenous shock is estimated to increase E performance by 6% to 8%.[14]

6. The Effect of Insider Control Rights When Families Care More About the Environment

We conclude our analysis by performing additional tests for family owned firms. First, we have an empirical interest in learning whether the negative impact of family ownership can be mitigated by non-governance factors. Second, we are motivated by the theoretical framework introduced earlier.

As noted in section 2, when families are in control, insiders face a tradeoff between the value they derive from non-pecuniary benefits from E investments and their attendant short termism costs. Our results so far are consistent with short-termism costs being dominant as we find lower E performance for family-controlled firms. A natural question that arises is whether this negative effect of family control is moderated when family owners place a greater premium on non-pecuniary benefits associated with their firms' environmental performance. A plausible

[13] Note that results are similar if we restrict attention solely to control firms that already had a female director.
[14] Results are unchanged if we restrict the control group firms to those that already have at least one female director.

measure of the premium family owners place on non-pecuniary environmental benefits is provided by country-level measures of environmental performance (Dyck et. al., 2018).

To capture the social norms facing insiders, we assume that controlling family owners live in the same country as the firms they own and we use data on social norms prevailing in that country. Specifically, we measure a country's social norms concerning environmental issues with (a) geographic location, continental Europe or not; and (b) the Environmental Performance Index (EPI) obtained from Yale Center for Environmental Law (Yale University) and Center for International Earth Science Information Network (Columbia University) – we use a year 2014 median split. The average EPI scores in Continental Europe are significantly higher than in other countries in our sample.

We present the results in Table 7. The odd columns focus on the blockholder status of firms and the even columns include in addition all of the specific governance mechanisms. We find that the negative effect of family ownership on E performance is concentrated in the settings with lower environmental norms. In columns 1 and 2, that focus on the Continental European sample where environmental norms are high, there is no significant impact of family ownership on E performance. In contrast, outside of Continental Europe in columns 3 and 4, results are as previously reported with a strong and significant negative impact of family ownership. As shown in columns 5 through 8, the negative impact of family ownership is again concentrated in countries with below median EPI scores, with higher negative coefficients. We note that family ownership has a significant negative effect (albeit lower) even in high EPI score countries.

These results are generally consistent with insiders facing a tradeoff between the value they derive from non-pecuniary benefits from E investments and their attendant short termism costs, as the negative effect of family control is moderated when family owners plausibly have a greater concern for environmental performance.

7. Conclusion

Institutional investors are increasingly interested in corporate sustainability worldwide and are exerting influence to push firms towards improving their environmental performance. Our paper shows that they should not focus on aggregate measures of ESG, or even E as a stand-alone measure. Rather, governance is fundamental to achieving environmental performance objectives.

Where insiders control the firm, as is the case with family firms, we find relatively low environmental performance. In these firms, insider short-termism appears to dominate the desire to address long-term environmental issues. In firms without dominant insiders, we find that governance mechanisms that increase outside investors' power lead to subsequent improvements in environmental performance. Across all firms, we find a strikingly strong positive impact for firm environmental performance when a woman is elected to the board of directors. This impact is the strongest in magnitude across all of the governance mechanisms we study. Possible explanations include the diverse skill sets new female directors bring, or these directors' stronger innate preferences towards environmental performance.

This paper shows sustainability-minded investors will be more effective in achieving their objective if they consider specific actionable governance mechanisms that lead to improved environmental performance, particularly in firms without dominant insiders. We show that these mechanisms include adopting majority voting for board members, increasing the percentage of independent directors, reducing board entrenchment, splitting the role of CEO and Chairman, and including at least one woman on the board of directors. We find two actionable governance mechanisms that attenuate the negative impact of family ownership. These are having the firm adopt majority voting provisions and adding a female director to the board.

Taken together, our findings show governance (G) quality–and the degree to which control is contestable–is itself a determinant of the other components of ESG. Governance is

fundamentally important and should not merely be considered alongside environmental performance metrics.

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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 summary statistics for firms grouped by whether they are family controlled, widely held, or have a different control structure (other). 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% (following 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). 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 Table A1 describes the indicator variables used to calculate the environmental scores. 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. Old or Stale Board is an indicator variable that equals one if at least 20% of the directors is over 70 years old or if at least 50% of directors have a tenure greater than 9 years, and zero otherwise. CEO-Chair Duality is an indicator variable that equals one if the CEO is also the Chairman of the board, and zero otherwise. Female Director is an indicator variable that equals one if a firm has at least one female director, and zero otherwise. Female Executive Director is an indicator variable that equals one if a firm has at least one female executive director, and zero otherwise. Female Non-executive Director is an indicator variable that equals one if a firm has at least one female non-executive 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 B shows country averages of environmental scores, control rights, and the number of observations for the year 2012 and the full sample.

