# Encouraging environmental sustainability through gender : a micro-foundational approach using linguistic gender marking

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# Encouraging environmental sustainability through gender: A micro-foundational approach using linguistic gender marking

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Abstract

While studies show that organizational diversity is beneficial to organizations' practice of environmental sustainability, we know very little about the effect that the gender of an individual director can have on sustainability practice. In this empirical paper, we employ a micro-foundational approach to examine whether the number of women on an organization's board of directors has a direct effect on its attitude towards environmental sustainability, regardless of the national culture in which the organization is located. Culture in this study is measured through grammatical gender marking, a unique approach to measuring female-oriented cultural effects. Previous studies show that certain cultures have more gender roles than others, which in turn affects general and organizational behavior in that society. Grammatical gender marking enables us to study the impact of gender of the individual director on the organization's attitude towards environmental sustainability across cultures, by empirically examining data from 71 countries, sampling a total of 4,500 organizations for multiple years and industries.

Our findings show that organizations become significantly more proactive in environmental sustainability with the appointment of even one woman to the board of directors, regardless of the local culture. We further show that the organization's level of disclosure regarding its sustainability activities, increases with the number of women on the board of directors. Our data also show a significantly negative relationship between various gender-based language indices and the presence of women on the board of directors. In cultures defined by a language that has clear grammatical gender markings, there is a tendency to appoint fewer women to boards of directors, thereby influencing indirectly the organization's attitude towards environmental sustainability.

## Introduction

Sustainability and the negative effects many organizations have on the environment have created demands from various stakeholders for more transparency and accountability. Thus, environmental sustainability has become a critical issue for the performance, growth, and survival of organizations (Dixon-Fowler, Slater, Johnson, Ellstrand, & Romi, 2012; Jackson, Ones, & Dilchert, 2012). Most research focused on environmental sustainability practices has addressed macro-oriented issues such as effectiveness and performance of the organization (Aras & Crowther, 2008; Delmas & Montiel, 2009; Moldan et al., 2012; Porter & Van Der Linde, 1995; Russo & Fouts, 1997); however, very few studies have addressed important micro-oriented issues such as how diversity among board members can influence pro-environmental attitudes of the organization.

The literature shows that diversity, specifically gender diversity of managers and directors, is beneficial to an organization's attitude towards long-term issues, altruistic behavior, corporate social responsibility and charity (Carter, Simkins, & Simpson, 2003; Erhardt, Werbel, & Shrader, 2003; Williams, 2003).

This article reports on out theoretical and empirical analysis of organizational attitudes towards environmental sustainability as an outcome of board gender diversification and gender roles in a given society (culture). By studying micro-foundations of environmental sustainability through the quantity of women present on boards of directors across cultures, we can develop a better understanding of the factors influencing the promotion of environmental sustainability among organizations.

Using a micro-foundational approach (Felin, Foss, Heimeriks, & Madsen, 2012), our research advances the knowledge on environmental sustainability by analyzing the impact of an

individual director's gender on an organization's environmental behavior. We propose that the presence of women on boards of directors will positively affect an organization's attitude and behavior towards environmental sustainability. By studying many different societies and the gender roles in each, we further examine if this effect is direct rather than dependent upon a given society's position regarding gender roles.

This research uses a unique approach to study the degree of femininity of various cultures, one based on grammatical gender marking. This method shows that certain cultures have more gender roles than others do, which in turn affects general (Hicks, Santacreu-Vasut, & Shoham, 2015) and organizational behavior (Santacreu-Vasut, Shenkar, & Shoham, 2014) in that society. Gender marking has been proven a very reliable instrument, which captures female-oriented cultural effects better than the traditional survey-based dimensions of culture (Santacreu-Vasut et al., 2014). Examining individual gender impact on environmental sustainability by empirically examining individual directors in a cross-country sample of companies for multiple years and industries is innovative, and not previously reported in the literature. Moreover, using the gender markers allows us to distinguish between the impact of the individuals and of societal values, and add to the current literature by differentiating between the presence of women on the board and general cultural attributes of a particular country regarding gender.

This paper is organized as follows; we will first discuss the meaning of the basic concepts of micro-foundations, sustainability and gender-marking. We then present our hypotheses. Next, the sample and methodology are explained and finally we discuss our findings.

## Research Background

### Micro-Foundations of Organizational Behavior

According to Felin et al. (2015), micro-foundational research aims to locate, theoretically and empirically, the proximate explanations of an outcome at a level of analysis lower than that of the outcome itself. It aims to understand how individual-level factors impact the organization, and how interactions between individuals lead to collective outcomes on higher levels (Barney & Felin, 2013; Molina-Azorin, 2014), such as the organizational, market and industry cluster levels (Felin et al., 2015, p. 576).

Recent studies have found that a large portion of the variance in the performance of organizations can be explained by the "CEO effect" (Quigley & Hambrick, 2011). Studies have shown that the CEO of an organization can affect strategic change both positively and negatively (Datta, Rajagopalan, & Zhang, 2003; Helfat & Peteraf, 2015; Zhang & Rjagopalan, 2010). These studies indicate that an individual in an organization, especially those filling managerial and executive functions, can indeed have a major impact on the organization. However, most studies on micro-foundations have focused on performance, not environmental sustainability. While more companies seek to emphasize their environmental sustainability, the antecedents that lead the company to become more environmentally sustainable have not been examined empirically for the role of an individual executive, and specifically the role of those on the board of directors. Gender diversity has been important in providing new insights and perspectives in the behavior of boards (Galbreath, 2011), and its potential influence on an organization's attitude regarding environmental sustainability might be significant.

**Environmental Sustainability and Gender Diversity**

Environmental sustainability concerns the impact of the organization's activities on geophysical environment (Aras & Crowther, 2008), as well as the initiatives that organizations undertake to minimize their impact on that environment. The natural environment is incessantly affected by the economic activity of organizations, including greenhouse gas emissions, decreases in biodiversity, deforestation, waste byproducts, and ozone depletion. Consequently, most organizations have an environmental impact, ranging from simply lighting offices to the emissions and waste generated by manufacturing (Moldan et al., 2012). Organizations can contribute to environmental sustainability by 1) controlling pollution through responsible waste disposal (Russo & Fouts, 1997); 2) minimizing greenhouse gas emissions by using innovative production processes and technologies; and 3) engaging in product stewardship by using fewer materials for producing their products, and by disassembling them for recycling or reuse at the end of their lifecycle (Hart, 1995). If the natural environment is compromised in the present, future generations will be limited in their ability to access basic resources such as clean air and water (WCED, 1987), highlighting the significance of environmental sustainability.

Environmental responsibility or sustainability is becoming a strategic issue with vital competitive implications for organizations, in terms of risk management, cost savings, access to capital, client relations, and human resource management. By accepting their environmental obligations, organizations can earn the dependable trust of employees, consumers, and citizens, which is the foundation for sustainable business models.

Adopting sustainable environmental strategies requires an organization to adopt management practices that are not legally mandated, which may include implementing environmental policies, setting environmental performance goals (Hart, 2005), employee training

aimed at improving behavior for environmental sustainability, internal and external audits, and more. Adoption of these standards and behavior requires significant organizational change (Delmas & Pekovic, 2013).

Several mechanisms linking the adoption of environmental management standards to corporate performance are reported in the literature. Environmental sustainability can lead to processes that are more efficient, to reduced costs, to access to customers and markets that require or prefer such behavior, and to better reputation (Delmas & Montiel, 2009; Porter & Van Der Linde, 1995). Results presented by Delmas and Pekovic (2013) showed that employees of organizations that invest in environmental sustainability are more productive and more identified with the organization. However, the studies addressing the relationship between environmental sustainability and financial performance were not conclusive, largely because of the difficulties of measuring this relationship (Blomgren, 2011; Callan & Thomas, 2009; Ducassy, 2013; Michelon, Boesso, & Kumar, 2013). Others have explored how sustainability enables organizations to develop unique capabilities (Hart, 1995) and increase environmental legitimacy (Bansal & Clelland, 2004). As Burke and Logsdon (1996) suggest, sustainability programs can create strategic benefits for an organization, even when they are not readily measurable as separable contributions to the bottom line. Thus, the working assumption is that companies that consider their social and environmental performance are more successful in the long term (Margolis & Walsh, 2003; Orlitsky, Schmidt, & Rynes, 2003) than those that do not.

Environmental sustainability in general, then, has become a strategic issue for organizations, one that many organizations consider important. However, most research focused on environmental sustainability has addressed macro-oriented issues, and few studies have examined its micro-foundations. While we tend to think about the organization as an economic

unit run by a management team, recent studies point to the influence that an individual member at the executive level can have on an organization's behavior in general.

A small but growing body of literature examines the relationship between gender diversity and environmental sustainability. In a study of 78 selected Fortune 1000 companies, Post, Rahman, and Rubow (2011) found that gender-diverse boards were more likely to achieve higher environmental ratings than non-gender diverse boards. Similarly, Walls, Berrone, and Phan (2012) analyzed various aspects of organization governance and its effect on environmental performance in a study of 294 USA-based organizations in 31 industries. They found that boards enjoy significant influence over environmental practices and policies, and boards with greater diversity are associated with stronger environmental performance. Moreover, Ciocirlan and Pettersson (2012), who studied 94 selected Fortune 500 organizations, report that organizations employing more women tend to demonstrate a stronger commitment to environmental sustainability. Thus, the literature suggests that the presence of women on the board of directors tends to be positively associated with environmental sustainability (Ciocirlan & Pattersson, 2012; Diamantopoulos, Schlegelmilch, Sinkovics, & Bohlen, 2003; Post et al., 2011 Walls et al., 2012).

Gender diversity, especially at top managerial levels, is capturing the attention of companies as studies continue to show the positive consequences of increasing the presence of women in management roles. However, this relationship has been mostly examined for single industries or in individual countries (Bear, Rahman, & Post, 2010; Galbreath, 2011; McElhaney & Mobasseri, 2012; Ricart, Rodriguez, & Sanchez, 2005). Moreover, the existing studies are based on relatively small to very small samples (McElhaney & Mobasseri, 2012).

Gender-socialization and gender-role theories are often used to explain the observed gender differences in environmental behavior (Dietz, Kalof, & Stern, 2002; Zelezny et al., 2000;

Dhont, Hodson, Costello, & MacInnis, 2014; Jylhä & Akrami, 2015; Xiao & McCright, 2015). Gender differences regarding environmental concerns can emerge from different sources, such as gender socialization (Klein, D'Mello, & Wierni, 2012), diverse attitudes to risk (Byrnes, Miller, & Schafer, 1999) or different views of well-being (Stern, Dietz, & Kalof, 1993). Stern, Dietz, and Kalof (1993) noted the potential importance of gender as a source of variation in environmental values. A number of theoretical arguments suggest that the values of altruism and self-interest may underpin environmental concern and pro-environmental behavior (Merchant, 1992; Stern & Dietz, 1994; Stern, Dietz, & Kalof, 1993); altruists are more likely to be pro-environmental, and those with high self-interest less likely to be pro-environmental. Similarly, experiments on the management of common-pool resources suggest that altruists are more likely to act in the collective interest than are those who hold less altruistic values (Kopelman, Weber, & Messick, 2002). Compared to men, women tend to be socialized to empathize with the needs and welfare of other people, and also to be more interdependent and cooperative. The argument is that this greater empathic concern acquired by women during socialization and gender role expectations and experiences give rise to a stronger empathic concern regarding the natural environment (Dietz, Kalof and Stern, 2002; Milfont, Richter, Sibley, Wilson and Fischer, 2013; Xiao & McCright, 2015; Milfont and Sibley, 2014; Milfont and Sibley, 2016). Furthermore, women are found to be more averse to inequality and more sensitive to social cues and the context in which they operate (Croson and Gneezy, 2009).

Female directors on boards are more likely than men to be well-educated, have specialized skills and community standing (Hillman et al., 2002), which they can use to their advantage when pushing new initiatives. Research already suggests that firms with a higher percentage of female board members do in fact have a higher level of charitable giving (Wang

and Coffey, 1992; Williams, 2003), more favorable work environments (Bernardi et al., 2006; Johnson and Greening, 1999), and higher levels of environmental corporate social responsibility (CSR) (Post et al., 2011). Corporate philanthropy is greater among companies with more women on their boards (Wang & Coffey 1992; Williams 2003; Zhang et al. 2013). Companies with women in top and middle management make more philanthropic donations than companies with no female officers (Marquis & Lee, 2012). The presence of women also has a positive effect on CSR ratings, reporting and performance (Bear et al., 2010; Boulouta 2013; Fernandez-Feijoo et al., 2014; Frias-Aceituno et al. 2013; Setó-Pamies 2015; Larrieta-Rubín de Celis et al., 2015). Women seem to take a broader perspective due to empathic concerns about others in the society. The broader perspective offered by women may help boards to better assess the needs of diverse stakeholders (Konrad & Kramer 2006; Jamali et al. 2007), and enhance their ability to effectively address CSR (Bear et al. 2010). Thus, having female board members is very likely to increase not only philanthropy but also environmental sustainability practiced by the organization (Wang & Coffey 1992; Dietz et al. 2002; Williams 2003; Post et al. 2011).

Since leaders of organizations can influence pro-environmental behavior of employees (Robertson & Barling, 2013), we argue that the gender of individual directors may affect the environmental sustainability of organizations by promoting environmental behavior and influencing its environmental policy. We propose that the gender of individual directors might help understand the antecedents of environmental sustainability in a micro-foundational context, especially because we examine this relationship in many different cultures. Therefore, taking into account the studies about the CEO effect as well as the studies discussed, we propose that having even one female director may encourage boards to adopt new initiatives, such as those that

further environmental sustainability, and provide perspectives that can be helpful in addressing issues of CSR.

**Hypothesis 1:** *The presence of at least one woman on the board of directors of an organization will positively affect its attitude towards environmental sustainability.*

## Grammatical Gender-Marking and its Relationship to the Presence of Women on the Board

Based on the theory of sociolinguistics and its implementation in research on grammatical gender marking, we argue in this paper that higher gender roles in a society's language will lead to the appointment of fewer females on board of directors.

Sociolinguistics (Labov, 1972) focuses on language's effect on the society based on the Sapir-Whorf hypothesis, which claims that the structure of a language affects how its speakers conceptualize their world (Hoijer, 1954). In recent years, this stream of thought has been influencing research on business and organizations because of the impact language has on organizations (e.g. Bordia & Bordia, 2014; Śliwa & Johansson, 2014). Language captures ancestral culture because grammar is inherited from the distant past, and reinforced by the influence of cognition on the speaker. Tang and Kevoes (2008) claim that while changes in economic conditions are the source of cultural dynamics, language provides the foundation for cultural stability.

Language can be seen as the result of a need for coordination among individuals facing a common problem. Languages testify to the various problems faced by different societies across space and time, and how those societies solved them. Similarly, today's corporate language is shaped by organizations' need to coordinate (Welch, Welch, & Piekkari, 2005).

