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The Socioemotional wealth perspective: preserving wealth, reputation or the environment?

A paper on the influence of family firms on the environmental performance of public firms.

Abstract

Environmental behavior has entered the center stage of the corporate landscape as companies have come under pressure due to their role in climate change. As a result of this increase in public awareness, companies have to find the right balance between making a profit without harming the environment; how to do well while doing good? Recent literature suggests that family firms are particularly well-positioned as they are partly governed by a socioemotional wealth perspective. This paper examines the influence of being a family firm on the environmental performance. I analyzed this relationship using a sample which consists of the largest public family and non-family firms in Europe. The findings of this paper support a significant negative relationship. I furthermore conduct a fsQCA analysis which results in five new configurations for both higher and lower environmental performance for global family firms.

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1. Introduction

Environmental behavior has entered the center stage of the corporate landscape. Companies have come under pressure from various stakeholders due to their role in climate change (Braam et al., 2016). Governments have decided to implement stricter regulations which force companies to reduce their emissions or to change their day-to-day operations. Public awareness has also increased and the societal cry for change has become louder and shareholders are taken this pressure seriously. Shareholders insist on more transparency and change with regards to the environmental behavior of their firms. At the annual meeting of shareholders in 2021, 30% of the shareholders base of Royal Dutch Shell demanded a more ambitious environmental vision for the future (Grol, 2021). However, this was just the tip of the iceberg as a national court ordered in a landmark case that Shell must slash its CO2 emissions since Shell was not in compliance with the Paris climate accord (Corder, 2021). The environmental behavior of firms has furthermore seen an increase in media attention, which forces firms to take action and improve their behavior (Flammer, 2013). As a result of this increase in public awareness, companies have to find the right balance between making a profit without harming the environment; how to do well while doing good (Guenster et al., 2011)?

Family firms, especially, are well-positioned to walk this line as certain characteristics set these firms apart from non-family firms. Family firms, for instance, could have alternative objectives, next to the obvious financial objectives, due to differences in their socioemotional wealth perspective (Dekker & Hasso, 2016). As a result, these firms might pursue strategies that are not necessarily driven by economic logic but rather by the family's preferences (Berrone et al., 2012). Environmental investments are an example of such a strategy since these expenditures are related to increased risk which might even be detrimental to the financial performance (Gómez-Mejía et al., 2007). These investment decisions could be explained by a family's desire to improve their reputation, their standing in the community or the state of the world (Berrone et al., 2010). Despite these intentions, the empirical literature has not provided conclusive evidence with regards to the relation between family firms and environmental performance.

Dekker & Hasso (2016) demonstrate that under certain circumstances, high level of social embeddedness, family firms put a larger emphasis on the environment, but their data only consist of Australian private firms from 2005-2009. Berrone et al. (2010) show that public family firms have a better environmental performance compared to non-family public firms. Their data consist of U.S. firms and could be relatively outdated as it concerns a sample period

of 1998-2002. The environmental behavior of firms has received an increasing amount of attention and has become an important topic on the agenda of executives (Kakabadse, 2007). A more recent sample could therefore lead to different results. So, whilst both studies are highly influential, as a result of their sample selections many questions remain unanswered. The aim of this paper is to provide more clarity and to provide an update on the relationship between family firms and firms' environmental performance. In order to do so, I formulate the following research question:

What is the influence of being a family firm on the environmental performance of Western-European public companies?

In order to answer this question I use a sample that consists of the largest public family and non-family firms in Western-Europe for a time period of 2015-2018. Thereafter, I focus on the drivers behind the environmental performance of family firms. I thus use a subsample that only comprises the family firms of my main sample. In particular, I examine the influence of ownership fraction, family board participation, family member as CEO or Chairman of the BoD. These variables indicate the level of control a family is able to exert over the firm's operations and hence over the environmental behavior. I also consider whether a country's propensity to care for the environment influences family firms. If governments prioritize the environment through subsidies or other means firms could be incentivized to improve their environmental performance. Lastly, I examine the influence of the environmental performance on the financial performance in the subsequent year as the main objective of every company, even of family firms, is the bottom line.