Panel A: Summary Statistics by Control Type

	Full Sample (N=25,143)	Family (N=5,421)			Widely Held (N=18,345)			Other (N=1,377)		
	Mean	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
ASSET4 E *z*-Score	53.7	48.5	44.5	31.0	55.4	60.2	31.7	51.7	54.8	29.2
Equally-weighted E Score	37.8	35.2	31.5	20.7	38.5	35.7	21.5	37.5	37.4	19.0
Majority Election	0.48	0.48	0.00	0.50	0.48	0.00	0.50	0.52	1.00	0.50
Board Independence	0.50	0.44	0.44	0.22	0.54	0.57	0.26	0.38	0.36	0.22
Old or Stale Board	0.19	0.34	0.00	0.47	0.14	0.00	0.35	0.15	0.00	0.35
CEO-Chair Duality	0.18	0.25	0.00	0.44	0.16	0.00	0.36	0.17	0.00	0.38
Female Director	0.63	0.65	1.00	0.48	0.63	1.00	0.48	0.63	1.00	0.48
Female Executive Director	0.12	0.18	0.00	0.38	0.10	0.00	0.30	0.18	0.00	0.38
Female Non-executive Director	0.59	0.58	1.00	0.49	0.60	1.00	0.49	0.56	1.00	0.50
Log(Total Assets)	8.68	8.56	8.56	1.47	8.67	8.51	1.83	9.34	9.30	1.69
Tangibility	0.31	0.29	0.25	0.23	0.31	0.26	0.26	0.35	0.33	0.28
Cash	0.13	0.14	0.10	0.12	0.13	0.08	0.13	0.12	0.09	0.11
Leverage	0.24	0.25	0.24	0.17	0.23	0.22	0.18	0.23	0.21	0.17
Profitability	0.06	0.07	0.06	0.08	0.05	0.05	0.08	0.06	0.05	0.08
Institutional Ownership	0.23	0.19	0.16	0.14	0.25	0.20	0.18	0.13	0.10	0.11
Cross-list	0.10	0.07	0.00	0.26	0.10	0.00	0.30	0.16	0.00	0.36

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	33.0	28.1	0.13	0.03	0.84	280	2,217
Austria	61.4	47.5	0.31	0.13	0.56	16	195
Belgium	57.2	44.3	0.38	0.04	0.58	24	262
Brazil	56.5	43.9	0.38	0.24	0.39	80	532
Canada	39.9	32.4	0.18	0.02	0.80	235	2,088
Chile	41.2	33.7	0.41	0.23	0.36	22	146
China	31.3	26.6	0.28	0.17	0.55	123	813
Colombia	37.6	32.1	0.18	0.36	0.45	11	64
Denmark	68.3	50.7	0.28	0.00	0.72	25	265
Egypt	18.3	18.1	0.36	0.18	0.45	11	65
Finland	81.4	62.1	0.16	0.08	0.76	25	291
France	81.7	63.1	0.50	0.03	0.47	90	963
Germany	68.6	54.7	0.30	0.04	0.66	76	859
Greece	56.0	44.9	0.47	0.00	0.53	17	214
Hong Kong	36.6	30.5	0.45	0.19	0.36	106	972
India	50.2	42.3	0.33	0.18	0.50	80	530
Indonesia	46.3	36.6	0.29	0.32	0.39	28	197
Ireland	49.2	41.6	0.13	0.00	0.87	15	159
Israel	42.1	33.7	0.53	0.00	0.47	15	104
Italy	60.8	50.1	0.27	0.07	0.67	45	496
Japan	63.4	51.6	0.06	0.00	0.94	384	4,345
Luxembourg	56.0	41.3	0.63	0.13	0.25	8	66
Malaysia	41.5	33.8	0.36	0.10	0.55	42	279
Mexico	45.4	35.8	0.77	0.04	0.19	26	200
Netherlands	66.7	51.7	0.19	0.00	0.81	36	381
New Zealand	44.2	34.2	0.10	0.20	0.70	10	137
Norway	68.1	52.0	0.18	0.06	0.76	17	196
Philippines	43.9	34.9	0.11	0.16	0.74	19	126
Poland	35.0	30.3	0.21	0.38	0.42	24	159
Portugal	73.4	57.5	0.58	0.08	0.33	12	132
Russia	45.7	35.9	0.55	0.24	0.21	33	250
Singapore	41.9	35.3	0.11	0.20	0.68	44	451
South Africa	49.9	39.2	0.12	0.08	0.80	120	586
South Korea	60.8	48.1	0.34	0.03	0.63	99	582
Spain	75.7	57.4	0.30	0.05	0.65	43	502
Sweden	75.3	57.1	0.42	0.04	0.53	45	552
Switzerland	57.6	45.3	0.32	0.02	0.67	60	612
Taiwan	46.9	37.5	0.06	0.00	0.94	126	724
Thailand	53.4	42.8	0.21	0.17	0.63	24	152
Turkey	57.9	44.7	0.54	0.17	0.29	24	158
UK	60.8	46.0	0.18	0.00	0.82	280	3,121
Overall	53.2	42.2	0.31	0.11	0.58	2,800	25,143

Table 2
Do Control Rights Affect 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 Table A1 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