North (1993) in his Noble prize lecture argues that collective learning, as defined by Hayek, consists of experiences that have passed the test of time and are embodied in "our language, institutions, technology, and ways of doing things" (Hayek, 1960, p. 27). Falck, Heblich, Lameli, and Suedekum (2010) hold that language is probably the best measurable indicator of cultural differences and provides empirical evidence that dialects portray culture in a way that is persistent over time, and has a causal effect on economic behavior. To bolster their view that language acts as a type of memory that stores information in a genome-like mode, they cite Charles Darwin:

> If we possessed a perfect pedigree of mankind, a genealogical arrangement of the races of man would afford the best classification of the languages now spoken around the world; and if all extinct languages, and all intermediate and slowly changing dialect, were to be included, such an arrangement would be the only possible one (1859, p. 422).

Peltokorpi and Vaara (2014) argue that language is an important aspect of culture, and symbolic capital for society and organizations.

Recent cognitive research supports the cognitive effect of language on speakers. The persistent impact of ancestral culture as marked in grammar may also emerge from the impact of language on cognition. Insofar as grammar influences the cognitive framework of speakers, it forces them to encode certain aspects of reality, and hence shapes their mental representation of social reality, reinforcing the persistency of inherited cultural values. Cognitive psychology studies on the impact of language on cognition (Boroditsky & Gaby, 2010) indicate that there may be a direct channel through which language structure influences socio-economic choices and outcomes. Cognitive scientists are currently studying cross-linguistic differences in thought related to time, navigation, colors, objects, and events (e.g. Levinson, 2003; Lucy & Gaskins,

2001; Winawer et al, 2007). Boroditsky, Schmidt, and Phillips (2003) found that grammatical gender influences the way speakers of different languages think about inanimate objects. Thus, we argue that grammatical gender markings are a better measure for culture and gender roles than the commonly-used survey based dimensions of culture (see Estfania et al. 2014 for details).

Recent literature in linguistics recognizes studying the relationships between grammatical features and other linguistic factors as a valid empirical approach for studying the societal environment, culture and organizations (e.g., Ladd, Roberts & Dediu, 2015). For example, Licht, Goldschmidt, and Schwartz (2007) use the grammar of pronouns as an instrumental variable in a study showing that countries tilted more in favor of autonomy, egalitarianism, and mastery exhibit a higher rule of law, less corruption, and more democratic accountability. They argue that languages requiring the explicit use of "I" or "you" signal that the person is highlighted, and autonomy is valued. Chen (2013) uses languages' marking of future time to investigate its impact on future-oriented decisions and outcomes like saving, debt and health-related behavior. Tabellini (2008) and Licht, Goldschmidt, and Schwartz (2004) use the grammar of pronouns to control for the possibility of reverse causality and identify the causal impact of values on institutional outcomes.

Female/male distinctions are another feature of language that is the subject of increasing attention. Existing studies show that gender distinctions in the grammar of a language are strongly associated with gender roles. For example, Santacreu-Vasut et al. (2014) show that female-male distinctions in language are negatively correlated with the participation of women on corporate boards and top management teams of MNCs. Furthermore, studying political quotas for women, Santacreu-Vasut, Shoham, and Gay (2013) found that the political participation of women was more likely to be regulated by quotas in countries with highly gendered grammar.

Hicks, et al. (2015) studied immigrants to the United States who speak different languages with diverse intensities of gender marking, and found that females who speak languages with a higher level of gender marking do many more household chores than those who speak languages with lower levels of gender marking. This result is so strong that it is even significant in single-person households. Gay, Hicks, Santacreu-Vasut, and Shoham (2015) also used a sample of immigrants in the US, and found that females who speak languages with higher gender marking have lower labor force participation, and work fewer hours and weeks. Givati and Troiano (2012) studied the relationship between gender marking in pronouns and the length of maternity leave. The study revealed a high correlation between positive attitudes towards motherhood (measured by gender markings in language) and the length of maternity leave. Guiora, Hallahmi, Fried, and Yoder (1982) found that higher "gender loading" in the grammar of a language was associated with stronger gender identity in young children. Finally, van der Velde, Tyrowicz, and Siwinska (2015) reported that grammatical gender marking correlated positively with the gender wage gap. In particular, existing studies show that a language's grammatical gender distinctions are strongly associated with a lack of opportunities for women in institutions, organizations, and markets. We propose that grammatical gender markings have an impact on the number of women appointed to boards of directors in different cultures, thereby indirectly impacting the level of environmental sustainability of companies in that country, leading us to the following hypothesis:

> **Hypothesis 2:** *Grammatical gender marking in a language is related to the number of women on boards of directors.*

**Grammatical Gender-Marking and its Impact on Environmental Sustainability**

Drawing on the strong literature that leads to hypotheses 1 and 2, we argue that the presence of women on the board of directors of an organization will positively affect its attitude towards environmental sustainability. We further propose that stronger gender roles in a society (as captured by linguistic gender marking) have a negative impact on the presence of females on board of directors. Recently, Roberts and Winters (2013) claim that finding correlations between language and social outcomes can be misleading, and provide a list of unexpected correlations on the cross country level, including linguistic diversity and traffic accidents, language tone and growing acacia trees, and siestas and morphological complexity. These correlations are likely significant due to a third behavioral variable that has been omitted but which mediates between the other variables. These lead us to further argue that effect of grammatical gender marking on organization environmental sustainability is mediated by women's presence on its board of directors. In other words, we argue that grammatical gender marking has an indirect effect on organization environmental sustainability via the impact on female presence on the board of directors.

We further build our argument on the value-belief theory (Hofstede, 2001; Triandis, 1995) that claims an exogenous impact of culture on the current environment. It further contends that values and beliefs held by the members of a culture will influence how individuals, groups, organizations and institutions in that society behave and the degree to which their behavior is viewed as legitimate, acceptable, and effective.

Gender is a very stable feature of grammar, inherited from distant past, and unaltered for millennia (Wichmann & Holman, 2009); thus language can be seen as a vehicle transmitting our ancestors' culture and potentially influencing socio-economic outcomes through cultural values

inherited from long ago. Linguistic research on the origin of languages suggests that the grammatical structure of languages reflects the way our ancestors coordinated economic activity (Johansson, 2005). Grammatical gender, therefore, allows us to capture ancestral gender-related cultural values that have not changed over time. Ancient culture is thus reinforced by the cognitive framework language creates for speakers, meaning that the centuries separating the creation of languages' structure and current socio-economic traits (e.g., national inequality) rule out the possibility of reverse causality.

The stability of grammatical features is unsurprising, and might be related to how network externalities affect technology adoption. Indeed, language can be considered a technology characterized by network externalities, because the value of mastering a language increases with the number of its speakers. Linguistic evolution can thus be seen as a type of technological adaption. If a new technology doesn't have sponsors, current technology has a strategic advantage and is likely to dominate. This dynamic applies to languages, because they are not owned or sponsored, meaning that there is no entity that has property rights to the technology which would motivate them to invest in promoting it (Katz & Shapiro, 1986).

Based on these arguments, we hypothesize:

**Hypothesis 3:** *The effect of grammatical gender marking on an organization's attitude towards environmental sustainability is mediated by the presence of women on its board of directors.*[1]

[1]This is basically the same as hypothesizing that grammatical gender marking exerts indirect influence on an organization's attitude toward environmental sustainability via the incidence of women on its board of directors.

## The study

### Data Sources

The data for this study were taken from the Thomson Reuters Corporate Responsibility Ratings for environmental sustainability. The dataset covers 4,500 companies in 52 industries and 71 countries for seven years from 2007 to 2013. Information regarding individual board members was imported from the BoardEx dataset, which contains biographical information for board members and senior executives around the globe. The biographical information includes, but is not limited to, age, gender, nationality, role and compensation packages. Because BoardEx tracks board members over years, we collapsed the data down to company-year level in order to understand unique characteristics not only of each board member, but also of the board itself. To examine the influence of board members' characteristics on organizations' behavior related environmental sustainability, we merged the datasets using the common company identifiers2 ("company ISIN" of BoardEx and "ISIN" of the Thomson Reuters Ratings). This successfully constructed a new dataset of 17,877 company-year matched observations, for 3,849 companies over 7 years from 2007 to 2013. The wide variance in key variables of our interest provided us with an environment for testing associations between language, presence of women on boards and corporate behavior regarding environmental sustainability.

### Environmental Sustainability

Among the key variables of interest in this study, we first assessed a company's environmental sustainability by referring to Thomson Reuters Environmental Index (hereinafter

[2] While the Thomson Reuters "ISIN" numbers are unique for each company, many companies in BoardEx have multiple Company ISINs. Therefore, we carefully compared and matched each company and number in both data sets one-by-one.

"EN rank") of companies in our sample. As shown in Table 1, the EN rank ranges from 0 to 100 with an average of 50.49, suggesting that awareness of and attention to environmental issues varies significantly across our sample.

Given the largest global companies increasing preference for sustainability reporting using the GRI[3] (Global Reporting Initiative) as an alternative measure to the EN rank, we used the GRI application level, or degree to which a reporting company discloses its sustainability activities, including management attitude toward environmental issues in its sustainability report. Under the current GRI's guidelines for sustainability reporting, the reporting company is asked to self-declare[4] its application level as A, B, or C, where A represents full disclosure while C refers to minimum disclosure. The GRI Reports List,[5] which gives a detailed overview of all sustainability reports, is included in GRI's Sustainability Disclosure Database.

**Incidence and Degree of Women' Presence on Board**

Next, we constructed and used three variables that measure the degree to which women are present on a board of directors. The first, "women ratio," represents the proportion of female directors to the total number directors on a board. Next, we created two dummy variables. The first dummy, "women_dir_yes/no" has a value of 1 if a company has at least one woman on the

[3] GRI is an international independent organization that has pioneered sustainability reporting since the late 1990s; it developed Sustainability Reporting Standards that approximately 93% of the world's 250 largest corporations use to voluntarily report their sustainability performance in three sectors: economic, environmental and social.

[4] The application levels can be upgraded to A+, B+, or C+ if the level is confirmed by a third party (e.g., a consultant or audit firm).

[5] Given that the GRI Reports Lists does not provide company identifiers such as ISIN, C USIP, or Ticker but only the names of reporting companies, we matched manually the GRI reports with companies in BoardEx by name.

board of directors. The second dummy, "women_3dir_yes/no," has a value of 1 if a company has at least three women on the board.

In addition, 11 interviews were conducted with executive and non-executive board members of manufacturing and service organizations in three countries: the Netherlands, UK and Israel. Table 1 summarizes characteristics of the people interviewed.

[Table-1-about-here]

The purpose of the interviews was to obtain a better understanding of the interplay between individual board members, their gender and their support (or lack thereof) of environmental sustainability at the organizational level.

**Language**

We introduced the Gender Intensity Index (GII), which measures the intensity of gender-marking in a language. The use of this grammatical structure as an empirical tool has been validated by a few prior studies (Hicks et al., 2015; Santacreu-Vasut et al., 2014). GII is described briefly in this section and additional explanations may be found in Appendix A, which that includes a detailed explanation quoted from Gay, Santacreu-Vasut, and Shoham (2013).

The World Atlas of Language Structures (WALS), includes four structures related to gender; GII incorporates them into a single measure of all available information regarding grammatical gender marking in a language. The first structure relates to Sex-Based (SB) gender (Corbett, 2011b [WALS chapter 31]). A language's gender system can be based on biological sex or on another distinction, for example, the distinction human and non-human, as in Fulfulde, a member of the Niger-Congo linguistic family, or between animate and inanimate, among others. The GII includes a dummy variable that equals one for languages with a biological sex-based gender system, and zero for languages with on a different system.

The second structure relates to the number of genders (NG), or the number of noun types that have different agreements (Corbett, 2011a [WALS chapter 30]). For example, while French has two genders ("feminine" and "masculine'') English includes "neuter'' as a third. There are languages, such as Nigerian Fula, which feature 20 genders. The GII includes a dummy variable that equals one for languages with two genders, and zero for languages that have a number of genders different from two.

The third structure is Gender Assignment (GA), which captures how a speaker assigns nouns to the genders defined by the gender system of a language, which provides a set of rules to help speakers make appropriate agreements (Corbett, 2011c [WALS chapter 32]). Assignment can depend on the semantic meaning or the form of the noun. For example, "table" is neuter in English, which assigns gender only on semantic, biological grounds. However, it is feminine in French, which assigns gender to nouns that do not have a biological gender. The GII includes a dummy variable that equals one for languages whose gender assignment system is both semantic and formal, and zero otherwise.

The fourth structure relates to Gender Pronouns (GP), which captures gender distinctions in independent personal pronouns (Siewierska, 2011 [WALS chapter 44]). There are languages with no gender distinctions in pronouns, gender distinctions in third-person pronouns only, and gender distinctions in the third-person and in the first and/or the second person. For example, English distinguishes gender in third-person pronouns only ("she," "he" and "it."). The GII includes a dummy variable that equals one for languages with gender distinction in third, and the first and/or second person pronouns and zero otherwise. Together GII=NG+SB+GA+GP where GII $\in\{0;1;2;3;4\}$.

For the gender-based language index, we employed GII first. However, given that GII by construction is open to criticism for assuming a linearity effect by summing the individual gender-marking indices, we constructed two additional gender-based language measures: a conditional GII by interacting SB with the sum of NG, GA and GP. We further did a principal component factor analysis on the four individual gender indices (NG, GA, GP and SB) to form a single "GII factor." As shown in Appendix B, all four individual language factors upload positively to the GII factor and exhibit very high correlations with the GII factor, suggesting that the GII factor is indeed a good description of the commonality between all four individual language indices.

Although we focused on companies from 71 different countries, our final sample includes a relatively high percentage of US companies and companies from English-speaking countries. About one-third companies in our sample originated in the US and more than 60% of our sample companies originate from English-speaking countries such as the US, Australia, Canada, and the UK. (Appendix C).

**Control Variables**

To capture the unique characteristics of the board of directors,[6] we included control variables in all models. These variables are (1) number of senior directors on board, (2) number of non-executive directors on board, (3) does the board have an executive chair or a combined CEO and chairman position (1 = yes, 0 = no), (4) average size of board members' networks, (5)

[6] The board of directors has been regarded in finance and economics literature as one of the paramount governance mechanisms in the firm and thus plays a critical role in formulating various firm policies including those on corporate social responsibility (Haniffa & Cooke, 2005)

average time of service on the board and (6) average age of board members. To reduce the impact of outliers, we used log values for the board-related variables.