My findings in Table 5 concerning H1 suggest that being a family has a negative influence on the environmental performance, which is contrary to Berrone et al. (2010) even though we both use public companies. This relationship could be explained by the high threshold I use in my sample for firms to be considered a family firm. Families must control at least 32% of the company and the average level of control among family firms is actually 52%. Berrone et al. (2010) apply a much lower threshold, namely 5%. In the setting of Berrone et al. (2010) families with a relatively low level of ownership, share the financial uncertainty and risk of investments that are supposed to foster the environment. Yet, the family is the main beneficiary as the creation of socioemotional wealth through these investments is predominantly in the interest of the family. The tradeoff of environmental investments is therefore in favor of controlling families as the financial risk is divided over all shareholders, whilst these families capture the benefits due to their socioemotional wealth perspective

(Kellermans et al., 2012). In my sample, families control at least 32% of the company and the families thus carry the largest financial burden because the uncertainty and risk related to environmental investments is predominantly imposed on controlling families since the remaining shareholder base is smaller. This increase in risk families must carry, whilst the socioemotional benefits do not increase, might make these families more hesitant to engage in environmental investments.

Whilst the environmental performance is an important objective for family firms through their socioemotional wealth perspective, the main objective of every company, even of family firms, is the bottom line. It is therefore interesting to research the influence of environmental performance on financial performance (H2). Recent literature suggests that improving environmental behavior can positively affect firms' financial performance (Clarkson et al., 2011; Hart & Dowell, 2011; Singal, 2014). In his meta-analytical review Albertini (2013) concludes that the majority of literature on this topic points towards a positive relationship. Albertini (2013) therefore argues that the question "When does it pay to be green?" has become more relevant than "Does it pay to be green?". The results of Table 6 indicate an insignificant relationship between the environmental performance and the financial performance in the subsequent year of family firms. However, Model 2 suggests the existence of a negative significant ($p<0.05$) relationship for non-family firms. As a result, an increase in environmental performance is associated with a decrease of the financial performance in the subsequent year for non-family public companies.

I extend my analysis by examining the drivers of environmental behavior within family firms (H3). I construct several variables: the ownership fraction, the percentage of BoD seats occupied by family members, the origin of the CEO and the origin of the Chairman of the BoD. However, none of the above-mentioned variables appear to have a significant influence on the environmental performance, as can be seen in Table 7. My fourth hypothesis concerns the location of the company's headquarters. Existing literature indicates that companies' involvement in environmental innovative projects tends to be higher if national institutions prioritize this involvement (Aguilera-Caracuel et al., 2013; Berrone et al., 2013). The results in Table 8 suggest that being located in environmentally progressive countries has a negative effect on the environmental performance of family firms. The insignificance of these results, however, prohibits me from drawing any conclusions.

My final hypothesis aims to clarify the insignificant results of H3. Recent research advocates that such variables interact with each other and that combinations of these variables

might offer more valuable insights (Basco & Perez-Rodriguez, 2009, 2011; Garcia-Castro & Aguilera, 2014; Lindow et al., 2010; Samara et al., 2018). In order to analyze the range of possible combinations that affect the environmental performance of family firms, I use the fsQCA method. Ragin (2008) first developed this technique and since then it has often featured in family firm and management literature (Bell et al., 2014; Kraus et al., 2016; Samara & Berbegal-Mirabent, 2017). This method enables me to examine a range of combinations of causal variables which lead to a particular outcome, higher or lower environmental performance. I use fsQCA to identify which combinations of ownership, board presence, family CEO, gender of the CEO and country of residence lead to a higher and lower environmental performance. The results of Table 9 and 10 present five new combinations for both higher and lower environmental performance.

The use of the fsQCA analysis and consequential the discovery of 5 combinations for both higher and lower environmental performance is not the sole contribution to family firm and environmental performance literature. The approach to the dependent variable, the environmental performance, is a key contribution of this paper. The existing literature argues that there are two different methods that can be deployed to assess the environmental performance of companies. The first method chooses to emphasize intent over outcome. This branch of literature aims to discover the intention of family firms through surveys and was recently deployed by Hasso and Dekker (2016). They decided to focus on the intention of firms because it is possible that there is a discrepancy between the intention of certain actions and the actual outcome. Berrone et al. (2010), however, utilized actual environmental outcomes, the toxic emissions of companies, rather than focusing on the intention behind such outcomes. This study is, to the best of my knowledge, the first to use graded scores based on performance indicators to assess the environmental performance of family firms. The dependent variable is therefore more objective than the subjective survey responses of Hasso and Dekker (2016) as it is independently evaluated and more extensive than the sole evaluation of toxic emissions of Berrone et al. (2010) since the performance is based on a wide range of environmentally-related aspects.