	ASSET4 Environmental *z*-Scores $_t$						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Family $_{t-1}$	-0.127***	-0.124***	-0.092***	-0.092***	-0.103***	-0.105***	-0.079***
	(-3.52)	(-3.39)	(-3.00)	(-3.13)	(-3.52)	(-3.60)	(-2.75)
Other $_{t-1}$	0.014	0.013	0.041	0.019	0.021	0.023	0.039
	(0.40)	(0.37)	(1.15)	(0.51)	(0.56)	(0.66)	(1.14)
Log (Total Assets) $_{t-1}$	0.242***	0.238***	0.227***	0.232***	0.232***	0.219***	0.214***
	(13.24)	(13.10)	(10.46)	(10.53)	(10.53)	(10.78)	(10.62)
Cash $_{t-1}$	-0.120	-0.124	-0.034	-0.032	-0.025	-0.030	-0.029
	(-1.09)	(-1.15)	(-0.52)	(-0.47)	(-0.36)	(-0.45)	(-0.44)
Tangibility $_{t-1}$	0.174**	0.179**	0.226***	0.229***	0.231***	0.225***	0.228***
	(2.45)	(2.59)	(3.54)	(3.56)	(3.65)	(3.78)	(3.76)
Leverage $_{t-1}$	-0.141	-0.138	-0.225***	-0.229***	-0.229***	-0.214***	-0.214***
	(-1.28)	(-1.25)	(-3.18)	(-3.32)	(-3.30)	(-3.13)	(-3.08)
Profitability $_{t-1}$	0.304**	0.312***	0.268**	0.267**	0.264**	0.236**	0.244**
	(2.69)	(2.75)	(2.50)	(2.47)	(2.46)	(2.24)	(2.30)
Institutional Ownership $_{t-1}$	0.211**	0.195**	0.118	0.184*	0.178*	0.156	0.100
	(2.32)	(2.06)	(1.19)	(1.86)	(1.80)	(1.65)	(1.04)
Cross-list $_{t-1}$	-0.049	-0.059	-0.067	-0.058	-0.058	-0.054	-0.066*
	(-1.37)	(-1.65)	(-1.68)	(-1.56)	(-1.54)	(-1.46)	(-1.79)
Majority Election $_{t-1}$		0.100***					0.067***
		(4.12)					(2.85)
Board Independence $_{t-1}$			0.243***				0.210***
			(3.93)				(3.71)
Old or Stale Board $_{t-1}$				-0.078***			-0.066***
				(-3.32)			(-2.94)
CEO-Chair Duality $_{t-1}$					-0.049		-0.037
					(-1.54)		(-1.30)
Female Director $_{t-1}$						0.155***	0.144***
						(5.70)	(5.40)
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	25,143	25,134	19,120	19,120	19,120	19,120	19,115
Adjusted R^2	0.436	0.439	0.465	0.464	0.463	0.47	0.475

Panel B: Equally-weighted Environmental Scores

	Equally-weighted Environmental Scores $_t$						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Family $_{t-1}$	-0.096***	-0.094***	-0.069**	-0.071***	-0.078***	-0.079***	-0.060**
	(-3.28)	(-3.16)	(-2.67)	(-2.86)	(-3.14)	(-3.21)	(-2.49)
Other $_{t-1}$	-0.009	-0.010	0.015	-0.003	-0.001	0.001	0.014
	(-0.32)	(-0.34)	(0.55)	(-0.09)	(-0.05)	(0.02)	(0.51)
Log (Total Assets) $_{t-1}$	0.210***	0.207***	0.197***	0.201***	0.201***	0.191***	0.187***
	(14.09)	(14.12)	(11.92)	(12.06)	(12.06)	(12.17)	(11.94)
Cash $_{t-1}$	-0.035	-0.039	0.046	0.048	0.053	0.050	0.050
	(-0.37)	(-0.42)	(0.75)	(0.77)	(0.83)	(0.80)	(0.81)
Tangibility $_{t-1}$	0.165***	0.169***	0.200***	0.203***	0.204***	0.200***	0.201***
	(3.29)	(3.46)	(4.35)	(4.40)	(4.50)	(4.70)	(4.57)
Leverage $_{t-1}$	-0.131	-0.129	-0.186***	-0.189***	-0.189***	-0.178***	-0.177***
	(-1.61)	(-1.57)	(-3.58)	(-3.73)	(-3.72)	(-3.51)	(-3.45)
Profitability $_{t-1}$	0.256**	0.262***	0.236**	0.235**	0.233**	0.211**	0.216**
	(2.64)	(2.72)	(2.49)	(2.45)	(2.44)	(2.27)	(2.34)
Institutional Ownership $_{t-1}$	0.137**	0.123*	0.063	0.116	0.112	0.095	0.047
	(2.08)	(1.78)	(0.85)	(1.57)	(1.52)	(1.33)	(0.65)
Cross-list $_{t-1}$	-0.015	-0.023	-0.022	-0.015	-0.015	-0.012	-0.023
	(-0.62)	(-0.95)	(-0.80)	(-0.57)	(-0.56)	(-0.46)	(-0.87)
Majority Election $_{t-1}$		0.082***					0.055***
		(4.00)					(2.83)
Board Independence $_{t-1}$			0.200***				0.174***
			(4.05)				(3.81)
Old or Stale Board $_{t-1}$				-0.052***			-0.042**
				(-2.84)			(-2.40)
CEO-Chair Duality $_{t-1}$					-0.034		-0.025
					(-1.46)		(-1.21)
Female Director $_{t-1}$						0.124***	0.116***
						(6.73)	(6.37)
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	25,143	25,134	19,120	19,120	19,120	19,120	19,115
Adjusted R^2	0.517	0.519	0.549	0.547	0.546	0.553	0.558