We also included gender differences in wages[7] and education in our analyses because we wanted to identify and isolate the impact of gender differences on corporate behavior. To control for wage inequality between genders while capturing current economic conditions regarding gender, and assess gender wage inequality, we used wage inequality between women and men for similar work (hereinafter "women-to-men wage ratio") which is available from the annual Executive Opinion Survey conducted by World Economic Forum. The women-to-men wage ratio shows that female workers on average earn less than two-thirds of their colleague male workers, dropping as low as 39% in some countries. This implies that gender wage inequality is still prevalent and severe across countries over the years. Given that an organization's awareness of environmental issues could be influenced by the educational level in the general public, we used the World Bank data on gender inequality in secondary education, which represents the ratio of girls to boys enrolled in public and private secondary schools. Secondary education is a country-level variable to capture impact of education of people on environmental issues of a country where an organization operates. We further controlled for overall economic health of a country by including GDP and GDP per capita[8], and for company size by including market capitalization and year-end revenue in our regressions.

[Table-2-about-here]

[7] Lee and Shoham (2016, working paper) document that a society's income inequality on the country level is affected by gender wage inequality.

[8] Dollar and Gatti (1999) found strong evidence that increases in per capita income lead to reductions in gender inequality.

## Results

Our first hypothesis stated that the presence of women on the Board of Directors of an organization will positively affect its attitude towards environmental sustainability, separate from societal values. We employed the multivariate OLS regression models as presented in equation (1):

(1) $$EN\ Rank = \alpha + \beta_1 * Women\ presence\ on\ Board + \beta_2\ Controls + Industry\text{-}fixed\ effect + Year\text{-}fixed\ effects + \varepsilon.$$

EN rank was used as a dependent variable, while the ratio of women on the board of directors and two other dummy variables indicating women's presence on boards were used interchangeably as explanatory variables, along with other control variables. All regressions included industry and year dummies. The standard errors, which were clustered at the country level, were used to cope with a possibility that observations within each country are correlated with each other to some degree.

Table 3 shows the main results of the multivariate OLS regressions. Models 1 to 3 present the impact that the presence of women has on a company's environmental sustainability attitude. As can be seen in Models 1 to 3, the presence of women serving on the board has a significantly positive impact on the organization's behavior regarding environmental sustainability, suggesting that a company's attitude regarding environmental sustainability becomes stronger as the company has more women on its board. In other words, the higher presence of women on the board strengthens a company's environmental sustainability attitude. For example, in Model 1, a 1% increase of the women ratio increases the EN rank by approximately 0.422 points. Models 2 and 3, together, provide more evidence of the positive impact that the presence of women has on a company's environmental sustainability attitude.

Models 2 (and 3) show that companies with at least one woman (more than 3 women) on their board, rank 7.279 points (9.155 points) higher in EN rank than companies that do not have any women on their boards. All of the regressions in table 3 strongly support hypothesis 1.

[Table-3-about-here]

A majority of the companies in the sample are from English-speaking countries. In order to see whether this bias in our data towards US companies (33% of the sample) or those from English-speaking countries (60% of the sample) distorts our main findings, we ran the same models using two sub-samples. The first, non-US company sub-sample excluded all US companies from the sample, which the second non-English speaking country sub-sample excluded all companies operating in English-speaking countries sample. Models 1-6 in Table 4 provide evidence that having women on the board has an impact on environmental sustainability. Regardless of the sub-sample used, a positive relationship was found between having women on the board of directors and having a positive attitude towards environmental sustainability. Furthermore, the coefficients presented in Table 4 are very similar to those in Table 3. Thus, we can conclude that our findings regarding the relationship between the presence of women on the board of directors and an organization's behavior is a phenomenon prevalent across countries and over time, regardless of language or origin. Furthermore, the findings seem to imply that the presence of even one woman on the board is sufficient to make a difference and encourage organizations to become more proactive in environmental sustainability.

[Table-4-about-here]

To check for robustness, we re-ran our models by including country-fixed effects along with industry-fixed effects and year-fixed effects to capture unobservable characteristics specific to each country in our sample, while dropping all the other country-specific variables such as

GDP and GDP per capita. Untabulated tests[9] showed that the results remain robust even after capturing all unobservable country-specific characteristics.

Subsequently, we expanded our models by adding company-specific variables in order to control for their effect. We added the company's size, market capitalization and year-end revenue to the equation. We assumed that larger corporations might be more likely to care about environmental issues than smaller ones. We also included market capitalization and year-end revenue to control for market-based and accounting-based size of company. We did not include a company's size in our main tests because data for both size variables were only available for one year. Although the number of observations decreased from more than 15,000 to about 3,000 after controlling for company size in the estimations, our main findings still held as shown in Models 1-3 in Table 5. These findings continued to hold when we ran the same models using sub-samples of non-US companies and non-English speaking countries, sample respectively as shown in Models 4-6 in Table 5. The untabulated results[10] remain robust even when the country-fixed effect was included along with company's size variables in the same estimations.

[Table-5-about-here]

To further examine whether the degree to which a company discloses its sustainability activities in a sustainability report is influenced by the presence of women on the board, we employed ordered Logit regression models. The models are presented in equation (2), where our dependent variable, GRI application levels (A, B, or C), is treated as an ordinal under the

[9] We also conducted the same estimations using the two sub-samples used in the regressions reported in Table 4, and again observed the same robust results, regardless of the sub-sample used. All results found in the untabulated tests are available from the authors upon request.

[10] The results are available from the authors upon request.

assumption that those levels have ordering values (high to low disclosure), but the distances between adjacent levels vary:

(2) $GRI\ Application\ Level = \alpha + \beta_1 * Women\ present\ on\ Board + \beta_2\ Controls + Industry\text{-}fixed\ effect + Year\text{-}fixed\ effects + \varepsilon.$

More specifically, we first created a GRI dummy that has a value of one if a reporting company issues its sustainability report in a year, regardless of whether it declares its application level in the report, and zero otherwise. Because the GRI dummy does not distinguish between application levels in terms of the degree of disclosure, we further classify the sustainability reports in two additional disaggregated specifications. For the first disaggregated specification, we classify the sustainability reports into three categories, with the top category including reports that declare any level of application (A, B or C), the middle category contains the reports[11] not having an application level, and the lowest for companies that issued no report issued that year. For the second disaggregated specification, we further disaggregated the top category into 3 sub-categories, depending on the application level: A level reports, which allows a reporting company the smallest amount of discretion in its disclosure, were placed into the high-top category and C level reports, where there is minimal disclosure, were placed in the low-top category. The middle-top category includes B level reports. Appendix D shows our classification of the sustainability reports in more detail.

As evident in Table 6, which shows the odd ratio of each coefficient, we found that the degree of a company's disclosure regarding its sustainability activities is highly influenced by the presence of women on the board, supporting our main hypothesis. Model 1 shows that with a 1% point increase in the women ratio, the odds of a company issuing its sustainability report

[11] Some reporting companies issue their sustainability reports, which follow the GRI guideline, but without disclosing their application levels while some companies do not even state that they follow the GRI guideline in their reports.

increases by 2%. Interestingly, in Model 2 there is an increase by about 30% when even one woman is present on the board, compared to a company with no women on the board. Furthermore, when the board has at least three women directors, the probability that the company reports its sustainability behavior is almost two times higher than for a company with fewer than three women on the board. Very similar patterns were found in the more disaggregated specifications. The odds that a company would issue the top category report (declaring its application) versus the middle and bottom categories combined are 1.24 times higher when at least one women serves on the board, given that the other variables are held constant in the Model 4. The odds for a top category report increase further in a company with more than three women on its board. Even after we disaggregated the top category reports further into three sub-categories for actual application levels, we observed a higher probability of a company disclosing more about its sustainability activities. All of the empirical results presented in tables 3-7, with two different data sets and several robustness checks, strongly support hypothesis 1.

[Table-6-about-here]

The literature shows that the CEO of an organization can instigate strategic change, both positively and negatively. As an additional robustness check,[12] we controlled for effects that the demographic characteristics of an organization's CEO might have on its attitude towards environmental sustainability by including CEO age and tenure as additional control variables, and then re-running the regression analyses. As shown in Appendix E, the results remain consistent, even after controlling for these characteristics.

[12] We are grateful to anonymous referee for suggesting us to control for the effects of CEO characteristics on environmental sustainability attitude of an organization.

The individual interviews conducted with the board members strongly support these findings. A majority of the interviewees (10 out of 11) reported that environmental programs and environmental transparency were mostly initiated by women in the organizations or by female board members. Of the female board members that were interviewed, two were also CEO of their respective organizations, and reported on various initiatives they had taken in order to encourage environmental sustainability. For instance, the female Israeli CEO of a large international insurance company told the researchers:

> I signed an agreement in which we agreed to replace our leased cars with electric cars once they became available in Israel. We also made sure that our waste was recycled: i.e., paper was recycled separately, packaging materials separated and so forth. I installed a system which shut off automatically all air conditioners and light at six in the evening. If someone is in the office later, they need to switch the electricity on manually. We further made rules that everyone in the organization should use as little paper as possible. If people do print, they must print on both sides and using small type. Also, we explained to the board members that they had to use electronic reports and not to print them. All initiatives were presented to the board, which was mostly male, but they went along when they understood that it was important to me.

The female CEO of an Israeli high-tech company, who also sits on the boards of other high-tech companies told the researchers:

> In high-tech, there are very clear ISO standards regarding our carbon footprint. Boards expect the CEO to know the ISO standards, rules and regulations and adhere to them. Also, many of the companies are located physically in high-tech parks that usually have very stringent recycling rules and regulations.

> As a CEO, I personally make sure that we are as green as possible on the individual level in the company. For instance, we grow vegetables for our own consumption at the firm. We recycle our plastic bottles and paper products. For me it is important, so I make sure our company allows for recycling and growing vegetables.

A male director of a Dutch bank reported:

> Women are much more interested in environmental sustainability than men. The men on the board will engage in typical male behavior, some will tell you that the greenhouse effects do not exist, and will say that it simply is not true. Men are more focused on the old economy, women are more focused on the big picture. Women look at the whole planet and how it will remain alive. Men will frequently tell you that environment is only interesting if you can see the financial benefits and innovation in it. What does it mean for our company if we are green? Women look at the bigger picture and are willing to invest in programs that do not have an immediate financial benefit for the bank. Most of the programs concerning the environment were either initiated by women or first supported by women.

A male director of a UK legal services agency stated:

> We need to send a lot of letters, documents and files to our clients. We also photocopy a large number of documents. We constantly need to keep record of our client's files and documents. The costs of printing and storage were increasing faster than we expected. During the board meeting, one male director proposed a way of tackling by focusing only on costs. In contrast, the female directors highlighted the negative impact of printing and paper waste, and suggested that we use digital and PDF format in keeping track of documents. So, instead of photocopies, we started keeping scanned copies and only

printed documents when necessary. The female director highlighted that the benefit of a digital record is that we are saving electricity costs by not printing or photocopying, and we are doing our bit in saving the environment. The costs of printing and photocopying gradually decreased over the last 12 months as a result of the suggestions by a female director.

To test our second hypothesis about the potential impact of grammatical gender marking in a language on women's presence on the board, we executed OLS regressions for the women ratio variable and our gender intensity index (GII). We also employed two gender-based language indices, conditional GII and GII factor, to mitigate the concerns about GII discussed in the Data section. We used each gender-based language index interchangeably as an explanatory variable of our interest in the regressions. The OLS regressions are expressed in equation (3), where we use the ratio of women as a dependent variable along with other control variables used above. All models include industry[13] and year dummies.

(3) $$Women\ ratio = \alpha + \beta 1 * Gender\text{-}based\ language\ index + \beta 2\ Controls + Industry\text{-}fixed\ effect + Year\text{-}fixed\ effects + \varepsilon.$$

As shown in Table 7, we found a significantly negative relationship between each gender-based language index and the presence of women on the board, strongly supporting our second hypothesis. These results suggest that grammatical gender markings in a language discourage an organization from appointing women directors to its board. Next, we tested two sets of sub-samples, (1) Non-US companies and (2) Non-English speaking countries and re-ran

[13] We did not test country-fixed effects in the regressions because the gender-based language index does not change over our sample period within a given country.

the same OLS Models, as we did in our main analyses. Our findings were similar, regardless of the sub-sample used.

[Table-7-about-here]

Next we examine whether the presence of women on its board of directors mediates an effect of grammatical gender marking on an organization's attitude towards environmental sustainability, as proposed in hypothesis 3. To put it differently, we test if grammatical gender marking exerts indirect influence on an organization's attitude towards environmental sustainability by means of the incidence of women on board. In order to mitigate possible endogeneity concerns,[14] we employed an instrumental variable (IV) estimation[15] with the gender-based language index as an instrumental variable. Specifically in the IV regressions, we used the *predicted* values of the ratio of women obtained from the OLS regressions[16] presented in Table 7 as explanatory variables of interest, while positioning the EN Rank of a company as the dependent variable.

[14] Those endogeneity concerns include, but are not limited to (1) the omitted variable bias that the impact of women presence on boards (the "mediator") on attitude towards environmental sustainability (the "outcome") might be driven by omitted, unobservable factors that affect the mediator and the outcome at the same time, and (2) the reverse causality bias that the mediator correlates with the outcome but does not cause it. IV estimation is widely-recognized, and used extensively in finance and economics to eliminate all three biases simultaneously.

[15] IV estimation is performed for two separate stages of regressions. The first-stage IV regression isolates the part of the "mediator" variable *M* (= presence of women on board), that is uncorrelated with an error term of the "outcome" variable *Y* (= environmental sustainability) using a valid instrumental variable (IV) (= gender-based language index). In the second-stage IV regression, a predicted value of the mediator variable *X* obtained from the first-stage IV regression is regressed on the outcome variable, *Y* in order to get an unbiased/consistent coefficient of the mediator variable *X*. Please refer to Angrist and Krueger (1991) for more information on the IV estimation.

[16] The OLS regressions in Table 7 are equivalent of running the first-stage IV regressions.

EN Rank = $\alpha + \beta_1$ * Predicted value of women's presence on board + $\beta_2$ Controls + Industry-fixed effect +Year-fixed effects + $\varepsilon$.

As shown in Model 1 of Table 8, the *predicted* value of women's presence on board has a significantly positive association with the companies' environmental sustainability, the same as reported in Table 3. In Models 2-3, the results remain robust when the women ratio is instrumented using either GII factor or Conditional GII. Furthermore, in Models 4-9, we continue to observe the same robust results using sub-samples, (1) Non-US companies and (2) Non-English speaking countries. The significantly positive *predicted* value of women ratio strongly imply that gender in a language can affect the organization's attitude towards environmental sustainability through its impact on the presence of women on board, supporting hypothesis 3 that effect of grammatical gender marking on an organization's attitude towards environmental sustainability is mediated by the presence of women on its board of directors.. The results of IV regressions in Table 8 also reconfirm earlier results reported in Table 3 showing that the presence of women on board of directors is a key determinant of a company's environmental sustainability attitude across countries over time, even after controlling for the possible endogeneity concerns.

[Table-8-about-here]

In untabulated tests[17], we expanded the IV regressions by adding two company-specific variables to control for effect of a company's size on its attitude towards environmental sustainability and found that all our prior results remain robust, even after controlling for company size in the IV estimations.