The determination of family firms is furthermore distinct as firms are only qualified as family firms if a family has a controlling interest over more than 50% of the voting rights and shares, whilst this threshold is 32% for public companies. Berrone et al. (2010) apply a much lower threshold of 5%, while Hasso and Dekker (2016) simply use the answer to the question ‘is this a family firm?’. The lower threshold used in Berrone et al. (2010) leaves room to argue

that a firm's environmental behavior is not related to family ownership. As a result of the lower threshold, the shareholder's base might be more equally distributed which limits the family's influence over the family and subsequently over the environmental performance. The higher threshold is a contribution since it truly establishes the influence families can exert over the company and therefore indirectly over the firm's environmental behavior.

This study lastly contributes through the sample selection. In contrast to previous literature, the focus of this paper is not on one single country but on 14 countries (even 32 countries for H5). This enables me to further entangle what drives a possible relationship between family firms and environmental performance. Essentially, there are differences in a country's propensity to care about the environment. Existing literature indicates that companies' environmental behavior is related to the regulatory pressure for environmentally-friendly policies (Chan & Welford, 2005; Sarkar, 2008). Companies' involvement in environmental innovative projects tends to be higher if institutions prioritize this involvement (Aguilera-Caracuel et al., 2013; Berrone et al., 2013). These academic findings are furthermore corroborated by Table 9 and 10 that demonstrate the importance of distinguishing between Anglo-Saxon and non Anglo-Saxon countries.

This paper proceeds as follows. In the following section, I will review the current state of related literature which is the foundation I develop my hypotheses on. Thereafter, I will provide an overview of the data collection process and describe the applied methodology for the traditional regressions. Next, I will present the results of these traditional methods. Thereafter, I will describe the fsQCA software and present the results of this method. I will lastly draw a conclusion based on the results and discuss shortcomings and possible avenues for future research.

2. Literature review

2.1 What is a family firm?

The academic literature has not come to a binding definition of family firms (Lindow, 2013). The different approaches make distinctions between ownership fractions and active family participation in the management of the company (Villalonga & Amit, 2006b). McConaughy et al. (1998) for instance, qualify any company operated by a member of the founder's family as a family firm, while other scholars require a certain threshold of ownership through voting rights or shares (Anderson & Reeb, 2003; Barth et al., 2005; Cronqvist & Nilsson, 2003). As the selection of family firms in this paper is based on the Family Business (FB) index (see

section 3.1 for a description), this paper also uses the same criteria for companies to be considered a family firm. As a result, Public companies are only considered to be family firms if a family has a controlling interest over more than 32% of the voting rights and shares. Firms must furthermore have published any sort of financial accounts in the 24 months prior to the publication of the yearly FB index. Lastly, the second generation or more must run the firm which means that at least one family member must occupy a seat in the BoD or the Executive Committee.

These strict conditions help to combat the heterogeneity that exists within family companies (Sciascia & Mazzola, 2008). The fraction of ownership, the governance of the company and the degree of family participation differ between firms and can vary over time as succession problems arise (Chua et al., 2012; Sharma & Nordqvist, 2008). These variations have an influence on both the governance structure and the performance objectives (Melin & Nordqvist, 2007; Nordqvist et al., 2014). The construction of the FB index limit the heterogeneity of my sample as the firms are not randomly collected but must meet certain conditions in order to qualify as a family firm. As a result, all the families in my sample are the largest shareholder and at least one family member must occupy a seat in the BoD or the Executive Committee. Admittedly, this sample is subject to a level of heterogeneity as there still remain differences in the level of controlling interest, the position of the CEO and Chairman and the degree of family participation. However, these differences are crucial as they enable me to research the influence of these differences.

2.2 The performance of family firms

It is important to understand the influence of families on the performance of their firms as literature suggests that family firms are the dominant organization-structure in the world (Arregle et al., 2007; Burkart et al., 2003). For example, in the Netherlands 69% of all companies are considered as family firms and these companies account for more than 50% of the gross domestic product (GDP) (Flören et al., 2010). 14 million European family firms furthermore generate more than 50% of the European GDP and are responsible for more than 50% of all jobs (Zellweger, 2015). While the presence and importance of family firms are evident, their performance has been subject to wide debate (Miller et al., 2007).