Table 3
Do Specific Governance Mechanisms Affect Family-controlled 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 the family indicator variable and the 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 Table A1 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 Measure	ASSET4 Environmental *z*-Scores				
	Majority Election	Board Independence	Old or Stale Board	CEO-Chair Duality	Female Director
	(1)	(2)	(3)	(4)	(5)
Family	0.089*	0.098	-0.056	-0.002	0.128***
	(0.065)	(0.263)	(0.352)	(0.967)	(0.001)
Widely Held/Other	0.104***	0.275***	-0.091***	-0.071*	0.163***
	(0.000)	(0.000)	(0.003)	(0.058)	(0.000)
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	25,134	19,120	19,120	19,120	19,120
Adjusted R^2	0.439	0.466	0.464	0.463	0.470

Panel B: Equally-weighted Environmental Scores

Governance Measure	Equally-weighted Environmental Scores				
	Majority Election	Board Independence	Old or Stale Board	CEO-Chair Duality	Female Director
	(1)	(2)	(3)	(4)	(5)
Family	0.064*	0.085	-0.039	-0.006	0.115***
	(0.076)	(0.296)	(0.376)	(0.862)	(0.000)
Widely Held/Other	0.087***	0.229***	-0.058***	-0.047*	0.127***
	(0.000)	(0.000)	(0.006)	(0.096)	(0.000)
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	25,134	19,120	19,120	19,120	19,120
Adjusted R^2	0.519	0.549	0.547	0.546	0.553

Table 4
Specific Governance Mechanisms 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, Old or Stale Boards, CEO-Chairman Duality and Female Director) is time invariant. Appendix Table A1 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

	ASSET4 Environmental *z*-Scores				
	(1)	(2)	(3)	(4)	(5)
Majority Election	0.054***				
	(4.09)				
Board Independence		0.104**			
		(2.18)			
Old or Stale Board			-0.020**		
			(-2.09)		
CEO-Chair Duality				-0.033**	
				(-2.30)	
Female Director					0.035***
					(3.23)
Controls	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Obs	12,994	17,623	6,960	3,574	10,540
Adjusted R^2	0.819	0.852	0.855	0.867	0.843

Panel B: Equally-weighted Environmental Scores

	Equally-weighted Environmental Scores				
	(1)	(2)	(3)	(4)	(5)
Majority Election	0.036***				
	(4.32)				
Board Independence		0.070*			
		(2.01)			
Old or Stale Board			-0.012		
			(-1.63)		
CEO-Chair Duality				-0.012	
				(-1.63)	
Female Director					0.018**
					(2.46)
Controls	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Obs	12,994	17,623	6,960	3,574	10,540
Adjusted R^2	0.879	0.903	0.904	0.909	0.898

Table 5
Corporate Governance and Firms' Environmental Performance: Quasi-natural Experiments

This table reports regression estimates of environmental scores on measures of corporate governance and control variables for years surrounding quasi-exogenous shocks to majority director election rules and female board representation. 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 Table A1 describes the indicator variables used to calculate the environmental scores. All other variables are described in Table 1. Panel A shows results for countries for which there was significant outside pressure to adopt majority director election rules. Columns 1 and 2 focus on Canada and the initiative of the CCGG to increase majority voting adoption (Doidge et al., 2018) leading to significant changes in firm adoptions in 2006 and 2007. We define treated firms as those that adopted majority voting in 2006 or 2007 and control firms are those that did not change their majority voting policy during the 2004 to 2009 period. Columns 3 and 4 focus on countries in which the fraction of firms that have majority direction elections increased by more than 20 percentage points in a single year (event year). For details see Appendix Table A4. Treated firms are those that adopt majority voting following the event year and control firms are those that did not change their majority voting policy during the time period considered. Panel B shows results for countries for which there was significant outside pressure for greater female board representation. Columns 1 and 2 focus on the UK and the 2011 Women on Boards review published by Lord Davies who recommended that FTSE100 firms should have 25% female board representation within 4 years. The effort was supported by investor groups such as the Association of British Insurers which disclosed that it would now start monitoring female board representation. We define treated firms as those that adopted majority voting in 2012 or 2013. Control firms are those that did not change their status of having at least one female director during the 2009 to 2015 period (they either had a female in all years or in none of the years). Columns 3 and 4 focus on countries for which the fraction of firms that have female board representation increased by more than 10 percentage points in a single year. For details see Appendix Table A4. Treated firms are firms that went from no woman to at least one woman on the board following the event year and control firms are those that always or never had women on the board during the time period considered. In all specifications, we include the two years before and two years after the event years. We require that treated and control firms have at least one observation before and after the event years. Firms that change family control, other-blockholder control, or cross-listing status are excluded. 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: Quasi-exogenous Shocks to Majority Director Election Rules