[17] The results are available from the authors, upon request.

## Discussion

This unique study examines the micro-foundations of the relationship between gender of individual board members and environmental sustainability practices of organizations among industries and nations, using a database that included 4,500 companies in 52 industries and 71 countries for seven years from 2007 to 2013. In addition, in-depth interviews with female and male directors in three countries provided examples of individual behavior of directors and how that behavior affected environmental CSR practices.

Environmental sustainability and the responsibility that organizations take regarding the damages that they do to the environment, is attracting increasing attention, however we do not know enough about the influence the individual can excise on this topic nor do we know much about the influence the culture of a country has on the organization's attitude regarding this issue. In this paper, we examined how the gender of individual board members is related to the environmental CSR practices of the organization in different countries and among different cultures. By using a linguistic gender marking instrument that can gauge the level of femininity of a culture and by measuring the individual directors and environmental CSR behavior of individual companies, we were able to conduct a study that integrates measures of the individual board member with the behavior of an organization among various countries.

We argued that gender differences in organizations are the result of gender socialization (Gilligan, 1982), social roles (Eagly & Wood, 1991), context-sensitivity (Croson & Gneezy, 2009) and value differences (Klein et al., 2012). We further posed that this may lead to differences in environmental concern between the genders and to more altruistic behavior among women. We argued that women are more likely than men to be concerned about environmental issues that threaten health and well-being, and increase the risk of air pollution, ozone depletion,

toxic waste, and acid rain. Research already suggests that firms with a higher percentage of female board members do in fact have a higher level of charitable giving (Wang and Coffey, 1992; Williams, 2003), more favorable work environments (Bernardi et al., 2006; Johnson and Greening, 1999), and higher levels of environmental CSR (Post et al., 2011).

Thus, we proposed that gender diversity on boards of directors will have a positive impact on the degree of openness organizations will show regarding the environment, and the responsibility that they take in terms of environmental sustainability. We proposed that these effects can be felt throughout the organization even if the action taken was by only one person.

We used the micro-foundational approach towards environmental sustainability and argued that the gender of an individual board member can affect the attitude of an organization towards environmental sustainability. While previous studies examined the effect that women serving on the board of directors have on variables such as effectiveness and profitability, very few have addressed micro-foundations, empirically examining the impact of individual directors from a cross-country sample of companies for multiple years and industries on organizational behavior. Moreover, very few studies have examined the relationship between gender and sustainability outside the US and other English-speaking countries. This study is unique in that it examines micro-foundations of environmental sustainability behavior of 4,500 companies from 52 industries, located in 71 countries over a period of seven years (2007-2013) and its relationship to the individual board member. It is also innovative in using grammatical gender marking, a unique approach that measures of female-oriented cultural effects better than the traditional survey-based dimensions of culture (Santacreu-Vasut et al., 2014). The method highlights that certain cultures have more gender roles than others do, which affects general

behavior in society (Hicks et al., 2015) as well as organizational behavior (Santacreu-Vasut et al., 2014).

Our very robust empirical findings support the hypotheses, and show very clearly that there is a positive relationship between the presence of even one woman on boards of directors, and attitudes of organizations regarding environmental sustainability. Furthermore, our findings show that this is true across cultures as well as industries. Moreover, the effect was found over years, regardless of language or origin. Our data show that the presence of even one woman on the board makes a difference and encourages organizations to become more proactive in environmental sustainability.

Our findings further showed that the degree of an organization's disclosure regarding its sustainability activities increases with the presence of women on the board. Results showed that by appointing just one woman to a male board of directors, the odds of the company issuing a sustainability report, increases by nearly 30%. Furthermore, we found that a 1% point increase in the women ratio of the board of directors increases the odds of an organization issuing a sustainability report by 2%. When the board has at least three women directors, the probability that the organization reports its attitudes and behavior regarding environmental sustainability is about two times higher than an organization with fewer than three women on the board. Very similar patterns were also found in more disaggregated specifications. The odds that an organization will issue a report in the highest category, with declared application levels (A, B or C), rather than one in the middle and lowest categories (combined) are 1.24 times higher when at least one woman serves on board, given that the other variables are constant. The odds of issuing a top category report are even greater for a company having more than three women serving on the board. These findings were also corroborated when we conducted individual, in-depth

interviews with female and male directors. The interviews all pointed to the same trend: female directors were frequently the initiators of environmental projects, supported environmental CSR and look at the bigger picture, not only quarterly financial results. Similar findings have not been reported previously. The clear effect that even one board member can have on the policy of the firm and the effect of gender diversity are very robust across cultures and industries, demonstrating the importance of gender diversity on boards of directors.

Our second hypothesis concerned the relationship between grammatical gender marking and the appointment of women to boards of directors. Our findings showed a significantly negative relationship between each gender-based language index and the presence of women on the board. These results suggest that grammatical gender markings in a language discourage organizations from appointing women to the board of directors.

Subsequently, we tested and found that the presence of women on boards of directors mediates the effect of grammatical gender marking on the attitude of organizations towards environmental sustainability. In other words, our data clearly show that grammatical gender markings exert indirect influence on an organization's attitude towards environmental sustainability by means of the presence of women on boards of directors.

## Conclusions and Limitations

Our findings support the micro-foundational approach by showing that even one woman on a company's board of directors, anywhere in the world, affects the attitude of the whole organization towards environmental sustainability. The more women on the board of directors, the stronger this organization's behavior and attitudes towards environmental sustainability. Our findings further show that cultures which have clear gender grammatical markings will tend to

appoint fewer women to boards of directors, thereby indirectly influencing the organization's environmental sustainability efforts.

These findings point to the importance of gender diversity on boards of directors and how diversity, even at a low level, can have a tremendous impact on the firm's attitude towards issues that are not necessarily related to quarterly financial results. In this specific study, we examined the relationship between gender of the individual board member and if, and how, that influences the firm's attitude towards environmental sustainability. The quantitative data as well as the interviews conducted in three countries, showed the importance of gender diversity and the impact of it on environmental sustainability. Moreover, these effects exist notwithstanding cultural effects.

The findings should support policy-makers, CEOs and boards in encouraging gender diversity and appointing strong, opinionated leaders. The results of this study clearly show that even one person can make a difference, and can change the way a firm uses its resources to satisfy different stakeholders. Our data further shows that women on boards will promote issues that may be not be the ones that interest male members, such as environmental sustainability. If governments want to further issues of this type, and CSR in general, our data suggests that they would do well to encourage gender diversity.

Like any study, this one has its limitations. While we can offer various hypotheses for why gender is so important for organizational sustainability behavior, very few studies actually measure this at the individual level. In this study, we suggest that the tendency of women to support environmental sustainability is the effect of altruistic behavior for women are socialized around the world, and which influences their behavior as directors. The argument is that the greater empathic concern acquired by women during socialization, gender role expectations and

gendered experiences give rise to a stronger empathic concern for others and the natural environment (Dietz, Kalof and Stern, 2002; Milfont, Richter, Sibley, Wilson and Fischer, 2013; Xiao & McCright, 2015; Milfont and Sibley, 2014; Milfont and Sibley, 2016). However, we have not examined this empirically, and did not test our subjects for altruistic behavior. Moreover, all of the board members we interviewed individually mentioned that women on the board to have a long-term orientation, see the bigger picture and take responsibility beyond the quarterly bottom line of the firm. However, this study did not examine empirically why this is so. Furthermore, we did not check if male directors who are socialized with more equalitarian attitudes share this long-term orientation and exhibit more altruistic behavior. Thus, we cannot say if this is learned behavior or if it is inherent to gender.

Future studies addressing micro-foundations and environmental sustainability behavior might use other research methods to examine this phenomenon more closely and understand it better. It might be, for instance, that individuals who score high on certain attributes are prone to encourage sustainability behavior, unrelated to their gender. However, this can only be examined at the individual level through in-depth case studies, and not at the aggregate level as in this study.

## References


Angrist, J. D. & Krueger. A. B. (1991). Does compulsory school attendance affect schooling and earnings? *Quarterly Journal of Economics, 106*(4), 979-1014.

Aras, G. & Crowther, D. (2008) Governance and sustainability. *Management Decision*, *46*(3), 433-448.

Bansal, P. & Clelland, I. (2004). Talking trash: Legitimacy, impression management, and unsystematic risk in the context of the natural environment. *Academy of Management Journal*, *47*, 93-103.

Bansal, P. (2005). Evolving sustainability: A Longitudinal study of corporate sustainable development. *Strategic Management Journal*, *26,* 197–218.

Barber, B. M., & Odean, T. (2001) Boys will be boys: Gender, overconfidence, and common stock investment, *Quarterly Journal of Economics, 116*, 261-292.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173-1182. doi:10.1037/0022-3514.51.6.1173

Barney, J. & Felin, T. (2013). What are microfoundations? *Academy of Management Perspectives*, *27*, 138-155.

Bear, S., Rahman, N., & Post, C. (2010). The impact of board diversity and gender composition on corporate social responsibility and firm reputation. *Journal of Business Ethics*, *97*, 207-221.

Bernardi, R., Bosco, S., & Vassill, K. (2006). Does female representation on boards of directors associate with Fortune's 100 "Best companies to work for" list? *Business & Society*, *45*(2), 235–248.

Blomgren, A. (2011). Does corporate social responsibility influence profit margins? A case study of executive perceptions, *Corporate Social Responsibility and Environmental Management*, *18*, 263-274.

Bordia, S & Bordia, P. (2014). Employees' willingness to adopt a foreign functional language in multilingual organizations: The role of linguistic identity. *Journal of International Business Studies*, *46*, 415-428.

Boroditsky, L., & Gaby, A. (2010). Remembrances of times east: Absolute spatial representations of time in an Australian aboriginal community, *Psychological Science*, *21*(11), 1635–1639

Boroditsky, L., Schmidt, L., & Phillips, W. (2003). Sex, syntax, and semantics. In D. Gentner, & S. Goldin-Meadow (Eds.), *Language in mind: Advances in the study of language and cognition* (pp. 61-80). Cambridge, MA: MIT Press.

Boulouta, I. (2013). Hidden connections: the link between board gender diversity and corporate social performance. *Journal of Business Ethics*, *113*(2), 185–197.

Brannen, M. Y., Piekkari, R., & Tietze, S. (2014). The multifaceted role of language in international business: Unpacking the forms, functions and features of a critical challenge to MNC theory and performance. *Journal of International Business Studies*, *45*(5), 495-507.

Burke, L. & Logsdon, J. M. (1996). How corporate social responsibility pays off, *Long Range Planning*, *29*(4), 495-502.

Byrnes, J. P., Miller, D. C. & Schafer W. D. (1999). Gender differences in risk taking: A meta-analysis, *Psychological Bulletin*, *125*, 367-383.

Callan, S. J. & Thomas, J. M. (2009). Corporate financial performance and corporate social performance: An update and reinvestigation. *Corporate Social Responsibility and Environmental Management, 16*, 61-78.

Carter, D. A., Simkins, B. J., & Simpson, W. G. (2003). Corporate governance, board diversity, and firm value. *Financial Review*, *38*(1), 33-53.

Chen, M. K. (2013). The effect of language on economic behavior: Evidence from savings rates, health behaviors, and retirement assets. *American Economic Review*, *103*(2), 690-731.

Christensen, L. J., Mackey, A. & Whetten, D. (2014). Taking responsibility for corporate social responsibility: The role of leaders in creating implementing, sustaining or avoiding social responsible firm behaviors. *Academy of Management Perspectives*, *28*(3), 2211-223.

Ciocirlan, C., & Pettersson, C. (2012). Does workforce diversity matter in the fight against climate change? An analysis of Fortune 500 companies. *Corporate Social Responsibility and Environmental Management*, *19*, 47-62.

Corbett, G. G. 2011a. Number of genders. In M. S. Dryer and M. Haspelmath (Eds.), The world atlas of language structures online (chapter 30). Munich, Germany: Max Planck Digital Library. Website: http://wals.info.

Corbett, G. G. 2011b. Sex-based and non-sex-based gender systems, in M. S. Dryer, and M. Haspelmath (eds.). The world atlas of language structures online (chapter 31). Munich, Germany: Max Planck Digital Library. Website: http://wals.info.

Corbett, G. G. 2011c. Systems of gender assignment, in M. S. Dryer, and M. Haspelmath (eds.) online (chapter 32). Munich, Germany: Max Planck Digital Library. Website: http://wals.info.

Croson, R. and Gneezy, U. (2009). Gender differences in preferences. *Journal of Economic Literature*. 47(2), 448-474.

Darwin, C. (1859). *On the Origin of Species*. London: John Murray.

Datta D. K., Rajagopalan N., & Zhang Y. (2003). New CEO openness to change and strategic persistence: the moderating role of industry characteristics. *British Journal of Management 14*(2), 101-114.

Delmas, M. A., & Pekovic, S. (2013). Environmental standards and labor productivity: Understanding the mechanisms that sustain sustainability. *Journal of Organizational Behavior*, *34*, 230-252.

Delmas, M., & Montiel, I. (2009). Green the supply chain: When is customer pressure effective? *Journal of Economics and Management Strategy*, *18*(1), 171-201.

Dhont, K., Hodson, G., Costello, K., & MacInnis, C. C. (2014). Social dominance orientation connects prejudicial human-human and human-animal relations. *Personality and Individual Differences*, *61-62*, 105–108.

Diamantopoulos, A., Schlegelmilch, B. B., Sinkovics, R. R., & Bohlen, G. M. (2003). Can socio-demographics still play a role in profiling green consumers? A review of the evidence and an empirical investigation. *Journal of Business Research*, *56*, 465-480.

Dietz, T., Kalof, L., & Stern, P. C. (2002). Gender, values, and environmentalism. *Social Science Quarterly*, *83*, 353–364.

Dixon-Fowler, H. R., Slater, D. J., Johnson, J. L., Ellstrand, A. E., & Romi, A. M. (2012). Beyond does it pay to be green?: A meta-analysis of moderators of the CEP-CFP relationship. *Journal of Business Ethics*, *112*, 353-366.

Dollar, D., & Gatti, R. (1999). *Gender inequality, income, and growth: are good times good for women?* (Vol. 1). Washington, DC: Development Research Group, The World Bank.

Ducassy, I. (2013). Does corporate social responsibility pay off in times of crisis? An alternate perspective on the relationship between financial and corporate social performance, *Corporate Social Responsibility and Environmental Management*, *20*, 157-167.

Eagly, A. H., & Wood, W. (1991). Explaining sex differences in social behavior: A meta-analytic perspective. *Personality and Social Psychology Bulletin*, *17*, 306-315.

Erhardt, N. L., Werbel, J. D., & Shrader, C. B. (2003). Board of director diversity and firm financial performance. *Corporate Governance: An International Review*. *11*(2), 102-111.

Falck, O., Heblich, S., Lameli, A., & Suedekum, J. 2010. Dialects, cultural identity, and economic exchange, IZA Discussion Papers No. 4743.