The main difference between family and non-family firms is the presence of a dominant coalition in family firms (Sharma & Sharma, 2011). The presence of a family creates a culture of personal control which distinguishes these firms from the institutional control in their

counterparts. Even though the dominant family group is comparable to an Executive Committee the family presence has a significant influence on the vision and the decision-making process (Chrisman et al., 2005; Miller & Le Breton-Miller, 2005). It is however unclear whether this family presence translates into improved firm performance (Habbershon & Williams, 1999).

Family firms are characterized by concentrated ownership which has long been suggested to enhance firm performance as it decreases agency costs (Berle & Means, 1932; Jensen & Meckling, 1976). Since the principal and the agent are often members of the same group, literature suggests that the principal-agency problem is less extensive and less present in family firms (Davis et al., 1997). Poza et al. (2004) demonstrate that the absence of the agency problem in family firms can lead to cost reductions in various areas such as compliance, administration and financial reporting. The familial bond can also deter firm performance. Family BoD members could exhibit signs of freeriding behavior, family managers might be ineffective managers or a disagreement might arise between a family member and an outside executive (Eddleston & Kellermans, 2007; Minichilli et al., 2010). These are all ingredients for agency problems and can negatively affect the firm's operations (Morck & Yeung, 2003; Schulze et al., 2003). The family involvement, however, can be a contributing factor as well because it can create a competitive advantage (Sirmon & Hitt, 2003). Family firms are more focused on long-term strategy that can accrue social capital and financial resources, which improve the firm's durability and longevity (Miller & Le Breton-Miller, 2005, 2016; Tokarczyk et al., 2007).

In line with these reasonings, the existing literature has provided mixed evidence for the relationship between family firms and financial performance. Research using a sample comprised of American companies demonstrate a higher Tobin's Q, as a proxy for financial performance, for family firms compared to non-family companies (Anderson & Reeb, 2003; Villalonga & Amit, 2006b). These findings are somewhat puzzling as they do not align with the evidence from samples using European or Asian countries. In Asian countries, Claessens et al. (2002) suggest that family firms are underperformers in comparison to non-family firms. In Norway family firms exhibit lower levels of productivity, while in Denmark and Thailand these firms are associated with lower firm performance (Barth et al., 2005; Bennedsen et al., 2007; Bertland et al., 2008).

2.3 The environmental performance of family firms

More recent literature has broadened the scope of research into family firms. The financial performance is no longer the ultimate goal that is pursued at all costs. Environmental behavior has entered the center stage of the corporate landscape since companies have come under pressure from various stakeholders due to their role in climate change (Braam et al., 2016). The environmental behavior has furthermore seen an increase in media attention, which forces firms to take action and improve their behavior (Flammer, 2013). Family firms are suitable partners for the environment for two reasons. First, due to the dominant position of the family through their controlling interest, the decision-making process of these firms is 'personalistic' and the influence of other channels within the company, external pressure or slow bureaucracy can be neglected (Carney, 2005). Owing to this higher degree of personalism and the intention to keep the business under family control in order to pursue their vision, family firms deploy a 'particularistic' approach. As a result, these firms might pursue strategies that are not necessarily driven by economic logic but rather by the family's preferences (Berrone et al., 2012; Cennamo et al., 2012). Environmental investments are an example of such a strategy since these expenditures are related to increased risk which might even be detrimental to the financial performance (Gómez-Mejía et al., 2007). These investment decisions could be explained by a family's desire to improve their reputation, their standing in the community or the state of the world (Berrone et al., 2010; Marques et al., 2014).

Hambrick (2007) have demonstrated that managerial characteristics such as morals and values influence the attitude of firms towards certain strategic decisions. The environmental behavior of firms has become more relevant and research suggests that a positive attitude of management towards environmental concerns can result in sustainable decisions (Roxas & Coetzer, 2012). If the management is dominated by family members, firms are more inclined to pursue strategies that will foster the environment. Family-based management teams harbor positive attitudes towards environmental preservation, believe that subjective norms favor pro-environmental activities in their firm, and perceive higher levels of behavioral control to pursue such activities (Sharma & Sharma, 2011). This is due to a variety of reasons.