	Single Country Experience		Broad Sample	
	ASSET4 E *z*-Scores	Equally-weighted E Scores	ASSET4 E *z*-Scores	Equally-weighted E Scores
	(1)	(2)	(3)	(4)
Post Majority Election Adoption × Treated	0.257**	0.190**	0.099***	0.075**
	(2.25)	(2.41)	(3.29)	(2.62)
Log (Total Assets)	0.033	0.081	0.087**	0.077**
	(0.40)	(1.62)	(2.59)	(2.86)
Cash	-0.122	0.052	-0.325*	-0.219
	(-0.18)	(0.12)	(-1.83)	(-1.53)
Tangibility	0.307	0.283	-0.206	-0.175
	(0.51)	(0.65)	(-1.09)	(-1.21)
Leverage	-0.355	-0.365	0.006	0.016
	(-1.02)	(-1.43)	(0.03)	(0.09)
Profitability	0.641	0.572***	0.250*	0.152
	(1.66)	(2.93)	(2.05)	(1.36)
Institutional Ownership	0.347	0.452**	0.037	0.106
	(1.19)	(2.40)	(0.22)	(0.71)
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Obs	293	293	1,596	1,596
Adjusted R^2	0.798	0.860	0.820	0.863
Countries in Sample	Canada		Australia, Austria, Belgium, Canada, Denmark, Ireland, Italy, Spain, Switzerland, UK	

Panel B: Quasi-exogenous Shocks to Female Board Representation

	Single Country Experience		Broad Sample	
	ASSET4 E *z*-Scores	Equally-weighted E Scores	ASSET4 E *z*-Scores	Equally-weighted E Scores
	(1)	(2)	(3)	(4)
Post Female Board Representation × Treated	0.160***	0.068**	0.086*	0.062**
	(2.91)	(2.60)	(2.22)	(2.59)
Log (Total Assets)	0.065	0.042	0.022	0.009
	(0.98)	(1.30)	(0.62)	(0.32)
Cash	0.068	0.055	0.087	0.039
	(0.38)	(0.56)	(1.03)	(0.57)
Tangibility	0.429	0.286*	-0.068	0.020
	(1.35)	(1.90)	(-1.20)	(0.69)
Leverage	-0.255*	-0.125	0.088	0.003
	(-1.67)	(-1.47)	(0.65)	(0.05)
Profitability	-0.023	0.015	0.074	0.035
	(-0.14)	(0.16)	(1.47)	(0.75)
Institutional Ownership	0.054	-0.011	0.162**	0.109
	(0.27)	(-0.10)	(2.79)	(1.59)
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Obs	981	981	1,696	1,696
Adjusted R^2	0.856	0.930	0.909	0.942
Countries in Sample	UK		Australia, Austria, Germany, Greece, Italy, Malaysia, Portugal, Switzerland, UK	

Table 6
Environmental Social Norms, Corporate Governance, and Firms' Environmental Performance

This table reports regression estimates of environmental scores on control rights, measures of corporate governance, and control variables for firms grouped by their countries' environmental social norms. 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 Table A1 describes the indicator variables used to calculate the environmental scores. All other variables are described in Table 1. We sort firms into low and high-social-norm groups based on the environmental social norms in the firm's country of domicile. We measure a country's social norms concerning environmental issues with a) geographic location, that is, whether a firm is from Continental Europe or from another country; and b) the Environmental Performance Index (median over the 2004-2014 period, obtained from Yale Center for Environmental Law (Yale University) and Center for International Earth Science Information Network (Columbia University), median split). 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

	ASSET4 Environmental *z*-Scores							
	Continental Europe		All Other Countries		High (Above-median) Environmental Protection Index		Low (Below-median) Environmental Protection Index	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Family	-0.062	-0.061	-0.168***	-0.097***	-0.089**	-0.072**	-0.194***	-0.124**
	(-1.38)	(-1.57)	(-4.51)	(-3.54)	(-2.89)	(-2.78)	(-3.21)	(-2.46)
Other	0.032	0.020	-0.002	0.046	0.114**	0.105*	-0.033	0.004
	(0.68)	(0.39)	(-0.04)	(1.08)	(2.16)	(2.02)	(-0.62)	(0.08)
Majority Election		0.055		0.075**		0.068*		0.072**
		(1.42)		(2.70)		(1.80)		(2.49)
Board Independence		0.137		0.284***		0.177***		0.217**
		(1.65)		(3.77)		(3.05)		(2.72)
Old or Stale Board		-0.142**		-0.043*		-0.105***		-0.047
		(-2.83)		(-1.93)		(-2.95)		(-1.45)
CEO-Chair Duality		0.027		-0.082**		-0.055		-0.019
		(0.57)		(-2.35)		(-1.24)		(-1.06)
Female Director		0.093*		0.148***		0.184***		0.083***
		(1.96)		(5.34)		(5.77)		(3.14)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	6,304	6,038	18,839	13,077	12,720	12,089	11,451	6,346
Adjusted R^2	0.454	0.462	0.428	0.475	0.502	0.519	0.424	0.450
p-value of Difference in Family Coefficient Between ('Low' vs. 'High') Social Norm Groups	(0.06)	(0.43)			(0.11)	(0.35)		