Felin, T., Foss, N. J. & Ployhart, R. E. (2015). The microfoundations movement in strategy and organization theory. *The Academy of Management Annals*, *9*(1), 575-632.

Felin, T., Foss, N., Heimeriks, K., & Madsen, T. (2012). Microfoundations of routines and capabilities: Individuals, processes, and structure. *Journal of Management Studies*, *49*, 1351-1374.

Fernandez-Feijoo, B., Romero, S. & Ruiz-Blanco, S. (2014). Women on boards: Do they affect sustainability reporting? *Corporate Social Responsibility and Environmental Management*, *21*(6), 351–364

Frias-Aceituno, J.V., Rodriguez-Ariza, L., & Garcia-Sanchez, I.M. (2013). The role of the board in the dissemination of integrated corporate social reporting. *Corporate Social Responsibility and Environmental Management*, *20*(4), 219–233.

Galbreath, J. (2011). Are there gender-related influences on corporate sustainability? A study of women on boards of directors. *Journal of Management and Organization*, *17* p. 17-38.

Gay, V., Hicks, D. L. Santacreu-Vasut, E., & Shoham, A. Decomposing culture: Can gendered language influence women's economic engagement? (January 1, 2015). Available at SSRN: http://ssrn. com/abstract=2544396 or http://dx. doi. org/10. 2139/ssrn. 2544396

Gay, V., Santacreu-Vasut, E., & Shoham, A. 2013. The grammatical origins of gender roles. Berkeley Economic History Economic Laboratory working paper series WP2013-03.

Gilligan, C. (1982). *In a different voice: Psychological theory and women's development*. Harvard University Press: Cambridge, MA.

Givati, Y., & Troiano, U. (2012). Law, economics, and culture: Theory of mandated benefits and evidence from maternity leave policies. *Journal of Law and Economics, 52*(2), 339-364.

Guiora, A. Z., Beit-Hallahmi, B., Fried, R., & Yoder, C. 1982. Language environment and gender identity attainment. *Language Learning, 32*(2), 289-304.

Haniffa, Roszaini M., and Thomas E. Cooke, (2005). The impact of culture and governance on corporate social reporting. *Journal of Accounting and Public Policy, 24*(5), 391-430.

Hart, S. L. (1995). A natural resource-based view of the firm. *Academy of Management Review*, *20*, 986-1014.

Hart, S. L. (2005). *Capitalism at the crossroads: The unlimited business opportunities in solving the world's most difficult problems*. Upper Saddle River, NJ: Wharton School Publishing.

Hayek, F. A. (1960). *The constitution of liberty*, Chicago: The University of Chicago.

Helfat, C. E., & Peteraf, M. A., (2015). Managerial cognitive capabilities and the microfoundations of dynamic capabilities. *Strategic Management Journal*, *36*(6), 831-850.

Hicks, D. L., Santacreu-Vasut, E., & Shoham, A. (2015). Does mother tongue make for women's work? Linguistics, household labor, and gender identity. *Journal of Economic Behavior & Organization*, *110*, 19-44.

Hillman, A. J., Cannella Jr, A. A. &Harris, I. C. (2002) Women and Racial Minorities in the Boardroom: How Do Directors Differ? *Journal of Management*, *28*, 747–763.

Hofstede G (1980) *Culture's consequences: International differences in work-related values*. Thousand Oaks, CA: Sage.

Hofstede G (2001) *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations*. Thousand Oaks, CA: Sage.

Hoijer H. (Ed.). (1954) *Language in culture: Conference on the interrelations of language and other aspects of culture: The Sapir-Whorf hypothesis*. Chicago: University of Chicago Press, 92-105.

Jackson, S. E., Ones, D. S., & Dilchert, S. (Eds.). (2012). *Managing human resources for environmental sustainability*. San Francisco: Jossey-Bass.

Jamali, D., Safieddine, A., & Daouk, M. (2007). Corporate governance and women: an empirical study of top and middle women managers in the Lebanese banking sector. *Corporate Governance*, *7*(5), 574–585.

Johansson, S. (2005). *Origins of language: Constraints on hypotheses*. Amsterdam: John Benjamins.

Johnson, R. A. & Greening, D. W. (1999). The effects of corporate governance and institutional ownership types on corporate social performance. *Academy of Management Journal*, *42*(5), 564–576.

Jylhä, K. M., & Akrami, N. (2015). Social dominance orientation and climate change denial: The role of dominance and system justification. *Personality and Individual Differences*, 86, 108–111.

Katz, M. L. & Shapiro, C. (1986). Technology adoption in the presence of network externalities. *Journal of Political Economy, 94*(4), 822-41.

Klein, R. M., D'Mello, S., & Wiernik, B. M. (2012). Demographic characteristics and employee sustainability. In S. E. Jackson, D. S. Ones, & S. Dilchert (Eds.), *Managing human resources for environmental sustainability*, (pp. 117-154). Jossey-Bass: Sanfranciso, CA.

Konrad, A., & Kramer, V.W. (2006). How many women do boards need? *Harvard Business Review*, *84*(12), 22–24.

Kopelman, S., Weber, J. M. & Messick, D. M. (2002). "Commons Dilemma Management: Recent Experimental Results." in E. Ostrom, T. Dietz, N. Dolsak, P. C. Stern, S. Stonich, and E. Weber, eds., *The Drama of the Commons*. Washington, DC: National Academy Press.

Labov, W. (1972). *Sociolinguistic Patterns*. University of Pennsylvania Press: Philadelphia.

Ladd, D. R., Roberts, S. G., & Dediu, D. (2015). Correlational studies in typological and historical linguistics. *Annual Review of Linguistics, 1*(1).

Larrieta-Rubín de Celis, I., Velasco-Balmaseda, E., Fernández de Bobadilla, S., Alonso-Almeida, M.D.M., & Intxaurburu-Clemente, G. (2015). Does having women managers lead to increased gender equality practices in corporate social responsibility? *Business Ethics: A European Review*, *24*(1), 91–110.

Levinson, S. C. (2003). *Space in language and cognition: explorations in cognitive diversity*. Cambridge, UK: Cambridge University Press.

Licht, A. N., Goldschmidt, C., & Schwartz, S. H. (2005). Culture, law, and corporate governance. *International Review of Law and Economics, 25*(2), 229-255.

Lucy, J. A., & Gaskins, S. (2001). Grammatical categories and the development of classification preferences: A comparative approach in language acquisition and conceptual development. In M. Bowerman & S. C. Levinson (Eds.) *Language acquisition and conceptual development*, (pp. 257-283). Cambridge, UK: Cambridge University Press,

Margolis, J., & Walsh, J. (2003). Misery loves companies: Rethinking social initiatives by business. *Administrative Science Quarterly*, *48*(2), 268-305.

Marquis, C. & Lee, M. (2012). Who is governing whom? Senior managers, governance and the structure of generosity in large U.S. firms. *Strategic Management Journal, 34*(4), 483–497.

McElhaney, K., & Mobasseri, S. (2012). *Women create a sustainable future*. Center for Responsible Business, Haas School of Business, University of California, Berkeley.

Meng, J. (2015). Sustainability: A Framework of typology based on efficiency and effectiveness, *Journal of Macromarketing*, *35*(1), 84-98.

Merchant, C. (1992). *Radical ecology: The search for a liveable world*. New York: Routledge.

Michelon, G., Boesso, G., & Kumar, K. (2013). Examining the link between strategic corporate social responsibility and company performance: an analysis of the best corporate citizens, *Corporate Social Responsibility and Environmental Management, 20*, p. 81-94.

Milfont, T. L., Richter, I., Sibley, C. G., Wilson, M. S., & Fischer, R. (2013). Environmental consequences of the desire to dominate and be superior. *Personality and Social Psychology Bulletin*, *39*, 1127-1138.

Milfont, T. L., & Sibley, C. G. (2014). The hierarchy enforcement hypothesis of environmental exploitation: A social dominance perspective. *Journal of Experimental Social Psychology*, *55*, 188-193.

Milfont, T. L. & Sibley, C. G. (2016). Empathic and social dominance orientations help explain gender differences in environmentalism: A one-year Bayesian mediation analysis. *Personality and Individual Differences, 90*, 85-88.

Moldan, B., Janousková, S., & Hák, T. (2012). How to understand and measure environmental sustainability: Indicators and targets, *Ecological Indicators*, *17*, p. 4-13.

Molina-Azorin, J. F. (2014). Microfoundations of strategic management: Towards micro-macro research in the resource-based theory. *Business Research Quarterly*, *17*(2), 102-114.

Montiel, I. (2008). Corporate social responsibility and corporate sustainability separate pasts, common futures. *Organization & Environment*, *21*, 245-269.

North, D. C. Prize Lecture. (1993). Nobelprize.org, accessed 21 February 2011. http://nobelprize.org/nobel_prizes/economics/laureates/1993/north-lecture.html

Orlitsky, M., Schmidt, F., & Rynes, F. (2003). Corporate social and financial performance: A meta-analysis. *Organization Studies*, *24*, 403-441.

Peltokorpi, V., & Vaara, E. (2014). Knowledge transfer in multinational corporations: Productive and counterproductive effects of language-sensitive recruitment. *Journal of International Business Studies*, *45*(5), 600-622.

Porter, M. E., & Van Der Linde, C. (1995). Towards a new conception of the environment - competitiveness relationship. *Journal of Economic Perspectives*, *9*(4), 97-118.

Post, C., Rahman N., & Rubow E. (2011). Green governance: boards of directors' composition and environmental corporate social responsibility. *Business and Society*, *50*, 189-223.

Quigley T., & Hambrick D. (2011). Macrosocietal changes and executive effects on firm performance: A new explanation for the great rise in attributions of CEO significance, 1950-2009. Working paper, University of Georgia.

Ricart, J. E., Rodriguez, M. A., & Sanchez, P. (2005). Sustainability in the boardroom: An empirical examination of Dow Jones sustainability world index leaders. *Corporate Governance: The International Journal of Business in Society, 5*, 24-41.

Roberts, S., & Winters, J. (2013). Linguistic diversity and traffic accidents: Lessons from statistical studies of cultural traits. *PloS one*, *8*(8), e70902.

Robertson, J. L., & Barling, J. (2013). Greening organizations through leaders' influence on employees' pro-environmental behaviors. *Journal of Organizational Behavior*. *34*(2), 176-194.

Russo, M. V., & Fouts, P. A. (1997). A resource-based perspective on corporate environmental performance and profitability. *Academy of Management Journal*, *40*, 534-559.

Sampson, G., Gill, D., & Trudgill, P. (Eds.) (2009). *Language complexity as an evolving variable*. Oxford: Oxford University Press.

Santacreu-Vasut, E., Shenkar, O., & Shoham, A. (2014). Linguistic gender marking and its international business ramifications. *Journal of International Business Studies*, *45,* 1170-1178.

Santacreu-Vasut, E., Shoham, A., & Gay, V. (2013). Do female/male distinctions in language matter? Evidence from gender political quotas. *Applied Economics Letters*, *20*(5), 495-498.

Setó-Pamies, D. (2015). The relationship between women directors and corporate social responsibility. *Corporate Social Responsibility and Environmental Management*, *22*(6), 334–345.

Siewierska, A. (2011). Gender distinctions in independent personal pronouns. In M. S. Dryer, and M. Haspelmath (Eds.). The world atlas of language structures online (chapter 44). Munich, Germany: Max Planck Digital Library. Website: http://wals.info.

Śliwa, M., & Johansson, M. (2014). How non-native English speaking staff are evaluated in linguistically diverse organizations: A sociolinguistic perspective. *Journal of International Business Studies, 45*(9), 1133-1151.

Smith, P. A. C., & Sharicz, C. (2011). The shift needed for sustainability, *The Learning Organization Journal*, *18*, 73-86.

Stern, P. C. & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues*, 50:65–84.

Stern, P. C., Dietz, T., & Guagnano, G. A. (1995). The new environmental paradigm in social psychological perspective. *Environment and Behavior, 27*, 723–745.

Stern, P., C. Dietz, T. & Kalof, L. (1993). Value orientations, gender, and environmental concern. *Environment and Behavior*, *25*(3), 322-348.

Tabellini, G. 2008. The scope of cooperation: Values and incentives. *The Quarterly Journal of Economics, 123*(3), 905-950

Tang, L., & Koveos, P. E. (2008). A framework to update hofstede's cultural value indices: economic dynamics and institutional stability. *Journal of International Business Studies*, *39*(6), 1045-1063.

Triandis HC (1995), *Individualism and collectivism*. Boulder, CO: Westview.

Van der Velde, L., Tyrowicz, J., & Siwinska, J. (2015). Language and (the estimates of) the gender wage gap. *Economics Letters, 136*, 165-170.

Walls, J. L., Berrone, P., & Phan, P. H. (2012). Corporate governance and environmental performance: is there really a link? *Strategic Management Journal*, *33*, 885-913.

Wang, J. & Coffey, B. (1992). Board Composition and Corporate Philanthropy. *Journal of Business Ethics*, *11*(10), 771–778.

WCED (1987). *Our common future: The Brundtland Report, World Commission on Environment and Development (WCED)*, Oxford: Oxford University Press.

Welch, D., Welch, L., & Piekkari, R. (2002). Speaking in tongues: The importance of language in international management processes. *International Studies of Management and Organization*, *35*(1), 10-27.

Wichmann, S. and Holman, E. W. 2009. *Assessing temporal stability for linguistic typological features*. Munich: LINCOM Europa.

Williams, R. J. (2003). Women on corporate boards of directors and their influence on corporate philanthropy. *Journal of Business Ethics*. *42*(1), 1-10.

Winawer, J., Witthoft, N., Frank, M. C., Wu, L., Wade, A. R., & Boroditsky, L. (2007). Russian blues reveal effects of language on color discrimination. *Proceedings of the National Academy of Sciences*, *104*(19), 7780-7785.

Xiao, C., & McCright, A. M. (2015). Gender differences in environmental concern: Revisiting the institutional trust hypothesis in the USA. *Environment and Behavior*, 47, 17–37.