First of all, family members that occupy management positions strongly identify themselves with the family name as a result of which these firms put more emphasis on corporate social behavior (Cennamo et al., 2012; Marques et al., 2014). A distinction between family and non-family firms furthermore explains the difference in environmental performance. Family firms are characterized by a dynamic of personalized control which has an effect on

firm decisions (Miller & LeBreton-Miller, 2016). The vision and beliefs of the controlling party, in this case the family, will therefore translate to the firm. Family firms are more aware of and susceptible to the opinion of the community and they thus avoid engaging in socially irresponsible ventures (Arregle et al., 2007; Dyer & Whetten, 2006). The attitude of firms towards the environment has been heavily scrutinized, which has raised the attentiveness of companies to their communities who demand environmentally responsible behavior (Binz et al., 2017; Kellermans et al., 2012).

In line with the aforementioned, the findings of Berrone et al. (2010) demonstrated that family firms have a better environmental performance than non-family firms. Their data sample, however, consists of American public companies while the majority of family firms are private and as a result have completely different strategic objectives and governance. Hasso and Dekker (2016) therefore focused on private Australian companies. They suggest that the difference between private and public firms can have an effect on the environmental performance via two channels. On the one hand, families may be more likely to retain a larger controlling interest in private companies and the objective of accumulating socio-emotional wealth might be more important in these private firms. Consequently, in line with Berrone et al. (2010) the firm would be more concerned with the environment. On the other hand, private firms have limited access to financial markets and this might give such firms an incentive to keep the status quo in place. As a result, polluting or contaminating equipment or plants are not replaced by environmentally-friendly alternatives. Hasso and Dekker (2016) believed that the benefits of a larger controlling interest would outweigh the limited access to financial markets as they hypothesized that, in line with Berrone et al. (2010), family firms would have a better environmental performance. Their findings, however, suggest the opposite as they show a negative relationship.

Since my sample comprises public companies I expect to find a relationship that is similar to the findings of Berrone et al. (2010). This expectation is furthermore strengthened by two aspects. First, all the public companies in my sample are majority shareholders. The reasoning of Hasso and Dekker (2016) with regards to large controlling interests that put the socio-emotional wealth of the family at the forefront of the company is thus also applicable to my sample. As this was not necessarily the case for the sample of Berrone et al. (2010) due to the low threshold of 5% ownership, this should push my results towards a positive relationship. Hasso and Dekker (2016) furthermore discussed the possibility that only public family firms will show a positive relationship as they are subject to more public scrutiny. In this day and

age, the level of scrutiny has only risen compared to the beginning of this century due to increased pressure from various stakeholders and increased media attention (Braam et al., 2016; Flammer, 2013). As family firms are more aware of, and susceptible to the opinion of the community (Arregle et al., 2007; Dyer & Whetten, 2006), they will show environmental behavior that might even go beyond the obligatory levels in order to avoid social outrage (Hasso & Dekker, 2016). Given the inclination of family firms to be more aware of their position in society and their desire to preserve their socioeconomic wealth, I expect that family firms will exhibit stronger environmental performance compared to non-family companies. I therefore formulate the following hypothesis:

Hypothesis 1 (H1): Public family firms will environmentally outperform public non-family firms

Whilst the environmental performance is an important objective for family firms through their socioemotional wealth perspective, the main objective of every company, even of family firms, is the bottom line. It is therefore interesting to research the influence of environmental expenditures on financial performance. Berrone et al. (2012) suggest that environmental investments are not necessarily driven by economic logic and this type of investments might therefore be detrimental to the financial performance of the firm. Previous research indicates that environmental investments can cause a decrease in the profitability in the short term, five years to be exact (Blacconiere & Patten, 1994). However, this decrease might be balanced out by an increase in the long-run (Sarkis & Codeiro, 1997). More recent literature suggests that improving environmental behavior can positively affect firms' financial performance. In his meta-analytical review Albertini (2013) concludes that the majority of literature on this topic points towards a positive relationship. Albertini (2013) therefore argues that the question "When does it pay to be green?" has become more relevant than "Does it pay to be green?". Clarkson et al. (2011) demonstrate that a higher level of environmental transparency can increase a firm's market value. Hart and Dowell (2011) furthermore find that environmental behavior positively affects profits margin, while Singal (2014) finds that credit ratings are positively affected by environmental performance. Based on the existing literature, I formulate the following hypothesis:

Hypothesis 2 (H2): There exists a positive relationship between the environmental performance and the financial performance for both family and non-family firms