Panel B: Equally-weighted Environmental Scores

	Equally-weighted Environmental Scores							
	Continental Europe		All Other Countries		High (Above-median) Environmental Protection Index		Low (Below-median) Environmental Protection Index	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Family	-0.050	-0.046	-0.125***	-0.074***	-0.062**	-0.050**	-0.149***	-0.104**
	(-1.30)	(-1.31)	(-4.07)	(-3.10)	(-2.53)	(-2.32)	(-3.22)	(-2.36)
Other	0.016	0.004	-0.020	0.022	0.045	0.035	-0.030	0.008
	(0.47)	(0.12)	(-0.59)	(0.66)	(1.12)	(0.89)	(-0.65)	(0.18)
Majority Election		0.055*		0.059**		0.054*		0.066***
		(1.80)		(2.49)		(1.75)		(2.97)
Board Independence		0.119*		0.221***		0.140**		0.181***
		(1.75)		(4.00)		(2.74)		(3.00)
Old or Stale Board		-0.100**		-0.021		-0.070**		-0.035
		(-2.87)		(-1.14)		(-2.69)		(-1.48)
CEO-Chair Duality		0.017		-0.059**		-0.038		-0.010
		(0.44)		(-2.51)		(-1.09)		(-0.82)
Female Director		0.080**		0.121***		0.141***		0.073***
		(2.41)		(6.39)		(6.15)		(3.87)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	6,304	6,038	18,839	13,077	12,720	12,089	11,451	6,346
Adjusted R^2	0.587	0.590	0.492	0.539	0.593	0.604	0.488	0.523
p-value of Difference in Family Coefficient Between ('Low' vs. 'High') Social Norm Groups	(0.12)	(0.50)			(0.09)	(0.26)		

Appendix

Table A1
Creating Environmental Indicators Based on Thomson Reuters ASSET4 ESG Environmental Data

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

Table A2
Alternative MSCI Entrenchment Measure

This table repeats the analysis from Tables 2, 3, 4, and 6 in Panels A, B, C, and D with an alternative MSCI Entrenched board measure. We replace the old or stale indicator with an MSCI Entrenched 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% of the directors are over 70 years old). 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 Table A1 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: Baseline Regression (Replicating Specifications of Table 2)

	ASSET4 Environmental *z*-Scores		Equally-weighted Environmental Scores	
	(1)	(2)	(3)	(4)
Family	-0.095***	-0.082***	-0.073***	-0.062**
	(-3.24)	(-2.88)	(-2.94)	(-2.59)
Other	0.019	0.039	-0.002	0.014
	(0.52)	(1.13)	(-0.08)	(0.51)
Log (Total Assets)	0.232***	0.215***	0.201***	0.187***
	(10.48)	(10.58)	(12.02)	(11.91)
Cash	-0.033	-0.029	0.048	0.049
	(-0.48)	(-0.44)	(0.76)	(0.80)
Tangibility	0.225***	0.225***	0.200***	0.199***
	(3.51)	(3.73)	(4.35)	(4.55)
Leverage	-0.228***	-0.213***	-0.188***	-0.177***
	(-3.26)	(-3.04)	(-3.68)	(-3.42)
Profitability	0.273**	0.248**	0.238**	0.218**
	(2.50)	(2.32)	(2.47)	(2.35)
Institutional Ownership	0.184*	0.101	0.116	0.048
	(1.89)	(1.07)	(1.59)	(0.67)
Cross-list	-0.060	-0.068*	-0.017	-0.024
	(-1.62)	(-1.83)	(-0.63)	(-0.91)
MSCI Entrenched	-0.088**	-0.070*	-0.057**	-0.042
	(-2.40)	(-1.91)	(-2.20)	(-1.63)
Majority Election		0.068***		0.056***
		(2.84)		(2.82)
Board Independence		0.201***		0.168***
		(3.49)		(3.61)
CEO-Chair Duality		-0.038		-0.026
		(-1.34)		(-1.25)
Female Director		0.146***		0.117***
		(5.46)		(6.43)
Country Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Obs	19,120	19,115	19,120	19,115
Adjusted R^2	0.464	0.474	0.547	0.557

Panel B: Governance Measures Within Family and Widely-held Firms (Replicating Specifications of Table 3)

Governance Measure	ASSET4 Environmental *z*-Scores	Equally-weighted Environmental Scores
	MSCI Entrenched	MSCI Entrenched
	(1)	(2)
Family	-0.029	-0.015
	(0.599)	(0.719)
Widely Held/Other	-0.141**	-0.093**
	(0.026)	(0.030)
Controls	Yes	Yes
Country Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Obs	19,120	19,120
Adjusted R^2	0.464	0.547

Panel C: Firm Fixed Effect Regressions (Replicating Specifications of Table 4)