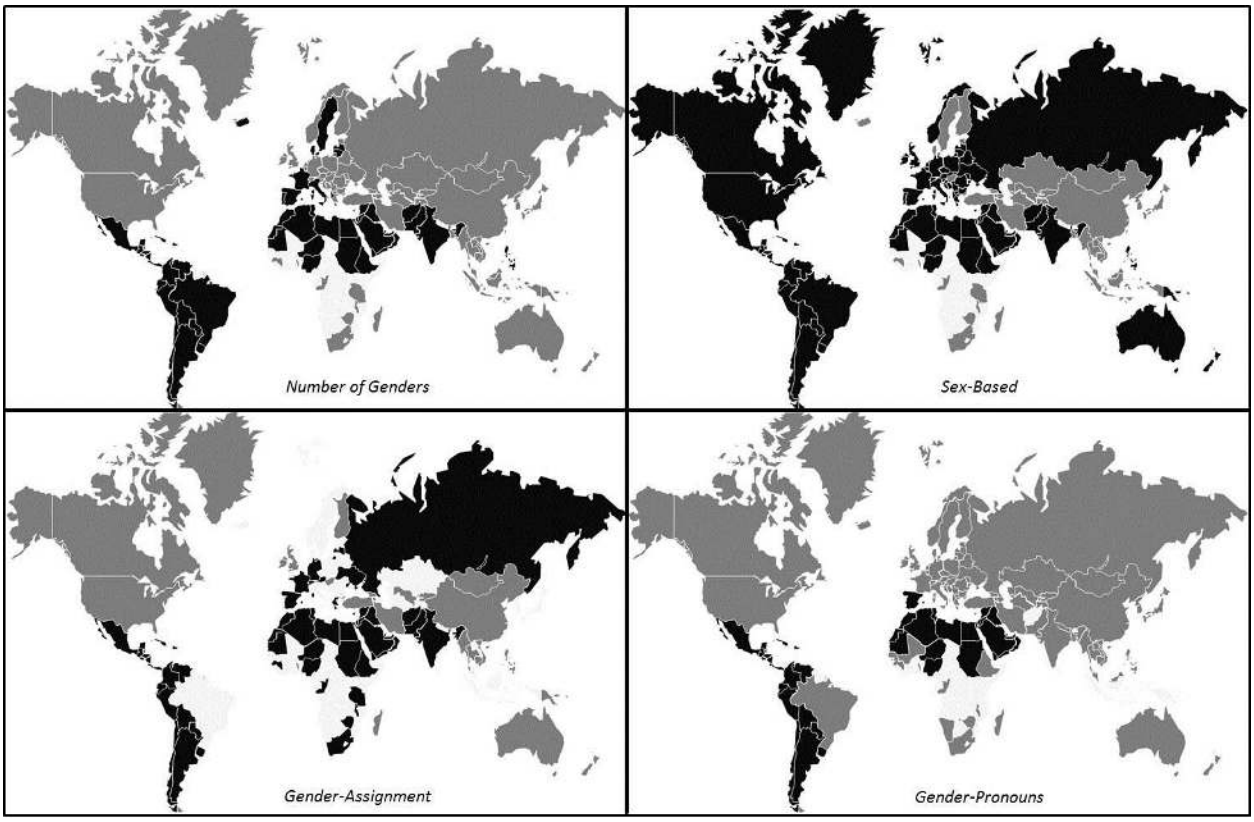
Zelezny, L. C., Chua, P. -P., & Aldrich, C. (2000). Elaborating on gender differences in environmentalism, *Journal of Social Issues*, *56*, 443–457.

Zhang, J. Q., Zhu, H., & Ding, H. (2013). Board composition and corporate social responsibility: an empirical investigation in the post Sarbanes-Oxley era. *Journal of Business Ethics*, *114*(3), 381–392.

Zhang Y., & Rajagopalan, N. (2010). Once an outsider, always an outsider? CEO origin, strategic change, and 41 firm performance. *Strategic Management Journal, 31*(3), 334-346.

## Appendix A

The source of this appendix is Gay at el. (2013). The maps in Figure 1 show the gender structure distribution for each country's dominant language.




Appendix A Figure 1: The four gender structure Intensity. For black countries, Dummy = 1.

Table A.1 presents a dataset extract that includes the seven indices.

[Table A.1 here]

We use four individual variables and three indices since (a) they contain different and complementary information; e.g., only 34% of languages have SB=1 and GP=1; and (b) because using different variables allows a bigger sample and different samples, as robustness checks.

Table 2 shows intensity indices across linguistic families and within the Indo-European subfamily. NC denotes the number of countries for which the dominant language belongs to the family and NL denotes the number of different languages in the family. Linguistic structures are

shown to vary widely across and within families. Thus, grammatical gender structures capture more than geographical or historical forces.

[Table A.2 here]

## Appendix B: Principal Component Factor Analysis

| Individual Language Index | Factor 1 (GII Factor) | Uniqueness |
|---|---|---|
| NG | 0. 9267 | 0. 1423 |
| SB | 0. 8021 | 0. 3567 |
| GA | 0. 8420 | 0. 2910 |
| GP | 0. 8747 | 0. 2350 |

## Appendix C: Location of Organizations in the Sample

| Country | Freq. | Percent | Country | Freq. | Percent |
|---|---|---|---|---|---|
| United States | 5,808 | 32. 49 | Korea | 68 | 0. 38 |
| United Kingdom | 1,822 | 10. 19 | Jersey | 65 | 0. 36 |
| Australia | 1,594 | 8. 92 | Malaysia | 59 | 0. 33 |
| Canada | 1,439 | 8. 05 | Chile | 54 | 0. 3 |
| France | 562 | 3. 14 | Turkey | 53 | 0. 3 |
| Germany | 511 | 2. 86 | New Zealand | 52 | 0. 29 |
| Japan | 500 | 2. 8 | Luxembourg | 51 | 0. 29 |
| Switzerland | 440 | 2. 46 | Israel | 50 | 0. 28 |
| India | 364 | 2. 04 | Philippines | 46 | 0. 26 |
| Sweden | 293 | 1. 64 | Thailand | 42 | 0. 23 |
| Bermuda | 291 | 1. 63 | Guernsey | 19 | 0. 11 |
| Italy | 283 | 1. 58 | Panama | 17 | 0. 1 |
| Spain | 270 | 1. 51 | Czech Republic | 16 | 0. 09 |
| South Africa | 248 | 1. 39 | British Virgin Islands | 15 | 0. 08 |
| Netherlands | 247 | 1. 38 | Egypt | 15 | 0. 08 |
| Hong Kong | 246 | 1. 38 | Colombia | 14 | 0. 08 |
| China | 237 | 1. 33 | Indonesia | 14 | 0. 08 |
| Cayman Islands | 215 | 1. 2 | Isle of Man | 13 | 0. 07 |
| Singapore | 209 | 1. 17 | Cyprus | 11 | 0. 06 |
| Brazil | 178 | 1 | Morocco | 11 | 0. 06 |
| Finland | 170 | 0. 95 | Hungary | 9 | 0. 05 |
| Denmark | 167 | 0. 93 | Papua New Guinea | 9 | 0. 05 |
| Ireland | 153 | 0. 86 | United Arab Emirates | 8 | 0. 04 |
| Belgium | 148 | 0. 83 | Gibraltar | 6 | 0. 03 |
| Austria | 109 | 0. 61 | Iceland | 6 | 0. 03 |
| Russian Federation | 107 | 0. 6 | Mauritius | 6 | 0. 03 |
| Norway | 106 | 0. 59 | Marshall Islands | 5 | 0. 03 |
| Taiwan; Republic of China | 100 | 0. 56 | Nigeria | 4 | 0. 02 |
| Greece | 90 | 0. 5 | Malta | 2 | 0. 01 |
| Poland | 81 | 0. 45 | Oman | 1 | 0. 01 |
| Portugal | 75 | 0. 42 | Saudi Arabia | 1 | 0. 01 |
| Mexico | 72 | 0. 4 | Total | 17,877 | 100 |

| Language | Freq. | Percent | Language | Freq. | Percent |
|---|---|---|---|---|---|
| English | 10,868 | 64. 55 | Greek | 101 | 0. 6 |
| German | 1,060 | 6. 3 | Polish | 81 | 0. 48 |
| French | 562 | 3. 34 | Korean | 68 | 0. 4 |
| Japanese | 500 | 2. 97 | Malay | 59 | 0. 35 |
| Mandarin | 446 | 2. 65 | Turkish | 53 | 0. 31 |
| Spanish | 427 | 2. 54 | Hebrew | 50 | 0. 3 |
| Dutch | 395 | 2. 35 | Tagalog | 46 | 0. 27 |
| Hindi | 364 | 2. 16 | Thai | 42 | 0. 25 |
| Swedish | 293 | 1. 74 | Arabic | 36 | 0. 21 |
| Italian | 283 | 1. 68 | Czech | 16 | 0. 1 |
| Portuguese | 253 | 1. 5 | Javanese | 14 | 0. 08 |
| Zulu | 248 | 1. 47 | Hungarian | 9 | 0. 05 |
| Finnish | 170 | 1. 01 | Icelandic | 6 | 0. 04 |
| Danish | 167 | 0. 99 | Hausa | 4 | 0. 02 |
| Russian | 107 | 0. 64 | Maltese | 2 | 0. 01 |
| Norwegian | 106 | 0. 63 | Total | 16,836 | 100 |

## Appendix D: Classification by GRI Application Level

| Application Level | # of obs. | Dummy | 3 Categories | 5 Categories |
|---|---|---|---|---|
| A or A+ | 833 | | | 5 |
| B or B+ | 597 | | 3 | 4 |
| C or C+ | 408 | 1 | | 3 |
| Undeclared Report | 996 | | | |
| GRI-Referenced Report | 277 | | 2 | 2 |
| Non-GRI Report | 555 | | | |
| No Report | 3961 | 0 | 1 | 1 |
| **Total** | **7627** | | | |

## Appendix E: Controlling for CEO characteristics

We employed the multivariate OLS regression models where a dependent variable is EN rank while the ratio of women on the board of directors and two other dummy variables indicating women's presence on boards were used interchangeably as explanatory variables, while controlling for CEO age and tenure. All regressions included industry and year dummies. The Standard errors clustered at the country are in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

| Models | (1) | (2) | (3) |
|---|---|---|---|
| women_ratio | 0.362*** | | |
| | (0.037) | | |
| women_dir_yes | | 6.252*** | |
| | | (1.029) | |
| women_3dir_yes | | | 6.969*** |
| | | | (1.822) |
| f_ratio_wage | -90.540*** | -89.530*** | -88.834*** |
| | (21.640) | (20.939) | (21.610) |
| secondary_ratio | 0.935** | 0.951** | 0.939** |
| | (0.358) | (0.355) | (0.352) |
| tot_sd | 1.299*** | 1.183** | 1.272*** |
| | (0.457) | (0.457) | (0.462) |
| tot_ned | 0.300 | 0.390 | 0.511 |
| | (0.494) | (0.514) | (0.517) |
| ceo_chair_yes | 0.185 | 0.277 | 0.111 |
| | (1.911) | (2.003) | (2.002) |
| ln_avg_net_size | 10.946*** | 11.208*** | 11.789*** |
| | (2.420) | (2.563) | (2.553) |
| ln_avg_time_in_role | 1.585 | 1.778 | 2.289 |
| | (3.149) | (3.146) | (3.192) |
| ln_avg_age | 0.381 | -3.951 | -6.254 |
| | (19.684) | (19.837) | (19.820) |
| Gdp | -0.019*** | -0.019*** | -0.019*** |
| | (0.003) | (0.003) | (0.003) |
| Gdppc | 0.301 | 0.438 | 0.429 |
| | (0.626) | (0.635) | (0.637) |
| Log (CEO age) | 8.767 | 9.639 | 9.221 |
| | (6.139) | (6.112) | (5.891) |
| Log (CEO tenure) | -1.335*** | -1.500*** | -1.587*** |
| | (0.447) | (0.448) | (0.470) |
| Constant | -89.205 | -80.087 | -70.719 |
| | (91.162) | (92.168) | (90.245) |
| Industry-fixed effect | YES | YES | YES |
| Year-fixed effect | YES | YES | YES |
| Observations | 12,413 | 12,413 | 12,413 |
| R-squared | 0.446 | 0.441 | 0.436 |
| Adj R-squared | 0.443 | 0.437 | 0.433 |

Table 1

*Board members interviewed in three countries*

| | Israel | Netherlands | UK |
|---|---|---|---|
| Male | 1 | 1 | 1 |
| Female | 4 | 2 | 2 |
| Financial sector | 2 | 2 | 1 |
| Government | 1 | 0 | 0 |
| High tech | 1 | 0 | 0 |
| Manufacturing | 0 | 1 | 0 |
| Service sector | 0 | 0 | 2 |
| **Total** | 5 | 3 | 3 |

Table 2

*Summary statistics of variables used in the empirical work.*

| **Variable** | **Obs** | **Mean** | **Std. Dev.** | **Min** | **Max** |
|---|---|---|---|---|---|
| EN Rank | 17,877 | 50. 49 | 28. 71 | 0. 00 | 100. 00 |
| Women Ratio | 17,877 | 11. 47 | 10. 52 | 0. 00 | 66. 67 |
| Women_dir_yes/no | 17,877 | 0. 68 | 0. 46 | 0. 00 | 1. 00 |
| Women_3dir_yes/no | 17,877 | 0. 05 | 0. 21 | 0. 00 | 1. 00 |
| tot_sd | 17,877 | 8. 30 | 3. 40 | 0. 00 | 31. 00 |
| tot_ned | 17,877 | 6. 18 | 3. 22 | 0. 00 | 27. 00 |
| ceo_chair_Y/N (Dummry) | 17,877 | 0. 45 | 0. 50 | 0. 00 | 1. 00 |
| ln_avg_net_size | 17,877 | 6. 11 | 0. 80 | 1. 79 | 8. 09 |
| ln_avg_time_in_role | 17,825 | 1. 73 | 0. 46 | 0. 00 | 3. 46 |
| ln_avg_age | 17,786 | 4. 09 | 0. 08 | 3. 37 | 4. 52 |
| f_ratio_wage | 16,893 | 65. 31 | 6. 71 | 39. 00 | 85. 00 |
| secondary_ratio | 15,831 | 99. 60 | 2. 97 | 85. 65 | 113. 45 |
| GII | 14,593 | 1. 27 | 0. 80 | 0. 00 | 4. 00 |
| GII Factor | 14,593 | -0. 76 | 0. 49 | -1. 56 | 0. 91 |
| Conditional GII | 14,593 | 0. 32 | 0. 75 | 0. 00 | 3. 00 |
| ln_mktcap | 3,538 | 8. 18 | 1. 96 | 0. 00 | 13. 07 |
| ln_revenue | 3,538 | 7. 55 | 2. 36 | 0. 00 | 14. 21 |
| gdp | 16,893 | 644. 86 | 646. 72 | 0. 78 | 1676. 81 |
| gdppc | 16,893 | 4. 49 | 1. 59 | 0. 10 | 11. 37 |
| globe | 16,893 | 4. 13 | 0. 49 | 2. 88 | 5. 37 |
| Masnew | 16,893 | 5. 87 | 1. 40 | 0. 50 | 9. 50 |
| Masold | 16,893 | 6. 44 | 1. 51 | 2. 10 | 11. 20 |

Table 3

*OLS regressions (effect of women's presence on the BOD on environmental sustainability)*