After researching these first two hypotheses, I aim to pinpoint what drives the environmental performance of family firms based on a sample of family-firms only. Hasso and Dekker (2016)

argued that a larger controlling interest enabled the family to put more emphasis on the accumulation of socio-emotional wealth (Bingham et al., 2011). If the management is dominated by family members, firms are more inclined to pursue strategies that will foster the environment. Family-based management teams harbor positive attitudes towards environmental preservation (Sharma & Sharma, 2011). Moreover, controlling shareholders can have a larger impact on the firm's operations if the CEO shares the vision and objectives of this controlling shareholder (Niehm et al., 2008). Schulze et al. (2003) argued that this is especially true for family CEOs as he/she is protected by its own family and is not subject to external pressure from the market of corporate control. Hence, if a CEO is part of the family, this increases the ability of the family to pursue their own agenda and focus on environmental issues (De Massis et al., 2014). To examine the influence of the family over the day-to-day operations I have constructed several variables: the ownership fraction, the percentage of BoD seats occupied by family members, the origin of the CEO and the origin of the Chairman of the BoD. All these variables are related to the level of control a family can exert over the company. I argue that a higher level of control by the family over the company will result in a better environmental performance. I therefore formulate the following hypothesis:

Hypothesis 3 (H3): There exists a positive relationship between the level of family control and the environmental performance

The use of European countries furthermore offers an interesting opportunity to discover whether the environmental performance varies across regions in Europe, such as Scandinavia and Southern Europe (Spain, Italy, Portugal and Greece). Existing literature indicates that companies' environmental behavior is related to the regulatory pressure for environmentally-friendly policies (Chan & Welford, 2005; Sarkar, 2008). Companies' involvement in environmental innovative projects tends to be higher if institutions prioritize this involvement (Aguilera-Caracuel et al., 2013; Berrone et al., 2013). Delmas & Montes-Sancho (2010) also demonstrated that institutions have the power to persuade companies to initiate projects that foster the environment. Based on these findings, it is evident that the country in which the headquarters are located influence the environmental performance of companies. The Climate Change Performance Index (CCPI) measures the differences in national environmental performance. The aim of the CCPI is to compare the climate progress and performance of individual countries. The CCPI therefore deploys a framework of standardized criteria to evaluate and compare the climate efforts of 57 countries and the EU. Essentially, the generated score could be considered to demonstrate a country's propensity to care about the environment.

This generated score might offer valuable insights because it could perhaps explain why a family firm has a better environmental performance compared to another firm. For example, in 2021 the Netherlands have a score of 50.96 whilst the UK has a score of 69.66. This indicates that the UK has shown more progress in their environmental behavior and following Aguilera-Caracuel et al. (2013) and Berrone et al. (2013) this could positively impact the environmental behavior of firms located in the UK. As a result, I formulate the following hypothesis:

Hypothesis 4: There exists a positive relationship between the CCPI score and the environmental performance of family firms

3. Data and methodology

3.1 Data collection and sample selection

This research derives data from four different databases to construct a sample of Western European public companies for a sample period of 2015-2018. This chosen sample period is the result of merging the most recent information of various databases. This research focuses on Western European countries since the majority of these countries share the same monetary currency and their economies are furthermore comparable. Whilst the majority of family firms are private SMEs, only public companies are incorporated since such companies are required by law to provide detailed financial information which enables a smoother data collection process.

The starting point of this study is the 2019 Ernst&Young and University of St. Gallen Global Family Business Index (FB index) which comprises the world's 500 largest family firms, private or public, based on revenue. The index has only been published since 2015 which is why the sample period is 2015-2018. Next to an established ranking of family firms, the FB index provides background information on the governance structure of the firms. The index presents an overview per firm of the founding year, the headquarters, the controlling interest of the family, the board participation of family members and the origin of the CEO. Inclusion in this FB index depends on several criteria. Public companies are only considered to be family firms if a family has a controlling interest over more than 32% of the voting rights and shares. Firms must furthermore have published any sort of financial accounts in the 24 months prior to the publication of the yearly FB index. Lastly, the second generation or more must run the firm which means that at least one family member must occupy a seat in the BoD or the Executive Committee.

The aim of this research is to establish whether family firms exhibit a different behavior than non-family firms with regards to environmental behavior. In order to make a valid comparison the Stoxx Europe 50 (SE50) index is used, which comprises the 50 largest European companies in terms of free-float market capitalization. The SE50 index is selected since the geographical composition and the magnitude of firm size are comparable to the FB index. This paper uses the composition of the SE50 as of 2019 as a reference point and any firm that was part of the SE50 during the sample period of 2015-2018 is furthermore added to this list.