	ASSET4 Environmental *z*-Scores	Equally-weighted Environmental Scores
	(1)	(2)
MSCI Entrenched	-0.023*	-0.018
	(-1.92)	(-1.05)
Controls	Yes	Yes
Firm Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Obs	3,080	3,080
Adjusted R^2	0.887	0.823

Panel D: Country Splits (Replicating Specifications of Table 6)

	ASSET4 Environmental *z*-Scores				Equally-weighted Environmental Scores			
	Continental Europe	All Other Countries	High (Above-median) EPI	Low (Below-median) EPI	Continental Europe	All Other Countries	High (Above-median) EPI	Low (Below-median) EPI
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Family	-0.070*	-0.099***	-0.077***	-0.121**	-0.052	-0.075***	-0.053**	-0.103**
	(-1.75)	(-3.55)	(-2.93)	(-2.42)	(-1.44)	(-3.10)	(-2.40)	(-2.34)
Other	0.020	0.045	0.102*	0.004	0.005	0.022	0.033	0.008
	(0.41)	(1.05)	(1.93)	(0.08)	(0.13)	(0.65)	(0.83)	(0.18)
MSCI Entrenched	-0.112	-0.050	-0.108**	-0.085	-0.086*	-0.020	-0.074**	-0.056
	(-1.72)	(-1.15)	(-2.30)	(-1.26)	(-1.82)	(-0.65)	(-2.35)	(-1.25)
Majority Election	0.057	0.075**	0.067*	0.073**	0.057*	0.059**	0.054*	0.067***
	(1.44)	(2.66)	(1.80)	(2.47)	(1.81)	(2.47)	(1.74)	(2.94)
Board Independence	0.131	0.274***	0.169**	0.198**	0.114	0.217***	0.134**	0.167***
	(1.52)	(3.55)	(2.86)	(2.72)	(1.63)	(3.79)	(2.58)	(2.99)
CEO-Chair Duality	0.023	-0.082**	-0.058	-0.018	0.014	-0.059**	-0.039	-0.010
	(0.46)	(-2.39)	(-1.30)	(-0.99)	(0.36)	(-2.54)	(-1.14)	(-0.78)
Female Director	0.101*	0.149***	0.188***	0.083***	0.086**	0.121***	0.144***	0.073***
	(2.05)	(5.29)	(6.04)	(3.15)	(2.49)	(6.35)	(6.40)	(3.86)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	6,038	13,077	12,089	6,346	6,038	13,077	12,089	6,346
Adjusted R^2	0.459	0.475	0.519	0.451	0.588	0.539	0.603	0.523
p-value of Difference in Family Coefficient Between ('Low' vs. 'High') Social Norm Groups	(0.55)		(0.43)		(0.58)		(0.31)	

Table A3
Do Family-controlled Firms Select Into 'Dirty' Industries?

This table shows summary statistics (Panel A) and regression estimates (Panels B and C) of environmental scores on control rights and control variables for firms grouped by industries with low and high environmental performance. Industries are classified as 'dirtier' based on a SASB materiality map by industry (Panel B) and the median ASSET4 Environmental *z*-score (Panel C). We map the 11 sub-categories from the SASB sections pertaining to environmental performance (Environment and Business Model and Innovation) and construct our own score as 2 points if classified as "material for more than 50% of industries in the sector", 1 point if "material for less than 50% of industries" and 0 points if "issue not likely to be material for any industries". These scores suggest that the sectors that are most material ('dirtier') are SIC Divisions Agriculture, Forestry, and Fishing (A), Mining (B), and Services (I). Based on the SASB classification, SIC Divisions Construction (C), Manufacturing (D), Transportation, Communications, Public Utilities (E), Wholesale Trade (F), Retail Trade (G), and Finance, Insurance, and Real Estate (H) are 'cleaner' industries. Our second classification is based on the median-sector ASSET4 Environmental *z*-score. SIC Divisions Agriculture, Forestry, and Fishing (A), Mining (B), Retail Trade (G), and Services (I) are classified as 'dirtier' sectors because they are below the median of 46.7. SIC Divisions Construction (C), Manufacturing (D), Transportation, Communications, Public Utilities (E), Wholesale Trade (F), and Finance, Insurance, and Real Estate (H) are 'cleaner' sectors. 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 Table A1 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: Summary Statistics

SIC Division	Industry Name	Obs	% Family-controlled Firms	Average ASSET4 Environmental *z*-Scores
A	Agriculture, Forestry, Fishing	140	41.4%	40.3
B	Mining	2,524	15.0%	38.4
C	Construction	1,106	25.5%	53.0
D	Manufacturing	9,093	23.5%	65.6
E	Transportation, Communications, Public Utilities	3,633	19.4%	56.4
F	Wholesale Trade	606	18.3%	46.7
G	Retail Trade	1,506	36.9%	45.0
H	Finance, Insurance, Real Estate	4,154	14.5%	47.3
I	Services	2,381	24.9%	28.6
A, B, I	Industries 'Dirtier' Based on SASB	5,045	20.4%	39.0
C, D, E, F, G, H	Industries 'Cleaner' Based on SASB	20,098	21.8%	57.4
A, B, G, I	Industries 'Dirtier' Based on ASSET4 z-scores	6,551	24.2%	40.4
C, D, E, F, H	Industries 'Cleaner' Based on ASSET4 z-scores	18,592	20.6%	58.4