We employed the multivariate OLS regression models where a dependent variable is EN rank while the ratio of women on the board of directors and two other dummy variables indicating women's presence on boards were used interchangeably as explanatory variables, along with other control variables. All regressions included industry and year dummies. The standard errors clustered at the country level are in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

| Models | (1) | (2) | (3) |
|---|---|---|---|
| women_ratio | 0. 422*** | | |
| | (0. 046) | | |
| women_dir_yes | | 7. 277*** | |
| | | (1. 080) | |
| women_3dir_yes | | | 9. 149*** |
| | | | (2. 196) |
| f_ratio_wage | -0. 801*** | -0. 761*** | -0. 755*** |
| | (0. 199) | (0. 200) | (0. 207) |
| secondary_ratio | 1. 129*** | 1. 209*** | 1. 234*** |
| | (0. 396) | (0. 395) | (0. 391) |
| tot_sd | 1. 534*** | 1. 434*** | 1. 529*** |
| | (0. 444) | (0. 432) | (0. 449) |
| tot_ned | 0. 145 | 0. 221 | 0. 375 |
| | (0. 455) | (0. 459) | (0. 470) |
| ceo_chair_yes | 0. 667 | 0. 696 | 0. 561 |
| | (1. 681) | (1. 785) | (1. 776) |

| | | | |
|---|---|---|---|
| ln_avg_net_size | 9. 242*** | 9. 397*** | 10. 030*** |
| | (2. 418) | (2. 516) | (2. 512) |
| ln_avg_time_in_role | -0. 460 | -0. 580 | -0. 141 |
| | (3. 351) | (3. 348) | (3. 354) |
| ln_avg_age | 11. 110 | 6. 653 | 4. 171 |
| | (23. 664) | (23. 618) | (23. 662) |
| Gdp | -0. 018*** | -0. 018*** | -0. 018*** |
| | (0. 003) | (0. 003) | (0. 003) |
| Gdppc | 0. 614 | 0. 942 | 0. 909 |
| | (0. 520) | (0. 582) | (0. 546) |
| Constant | -114. 442 | -109. 496 | -104. 529 |
| | (96. 981) | (98. 102) | (96. 739) |
| Industry-fixed effect | YES | YES | YES |
| Year-fixed effect | YES | YES | YES |
| Observations | 15,765 | 15,765 | 15,765 |
| R-squared | 0. 423 | 0. 414 | 0. 409 |
| Adj R-squared | 0. 420 | 0. 412 | 0. 406 |

Table 4

*OLS regressions using two sets of sub-samples*

We employed the same multivariate OLS regression models as in Table 3 using two sub-samples. For Model (1) to (3), we used non-US company sub-sample where we excluded all US companies from the full sample. For Model (4) to (6), we focused only on companies which operate in non-English speaking countries. All regressions included industry and year dummies. The standard errors clustered at the country level are in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Sub-sample | No USA | | | No English | | |
| women_ratio | 0. 450*** | | | 0. 310*** | | |
| | (0. 063) | | | (0. 073) | | |
| women_dir_yes | | 8. 233*** | | | 4. 036** | |
| | | (1. 385) | | | (1. 595) | |
| women_3dir_yes | | | 8. 799*** | | | 9. 352*** |
| | | | (2. 857) | | | (2. 642) |
| f_ratio_wage | -0. 726*** | -0. 688*** | -0. 680*** | -0. 424** | -0. 376* | -0. 380** |
| | (0. 229) | (0. 225) | (0. 230) | (0. 183) | (0. 190) | (0. 188) |
| secondary_ratio | 1. 206*** | 1. 296*** | 1. 324*** | 0. 521 | 0. 624* | 0. 640* |
| | (0. 342) | (0. 364) | (0. 365) | (0. 355) | (0. 361) | (0. 373) |
| tot_sd | 1. 446*** | 1. 338*** | 1. 478*** | 0. 998** | 0. 935** | 0. 910* |
| | (0. 359) | (0. 353) | (0. 379) | (0. 452) | (0. 442) | (0. 456) |
| tot_ned | 0. 190 | 0. 230 | 0. 386 | 0. 355 | 0. 433 | 0. 449 |
| | (0. 300) | (0. 290) | (0. 340) | (0. 334) | (0. 348) | (0. 364) |
| ceo_chair_yes | -2. 234 | -2. 458 | -2. 480 | -2. 148 | -2. 458 | -2. 138 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | (1. 761) | (1. 733) | (1. 781) | (2. 521) | (2. 455) | (2. 540) |
| ln_avg_net_size | 7. 313*** | 7. 184*** | 7. 878*** | 5. 398*** | 5. 600*** | 5. 691*** |
| | (1. 755) | (1. 757) | (1. 778) | (1. 731) | (1. 785) | (1. 739) |
| ln_avg_time_in_role | -0. 699 | -0. 944 | -0. 658 | -2. 826 | -2. 755 | -2. 632 |
| | (2. 505) | (2. 502) | (2. 511) | (3. 016) | (3. 008) | (3. 031) |
| ln_avg_age | 18. 659 | 14. 817 | 10. 960 | 44. 202** | 38. 592* | 38. 710* |
| | (19. 807) | (19. 761) | (20. 103) | (21. 705) | (22. 287) | (22. 489) |
| gdp | 0. 019 | 0. 017 | 0. 015 | 0. 012 | 0. 011 | 0. 010 |
| | (0. 020) | (0. 020) | (0. 020) | (0. 019) | (0. 019) | (0. 018) |
| gdppc | 1. 316* | 1. 635** | 1. 594** | 2. 645*** | 2. 959*** | 2. 834*** |
| | (0. 740) | (0. 792) | (0. 748) | (0. 826) | (0. 858) | (0. 824) |
| Constant | -155. 271* | -151. 618* | -140. 817 | -188. 278** | -180. 131* | -179. 513* |
| | (87. 974) | (90. 192) | (89. 452) | (89. 105) | (91. 753) | (91. 690) |
| Industry-fixed effect | YES | YES | YES | YES | YES | YES |
| Year-fixed effect | YES | YES | YES | YES | YES | YES |
| Observations | 9,977 | 9,977 | 9,977 | 5,120 | 5,120 | 5,120 |
| R-squared | 0. 391 | 0. 382 | 0. 372 | 0. 388 | 0. 380 | 0. 384 |
| Adj R-squared | 0. 387 | 0. 378 | 0. 367 | 0. 379 | 0. 371 | 0. 376 |

Table 5

*OLS regressions using firm-specific variables.*

We employed the same multivariate OLS regression models as in Table 3 and 4 after adding firm-specific variables. All regressions included industry and year dummies. The standard errors clustered at the country level are in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

| Panel A. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| Sample | | **All** | | | **No USA** | | | **No English** | |
| women_ratio | 0. 352*** | | | 0. 294*** | | | 0. 325*** | | |
| | (0. 057) | | | (0. 059) | | | (0. 083) | | |
| women_dir_yes | | 5. 732*** | | | 5. 317*** | | | 2. 956 | |
| | | (0. 971) | | | (1. 390) | | | (2. 206) | |
| women_3dir_yes | | | 5. 392*** | | | 5. 140** | | | 7. 832*** |
| | | | (1. 428) | | | (2. 075) | | | (2. 219) |
| f_ratio_wage | -0. 515*** | -0. 535*** | -0. 521*** | -0. 519*** | -0. 538*** | -0. 524*** | -0. 430*** | -0. 436*** | -0. 420*** |
| | (0. 136) | (0. 137) | (0. 141) | (0. 147) | (0. 151) | (0. 153) | (0. 124) | (0. 141) | (0. 136) |
| secondary_ratio | 0. 679** | 0. 793** | 0. 786** | 0. 845*** | 0. 946*** | 0. 932*** | -0. 104 | 0. 052 | 0. 015 |
| | (0. 316) | (0. 303) | (0. 308) | (0. 309) | (0. 299) | (0. 305) | (0. 252) | (0. 284) | (0. 281) |
| tot_sd | 1. 265*** | 1. 195*** | 1. 206*** | 1. 305*** | 1. 246*** | 1. 238*** | 1. 064*** | 1. 058*** | 0. 924*** |
| | (0. 335) | (0. 333) | (0. 334) | (0. 339) | (0. 333) | (0. 347) | (0. 285) | (0. 267) | (0. 302) |
| tot_ned | 0. 492 | 0. 557 | 0. 670 | 0. 103 | 0. 127 | 0. 208 | 0. 312 | 0. 386 | 0. 391 |
| | (0. 416) | (0. 438) | (0. 451) | (0. 316) | (0. 310) | (0. 332) | (0. 249) | (0. 260) | (0. 267) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ceo_chair_yes | 1. 285 | 1. 406 | 1. 081 | 1. 224 | 1. 155 | 0. 764 | 0. 190 | -0. 049 | 0. 057 |
| | (0. 923) | (0. 950) | (0. 995) | (1. 729) | (1. 711) | (1. 760) | (2. 679) | (2. 706) | (2. 738) |
| ln_avg_net_size | 7. 401*** | 7. 580*** | 7. 956*** | 6. 939*** | 6. 925*** | 7. 184*** | 5. 317*** | 5. 773*** | 5. 686*** |
| | (1. 310) | (1. 287) | (1. 334) | (1. 494) | (1. 423) | (1. 461) | (1. 701) | (1. 746) | (1. 753) |
| ln_avg_time_in_role | 2. 114 | 1. 705 | 1. 882 | -0. 422 | -0. 950 | -0. 961 | -2. 360 | -2. 436 | -2. 296 |
| | (2. 139) | (2. 208) | (2. 302) | (2. 035) | (1. 976) | (1. 972) | (2. 610) | (2. 523) | (2. 553) |
| ln_avg_age | -12. 581 | -15. 921* | -17. 705** | -8. 803 | -10. 935 | -12. 795 | 16. 566 | 10. 581 | 11. 309 |
| | (8. 100) | (8. 275) | (8. 341) | (10. 293) | (10. 316) | (10. 222) | (15. 083) | (15. 325) | (15. 165) |
| gdp | **-0. 017*** ** | **-0. 018*** ** | **-0. 018*** ** | **-0. 013** | **-0. 013** | **-0. 014** | **-0. 013** | **-0. 013** | **-0. 015*** |
| | **(0. 002)** | **(0. 002)** | **(0. 002)** | **(0. 011)** | **(0. 010)** | **(0. 010)** | **(0. 008)** | **(0. 008)** | **(0. 008)** |
| gdppc | **0. 755** | **1. 213*** | **1. 166*** | **1. 239*** | **1. 624**** | **1. 550**** | **2. 227***** | **2. 742***** | **2. 564***** |
| | **(0. 639)** | **(0. 646)** | **(0. 645)** | **(0. 677)** | **(0. 698)** | **(0. 674)** | **(0. 779)** | **(0. 765)** | **(0. 723)** |
| ln_mktcap | 2. 286*** | 2. 446*** | 2. 418*** | 2. 426*** | 2. 594*** | 2. 619*** | 1. 348 | 1. 502 | 1. 255 |
| | (0. 644) | (0. 657) | (0. 679) | (0. 782) | (0. 785) | (0. 804) | (1. 004) | (0. 995) | (1. 003) |
| ln_revenue | 2. 483*** | 2. 526*** | 2. 621*** | 2. 331*** | 2. 336*** | 2. 436*** | 1. 744* | 1. 718* | 1. 691* |
| | (0. 680) | (0. 705) | (0. 713) | (0. 763) | (0. 780) | (0. 784) | (0. 963) | (0. 979) | (0. 967) |
| Constant | -2. 363 | -1. 302 | 5. 560 | -24. 425 | -25. 812 | -16. 404 | -23. 087 | -14. 855 | -11. 353 |
| | (49. 576) | (51. 693) | (52. 114) | (62. 155) | (64. 066) | (63. 600) | (83. 128) | (84. 452) | (83. 885) |
| Industry-fixed effect | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Year-fixed effect | YES | YES | YES | YES | YES | YES | YES | YES | YES |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Observations | 2,531 | 2,531 | 2,531 | 1,583 | 1,583 | 1,583 | 813 | 813 | 813 |
| R-squared | 0. 516 | 0. 508 | 0. 504 | 0. 494 | 0. 489 | 0. 486 | 0. 471 | 0. 460 | 0. 465 |
| Adj R-squared | 0. 503 | 0. 495 | 0. 491 | 0. 472 | 0. 467 | 0. 464 | 0. 426 | 04 | 0. 420 |

Table 6

*Ordered Logit Regressions using GRI as the dependent variable.*

We employed Ordered Logit regression models where dependent variables represent a company's disclosure level of its sustainability activities. For Model (1) to (3), we used a GRI dummy, which has a value of one if a reporting company issues its sustainability report and zero otherwise. For Model (4) to (6), we used 3 categories for the level of disclosure while we further disaggregated the level of disclosure into 5 categories for Model (7) to (9). All regressions included industry and year dummies. The standard errors clustered at the country level are in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| **Sample** | **GRI Dummy** | | | **GRI_3 (3 Categories)** | | | **GRI_5 (5 Categories)** | | |
| **women_ratio** | **1. 020*** ** | | | **1. 016*** ** | | | **1. 015*** ** | | |
| | **(0. 003)** | | | **(0. 003)** | | | **(0. 003)** | | |
| **women_dir_yes** | | **1. 290*** ** | | | **1. 240*** ** | | | **1. 218*** ** | |
| | | **(0. 103)** | | | **(0. 092)** | | | **(0. 090)** | |
| **women_3dir_yes** | | | **1. 877*** ** | | | **1. 528*** ** | | | **1. 465*** ** |
| | | | **(0. 218)** | | | **(0. 150)** | | | **(0. 137)** |
| f_ratio_wage | 1. 026 | 1. 351 | 1. 351 | 0. 827 | 1. 010 | 1. 069 | 0. 501* | 0. 611 | 0. 650 |
| | (0. 461) | (0. 599) | (0. 601) | (0. 332) | (0. 402) | (0. 426) | (0. 198) | (0. 239) | (0. 254) |
| secondary_ratio | 1. 016 | 1. 024** | 1. 024** | 1. 012 | 1. 019** | 1. 019** | 0. 998 | 1. 005 | 1. 005 |
| | (0. 011) | (0. 011) | (0. 011) | (0. 009) | (0. 009) | (0. 009) | (0. 009) | (0. 009) | (0. 009) |
| tot_sd | 1. 055*** | 1. 051*** | 1. 048*** | 1. 068*** | 1. 064*** | 1. 062*** | 1. 075*** | 1. 072*** | 1. 069*** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (0. 010) | (0. 010) | (0. 010) | (0. 009) | (0. 010) | (0. 010) | (0. 009) | (0. 010) | (0. 010) |
| tot_ned | 1. 017 | 1. 024** | 1. 029** | 1. 017 | 1. 022* | 1. 026** | 1. 009 | 1. 013 | 1. 017 |
| | (0. 012) | (0. 012) | (0. 012) | (0. 011) | (0. 011) | (0. 011) | (0. 011) | (0. 011) | (0. 011) |
| ceo_chair_yes | 0. 966 | 0. 964 | 0. 960 | 1. 025 | 1. 022 | 1. 019 | 1. 063 | 1. 061 | 1. 059 |
| | (0. 062) | (0. 062) | (0. 062) | (0. 060) | (0. 060) | (0. 060) | (0. 062) | (0. 062) | (0. 062) |
| ln_avg_net_size | 1. 311*** | 1. 329*** | 1. 347*** | 1. 387*** | 1. 406*** | 1. 422*** | 1. 465*** | 1. 482*** | 1. 499*** |
| | (0. 064) | (0. 065) | (0. 065) | (0. 062) | (0. 063) | (0. 063) | (0. 065) | (0. 066) | (0. 066) |
| ln_avg_time_in_role | 0. 995 | 1. 010 | 1. 028 | 1. 037 | 1. 050 | 1. 065 | 1. 039 | 1. 051 | 1. 063 |
| | (0. 075) | (0. 076) | (0. 077) | (0. 072) | (0. 073) | (0. 073) | (0. 071) | (0. 072) | (0. 072) |
| ln_avg_age | 10. 749*** | 6. 448*** | 7. 096*** | 5. 437*** | 3. 654*** | 3. 728*** | 8. 285*** | 5. 668*** | 5. 854*** |
| | (5. 535) | (3. 257) | (3. 567) | (2. 529) | (1. 672) | (1. 691) | (3. 799) | (2. 557) | (2. 619) |
| gdp | 0. 999*** | 0. 999*** | 0. 999*** | 0. 999*** | 0. 999*** | 0. 999*** | 0. 999*** | 0. 999*** | 0. 999*** |
| | (0. 000) | (0. 000) | (0. 000) | (0. 000) | (0. 000) | (0. 000) | (0. 000) | (0. 000) | (0. 000) |
| gdppc | 0. 919*** | 0. 939*** | 0. 935*** | 0. 954*** | 0. 970* | 0. 968* | 0. 925*** | 0. 940*** | 0. 938*** |
| | (0. 018) | (0. 018) | (0. 018) | (0. 017) | (0. 017) | (0. 017) | (0. 016) | (0. 016) | (0. 016) |
| **Industry-fixed effect** | **YES** | **YES** | **YES** | **YES** | **YES** | **YES** | **YES** | **YES** | **YES** |
| **Year-fixed effect** | **YES** | **YES** | **YES** | **YES** | **YES** | **YES** | **YES** | **YES** | **YES** |
| Observations | 6,814 | 6,814 | 6,814 | 6,814 | 6,814 | 6,814 | 6,763 | 6,763 | 6,763 |
| Pseudo R-squared | 0. 162 | 0. 159 | 0. 161 | 0. 113 | 0. 112 | 0. 112 | 0. 0992 | 0. 0980 | 0. 0985 |