To get a better insight into the participation of family members in the BoD or the Executive Committee, annual reports and company websites were consulted, which present an overview of the composition of the BoD and the Executive Committee. However, since the FB index is merely a snapshot of the situation in 2019, the required information to construct a time-series sample was manually retrieved from these public sources. During the selected sample period several changes occurred to the compositions of these bodies as the official term ended for some BoD members, because other members went into retirement or simply because some executives were relieved from their duties. Taking these changes into account in the FB index and manual collection of such changes was therefore required.

In order to research hypothesis 4, this paper uses the Climate Change Performance Index (CCPI), which measures the differences in national environmental performance. The aim of the CCPI is to improve the transparency of international climate politics and to compare the climate progress and performance of individual countries. The CCPI therefore deploys a framework of standardized criteria to evaluate and compare the climate efforts of 57 countries and the EU. Essentially, the generated score could be considered to demonstrate a country's propensity to care about the environment.

This paper furthermore retrieved data from the Worldscope database to obtain financial information. This database contains detailed financial data and provided information on the ROA, the Total Assets and the Debt-Equity ratio.

The final database this paper retrieved data from, is the ESG database from Datastream which monitors and assesses the ESG practices of companies based on various performance indicators.

After the separate retrieval of this information, all the afore-mentioned databases were merged in order to provide a clear overview. Table 1 will present the steps that were taken during the merging process.

The first step in this merging process was limiting the FB index to Western European countries. From the initial 500 family firms, 288 of them were excluded based on this geographical condition. Even though 128 Western European firms met the geographical condition they were excluded since they are not publicly traded companies. As a result, the sample comprises 84 companies. However, during the collection process of both financial and family participation data due to a lack of information 11 more firms are excluded. The final sample of family firms, based on the FB index, therefore consists of 73 companies.

Thereafter, the 50 European firms that currently comprise the SE50 were added to the afore-mentioned 83 family firms. However, there is a small overlap as some SE50 companies are also considered family firms. This led to the exclusion of the following companies from the SE50 list: Kering, LVMH, L'Oréal and Roche Holding. As the sample period concerns 2015-2018 some companies are also included since they were part of the SE50 at any point during the sample period. The following five companies are incorporated into the sample: BBVA, Banco Santander, Glencore, Imperial Brands and Telefonica. As a result, the manually constructed sample consists of 73 + 51 = 124 companies.

I lastly retrieved the financial and environmental data of these 124 companies from Worldscope and Datastream. However, not all companies received an assessment from the ESG database and other companies had missing values with regards to either Total Assets or the Debt-Equity ratio. All these 21 companies were excluded from the sample, which consists of 103 firms and therefore 412 firm-year observations. The sample is evenly distributed as it comprises 56 family firms and 47 non-family firms.

Table 1

Sample overview

	Excluded firms	**Firms remaining**
Initial sample: FB Index + SE50	0	551
Non-Western European firms	288	263
Private firms	128	135
Inadequate annual reports	11	124
Merger inaccuracies: missing values	21	103
Final sample		**103**
Family firms		56
Non-family firms		47

3.2 Definition and measures

3.2.1 Dependent variable – environmental performance

The environmental performance of companies will be measured using the ESG Asset 4 database from Datastream. The environmental score evaluates a company's impact on living and non-living natural systems, including the air, land and water, as well as complete ecosystems. It reflects how well a company deploys best management practices to avoid environmental risks and capitalizes on environmental opportunities to generate long term shareholder value. The existing literature argues that there are two different methods that can be deployed to assess the environmental performance of companies.

The first method chooses to emphasize intent over outcome. This branch of literature aims to discover the intention of family firms through surveys and was recently deployed by Hasso and Dekker (2016). They decided to focus on the intention of firms because it is possible that there is a discrepancy between the intention of certain actions and the actual outcome. Berrone et al. (2010), however, utilized actual environmental outcomes rather than focusing on the intention behind such outcomes.

This paper uses graded scores from the ESG database to assess firm's environmental performance. While focusing on intentions is important, claiming to be environmentally friendly is fairly easy as long as there are no consequences. The assessment of environmental outcomes offers a better insight into the value firms attribute to the environment since these outcomes are the result of implementing intentions that will foster the environment. Actions speak louder than words which is why this paper is more in line with the research method of Berrone et al. (2010).