Panel B: Regressions Based on Dirty/Clean SASB Industries

SIC Divisions	ASSET4 Environmental *z*-Scores		Equally-weighted Environmental Scores	
	'Dirtier' A, B, and I	'Cleaner' C, D, E, F, G, and H	'Dirtier' A, B, and I	'Cleaner' C, D, E, F, G, and H
	(1)	(2)	(3)	(4)
Family	-0.109**	-0.127***	-0.079***	-0.094**
	(-2.04)	(-3.08)	(-2.08)	(-2.76)
Other	0.078	0.019	0.057	-0.004
	(1.16)	(0.50)	(1.09)	(-0.13)
Controls	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Obs	5,045	20,098	5,045	20,098
Adjusted R^2	0.526	0.398	0.582	0.485
p-value of Difference in Family Coefficient Between Industry Groups	(0.79)		(0.76)	

Panel C: Regressions Based on Dirty/Clean Industry ASSET4 Environmental z-scores

SIC Divisions	ASSET4 Environmental *z*-Scores		Equally-weighted Environmental Scores	
	'Dirtier' A, B, G, and I	'Cleaner' C, D, E, F, and H	'Dirtier' A, B, G, and I	'Cleaner' C, D, E, F, and H
	(1)	(2)	(3)	(4)
Family	-0.097**	-0.134***	-0.076***	-0.097**
	(-2.45)	(-2.89)	(-2.61)	(-2.55)
Other	0.079	0.022	0.050	-0.000
	(1.07)	(0.56)	(0.93)	(-0.01)
Controls	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Obs	6,551	18,592	6,551	18,592
Adjusted R^2	0.502	0.396	0.562	0.485
p-value of Difference in Family Coefficient Between Industry Groups	(0.58)		(0.67)	

Table A4
Quasi-exogenous Shocks to Majority Voting and Female Board Representation

This table reports summary statistics for quasi-exogenous shocks to majority director election rules and female board representation.

Panel A: Quasi-exogenous Shocks to Majority Director Election Rules

Country	Event Year(s)	Percentage of Firms with a Majority Director Election Rule	
		Change Over One Year	Change Over Two Years
Australia	2008	From 12% to 35%	From 12% to 44%
Austria	2007	24% to 53%	24% to 68%
Belgium	2007	13% to 42%	13% to 46%
Canada	2005/2006	22% to 37%	22% to 51%
Denmark	2008	35% to 70%	35% to 83%
Ireland	2009	29% to 53%	29% to 56%
Italy	2007	27% to 62%	27% to 67%
Spain	2007	14% to 29%	14% to 43%
Switzerland	2007	43% to 64%	43% to 76%
UK	2008	14% to 35%	14% to 51%

Panel B: Quasi-exogenous Shocks to Female Board Representation

Country	Event Year(s)	Percentage of Firms with at Least One Woman on the Board of Directors	
		Change Over One Year	Change Over Two Years
Australia	2011	From 40% to 50%	From 40% to 55%
Austria	2011	63% to 73%	63% to 88%
Germany	2011	70% to 80%	70% to 91%
Greece	2010	56% to 71%	56% to 75%
Italy	2011	59% to 73%	59% to 83%
Malaysia	2012	50% to 60%	50% to 74%
Portugal	2009	31% to 46%	31% to 58%
Switzerland	2008	44% to 53%	44% to 56%
UK	2011	57% to 64%	57% to 76%

Panel C: Sources of Quasi-exogenous Shocks

Majority Director Election

Canada (2005/2006), Canadian Coalition for Good Governance push to get Canadian firms to adopt majority voting in 2005/2006 (Doidge et. al., 2018).

UK (2006), Companies Act 2006 widely introduced appointment of board members by ordinary resolution.

Female Board Representation

UK (2011), Lord Davies, a Labour government minister, published a report telling FTSE 100 companies they should double the number of women directors by 2015. This report was met with enthusiastic support publicly and from a number of shareholder organization. For example, one of the UK's largest shareholder organizations, the Association of British Insurers, disclosed that it would start monitoring the number of women on FTSE boards. No formal rule on female board representation introduced.

Australia (2011), ASX Corporate Governance Council updated its Corporate Governance Principals and Recommendations for diversity in Australia, the Australian Institution of Company Directors pushed for an increase in the number of women on the board. No formal rule on female board representation introduced.

Austria (2011), A gender quota (25%) for supervisory boards of companies in which the state has a majority stake introduced in 2011.

Germany (2011), A group of 18 multinational German firms publicly commit to promote women into leadership positions (May 2010). A bipartisan parliamentary group issues *Berliner Erklaerung* with the goal of introducing a 30% female board representation quota (December 2011).

Greece (2010), Start of the *National Programme for Substantive Gender Equality* (2010-2013).

Italy (2011), A gender quota (33%) for supervisory boards of companies introduced in 2011.

Malaysia (2012), A gender quota (30%) for supervisory boards introduced in 2011.