Table 7

*OLS regressions (Effect of grammatical gender marking on women presence on board)*

We employ the first-stage IV regression models where the women ratio is used as a dependent variable. GII is calculated as the sum of NG, SB, GA and GP. We obtain GII factor by conducting a principal component factor analysis on four individual language indices (NGI, GA, GP and SB). Conditional GII is an interaction of SB with the sum of NG, GA and GP. All regressions included industry and year dummies. The standard errors clustered at the country level are in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| **Sample** | | **All** | | | **No USA** | | | **No English** | |
| GII | -1. 629*** | | | -2. 387*** | | | -2. 422*** | | |
| | (0. 158) | | | (0. 179) | | | (0. 198) | | |
| GII Factor | | -2. 663*** | | | -3. 871*** | | | -3. 906*** | |
| | | (0. 256) | | | (0. 290) | | | (0. 320) | |
| Conditional GII | | | -1. 138*** | | | -1. 870*** | | | -2. 569*** |
| | | | (0. 185) | | | (0. 208) | | | (0. 238) |
| f_ratio_wage | -0. 120*** | -0. 122*** | -0. 0717*** | -0. 185*** | -0. 187*** | -0. 128*** | -0. 148*** | -0. 149*** | -0. 109*** |
| | (0. 0190) | (0. 0191) | (0. 0196) | (0. 0210) | (0. 0211) | (0. 0216) | (0. 0278) | (0. 0279) | (0. 0272) |
| secondary_ratio | 0. 210*** | 0. 207*** | 0. 233*** | 0. 227*** | 0. 223*** | 0. 258*** | 0. 493*** | 0. 487*** | 0. 565*** |
| | (0. 0289) | (0. 0289) | (0. 0289) | (0. 0306) | (0. 0307) | (0. 0307) | (0. 0415) | (0. 0416) | (0. 0412) |
| tot_sd | 0. 293*** | 0. 293*** | 0. 280*** | 0. 449*** | 0. 449*** | 0. 426*** | 0. 227*** | 0. 226*** | 0. 188*** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (0. 0307) | (0. 0307) | (0. 0311) | (0. 0350) | (0. 0350) | (0. 0355) | (0. 0452) | (0. 0452) | (0. 0452) |
| tot_ned | 0. 665*** | 0. 665*** | 0. 669*** | 0. 533*** | 0. 534*** | 0. 555*** | 0. 272*** | 0. 274*** | 0. 294*** |
| | (0. 0360) | (0. 0360) | (0. 0362) | (0. 0442) | (0. 0441) | (0. 0446) | (0. 0570) | (0. 0570) | (0. 0572) |
| ceo_chair_yes | 0. 522*** | 0. 524*** | 0. 496*** | 0. 323 | 0. 327 | 0. 221 | 0. 719* | 0. 715* | 0. 734** |
| | (0. 173) | (0. 173) | (0. 174) | (0. 249) | (0. 249) | (0. 251) | (0. 368) | (0. 368) | (0. 370) |
| ln_avg_net_size | 2. 268*** | 2. 272*** | 2. 217*** | 1. 547*** | 1. 554*** | 1. 387*** | 1. 785*** | 1. 794*** | 1. 721*** |
| | (0. 131) | (0. 131) | (. 132) | (0. 161) | (0. 162) | (0. 162) | (0. 256) | (0. 256) | (0. 257) |
| ln_avg_time_in_role | 0. 795*** | 0. 796*** | 0. 744*** | 0. 432* | 0. 432* | 0. 328 | 0. 931** | 0. 928** | 0. 797* |
| | (0. 193) | (0. 193) | (0. 194) | (0. 255) | (0. 255) | (0. 256) | (0. 408) | (0. 408) | (0. 411) |
| ln_avg_age | -13. 78*** | -13. 76*** | -14. 50*** | -13. 46*** | -13. 45*** | -14. 00*** | -16. 60*** | -16. 59*** | -15. 78*** |
| | (1. 283) | (1. 283) | (1. 290) | (1. 606) | (1. 606) | (1. 625) | (2. 463) | (2. 464) | (2. 510) |
| gdp | -0. 00139*** | -0. 00140*** | -0. 00125*** | -0. 0114*** | -0. 0114*** | -0. 00920*** | -0. 0103*** | -0. 0102*** | -0. 00838*** |
| | (0. 000168) | (0. 000168) | (0. 000171) | (0. 000980) | (0. 000979) | (0. 000966) | (0. 00112) | (0. 00112) | (0. 00108) |
| gdppc | 0. 241*** | 0. 241*** | 0. 241*** | 0. 0719 | 0. 0728 | 0. 0856 | 0. 431*** | 0. 433*** | 0. 439*** |
| | (0. 0612) | (0. 0612) | (0. 0637) | (0. 0680) | (0. 0680) | (0. 0711) | (0. 0840) | (0. 0840) | (0. 0849) |
| Constant | 29. 64*** | 25. 82*** | 25. 86*** | 39. 88*** | 34. 26*** | 33. 29*** | 28. 50*** | 23. 06** | 14. 41 |
| | (6. 242) | (6. 224) | (6. 242) | (7. 572) | (7. 554) | (7. 599) | (10. 88) | (10. 89) | (11. 01) |
| Industry-fixed effect | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Year-fixed effect | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Observations | 13,904 | 13,904 | 13,904 | 8,116 | 8,116 | 8,116 | 3,259 | 3,259 | 3,259 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| R-squared | 0. 250 | 0. 250 | 0. 246 | 0. 250 | 0. 250 | 0. 241 | 0. 290 | 0. 290 | 0. 283 |

Table 8

*IV Regressions (Grammatical gender markings as instrumental variables).*

In the IV regression, we regressed the predicted value of the women ratio obtained from the OLS regressions in Table 7 against the EN rank of a company. All regressions included industry and year dummies. The standard errors clustered at the country level are in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| **Sample** | | **All** | | | **No USA** | | | **No English** | |
| Instrumental Variable | GII | GII Factor | Conditional GII | GII | GII Factor | Conditional GII | GII | GII Factor | Conditional GII |
| Predicted value of women ratio | 2. 072*** | 2. 048*** | 2. 854*** | 1. 004*** | 0. 994*** | 1. 249*** | 0. 988*** | 0. 993*** | 0. 983*** |
| | (0. 278) | (0. 273) | (0. 548) | (0. 175) | (0. 174) | (0. 266) | (0. 192) | (0. 193) | (0. 217) |
| f_ratio_wage | -0. 817*** | -0. 817*** | -0. 827*** | -0. 816*** | -0. 816*** | -0. 819*** | -0. 557*** | -0. 558*** | -0. 557*** |
| | (0. 040) | (0. 040) | (0. 048) | (0. 035) | (0. 035) | (0. 036) | (0. 051) | (0. 051) | (0. 052) |
| secondary_ratio | 0. 450*** | 0. 456*** | 0. 263 | 0. 790*** | 0. 793*** | 0. 727*** | 0. 002 | -0. 001 | 0. 005 |
| | (0. 106) | (0. 105) | (0. 163) | (0. 084) | (0. 084) | (0. 101) | (0. 146) | (0. 147) | (0. 157) |
| tot_sd | 1. 434*** | 1. 440*** | 1. 248*** | 1. 571*** | 1. 575*** | 1. 487*** | 1. 714*** | 1. 713*** | 1. 715*** |
| | (0. 109) | (0. 108) | (0. 166) | (0. 100) | (0. 100) | (0. 123) | (0. 111) | (0. 111) | (0. 112) |
| tot_ned | -0. 691*** | -0. 674*** | -1. 235*** | 0. 033 | 0. 039 | -0. 120 | 0. 157 | 0. 155 | 0. 160 |
| | (0. 219) | (0. 216) | (0. 400) | (0. 150) | (0. 149) | (0. 197) | (0. 153) | (0. 153) | (0. 159) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ceo_chair_yes | 0. 090 | 0. 099 | -0. 199 | -1. 811*** | -1. 813*** | -1. 762*** | -0. 030 | -0. 032 | -0. 028 |
| | (0. 503) | (0. 501) | (0. 616) | (0. 573) | (0. 573) | (0. 593) | (0. 866) | (0. 867) | (0. 866) |
| ln_avg_net_size | 8. 623*** | 8. 678*** | 6. 871*** | 9. 435*** | 9. 449*** | 9. 098*** | 6. 995*** | 6. 986*** | 7. 002*** |
| | (0. 727) | (0. 718) | (1. 305) | (0. 446) | (0. 445) | (0. 534) | (0. 662) | (0. 663) | (0. 678) |
| ln_avg_time_in_role | 2. 709*** | 2. 728*** | 2. 119*** | 3. 336*** | 3. 340*** | 3. 245*** | 2. 713*** | 2. 707*** | 2. 719*** |
| | (0. 590) | (0. 586) | (0. 772) | (0. 598) | (0. 597) | (0. 621) | (0. 982) | (0. 983) | (0. 988) |
| ln_avg_age | 9. 304 | 8. 913 | 21. 774** | -0. 711 | -0. 880 | 3. 378 | 15. 070** | 15. 200** | 14. 954** |
| | (5. 719) | (5. 655) | (9. 730) | (4. 719) | (4. 707) | (5. 863) | (7. 189) | (7. 206) | (7. 555) |
| gdp | -0. 017*** | -0. 017*** | -0. 016*** | 0. 003 | 0. 003 | 0. 004* | -0. 010*** | -0. 010*** | -0. 010*** |
| | (0. 001) | (0. 001) | (0. 001) | (0. 002) | (0. 002) | (0. 003) | (0. 003) | (0. 003) | (0. 003) |
| gdppc | -0. 540*** | -0. 531*** | -0. 830*** | 0. 352** | 0. 355** | 0. 270 | 1. 331*** | 1. 327*** | 1. 334*** |
| | (0. 200) | (0. 198) | (0. 287) | (0. 163) | (0. 162) | (0. 180) | (0. 232) | (0. 233) | (0. 242) |
| Constant | -41. 911** | -41. 305** | -61. 223** | -46. 615** | -46. 281** | -54. 680*** | -37. 792 | -37. 949 | -37. 652 |
| | (19. 063) | (18. 942) | (24. 995) | (18. 533) | (18. 505) | (20. 187) | (26. 196) | (26. 218) | (26. 333) |
| Industry-fixed effect | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Year-fixed effect | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Observations | 13,904 | 13,904 | 13,904 | 8,116 | 8,116 | 8,116 | 3,259 | 3,259 | 3,259 |
| IV F-Stat | 105. 9 | 108. 2 | 37. 79 | 176. 8 | 178. 2 | 80. 73 | 150 | 148. 7 | 116. 1 |
| Durbin P-value | 0 | 0 | 6. 49e-11 | 0. 000346 | 0. 000413 | 0. 000659 | 0. 000788 | 0. 000742 | 0. 00341 |

Table A.1

*Dataset extract*

| Country | Language | NG | SB | GA | GP | GII |
|---|---|---|---|---|---|---|
| Argentina | Spanish | 1 | 1 | 1 | 1 | 4 |
| Armenia | Armenian | 0 | 0 | 0 | 0 | 0 |
| Australia | English | 0 | 1 | 0 | 0 | 1 |
| Austria | German | 0 | 1 | 1 | 0 | 2 |
| Azerbaijan | Azerbaijani | 0 | 0 | n/a | 0 | n/a |

Table A.2

*Indices variation*

| Family | $N^C$ | $N^L$ | NG | SB | GA | GP |
|---|---|---|---|---|---|---|
| Indo-European | 67 | 34 | 0. 48 | 0. 91 | 0. 79 | 0. 30 |
| Afro-Asiatic | 23 | 5 | 1 | 1 | 1 | 0. 95 |
| Niger-Congo | 10 | 10 | 0 | 0 | 0. 86 | 0 |
| Altaic | 7 | 7 | 0 | 0 | 0 | 0 |
| Austronesian | 7 | 7 | 0. 20 | 0. 20 | 0 | 0 |

| Indo-European | $N^C$ | $N^L$ | NG | SB | GA | GP |
|---|---|---|---|---|---|---|
| Romance | 25 | 5 | 0. 92 | 1 | 1 | 0. 79 |
| Germanic | 16 | 7 | 0. 13 | 0. 88 | 0. 36 | 0 |
| Slavic | 12 | 10 | 0 | 1 | 1 | 0 |
| Iranian | 3 | 3 | 0. 33 | 0. 33 | 0. 5 | 0 |