3.2.2 Independent variable – ownership and participation variables

The independent variable of the first regression will be the difference in ownership structure. This paper utilizes the 2019 Ernst&Young and University of St. Gallen Global Family Business Index and the Stoxx Europe 50 Index to obtain a list of the world's largest family firms and the 50 biggest European blue-chip stocks, respectively. Thereafter, both lists are merged and a dummy variable is created. This dummy variable will be equal to 1 if a firm meets the required conditions to qualify as a family firm and 0 if no family ownership structure is present.

The mere distinction between ownership structures, however, is not the only relationship this paper aims to clarify. Within family firms several distinctions are observed based on the influence of the controlling family over the day-to-day operations. To research these

distinctions this paper relied on annual reports, company websites and other public documents.

The first observable difference is the controlling interest of the family through their voting shares. Whilst all families remain the single largest shareholders, not all families managed to retain the majority of shares and voting rights. I created a variable which depicts the percentage of shares and voting rights a family has in a particular year.

Next to the voting shares, families can influence the company through active participation within the management of the firm. The number of seats on the BoD occupied by family members for example varies considerably. This paper therefore calculates the number of board seats occupied by family members as a percentage of the entire board.

Lastly, the attitude of family firms towards outside occupation of the two most influential positions, the CEO and the Chairman of the BoD, differs substantially. To research this distinction in behavior, this paper creates two separate dummy variables which equal 1 if the CEO or Chairman is a family member or zero if this position has been granted to an outsider.

3.2.3 Control variables

Based on the previous work of Hasso and Dekker (2016) and Berrone et al. (2010) this paper uses several firm characteristics as control variables. Profitability should be taken into account since Dawkins and Fraas (2011) provided evidence for a positive relationship between environmental awareness and profitability. This relationship exists because profitability allows firms to direct some of their resources towards environmental concerns. The variable *Return on Assets (ROA)* will act as a proxy for profitability.

Furthermore, the impact of firm size should not be neglected. Several scholars have argued that an increase in firm size enables firms to better allocate resources to improve their environmental footprint (Grant et al. 2002; Sarkis & Codeiro, 2001; King & Lenox, 2002). Firm size in this paper equates to Total Assets. However, Total Assets exhibit signs of exponential growth, so the logarithm of Total Assets will be used to solve this problem. Any reference to Total Assets in the remainder of this paper will therefore be equal to the logarithm of this variable.

Thirdly, Berrone et al. (2010) suggest a negative relationship between firm age and environmental performance. Older firms may be plagued by sunk costs which gives such firms an incentive to keep the status quo in place. As a result, polluting or contaminating equipment or plants are not replaced by environmentally-friendly alternatives. However, Hasso and Dekker (2016) demonstrate that older companies put a higher emphasis on the environment.

The variable *Company Age* is the difference between the founding year of the firm and a particular year used in the regression.

Besides firms size, I also take the board size into account as recent literature provides evidence for its influence on corporate social responsibility. However, the existing literature present contrasting views on the directional effect (Estélyi & Nisar, 2016; Karim et al., 2020).

In addition, in line with the approach of Berrone and Gomez-Mejia (2009), the industry in which firms are active are used since there are differences in polluting intensity per sector. The *Industry* variable is created via the SIC codes.

Lastly, higher volumes of debt might negatively influence environmentally-friendly behavior (Campbell, 2007; McGuire et al., 1988). As a firm becomes more leveraged, the firm might enter financial distress during which the importance of environmentally-friendly policies decreases.

3.3 Descriptive statistics

In this section, I will present a detailed overview of the summary statistics of the 412 firm-year observations and the correlation between all the variables. Table 2 distinguishes between family and non-family firms in order to provide better insights into the differences between these firms. While there are no statistical differences between the two groups, boxplots show that variables from both groups contain extreme values. For example the extremity of the minima and maxima of *Leverage* result in a negative Debt-Equity ratio of -18,591% for non-family firms. The use of boxplots further suggests that *ROA* is subject to extreme values. As a result of these extreme values, the regression results could be biased. I therefore used the winsorizing-process to limit the extreme values of *ROA* and *Leverage*. I winsorized *ROA* at the 2.5% level at the downside and the 5% level at the upside, while *Leverage* is winsorized at the 2.5% level at the downside and the 10% level at the upside. As a result of this winsorizing-process, the boxplots of both variables no longer depict any extreme values. Consequently, in the remainder of this paper any reference to the variables *Leverage* and *ROA* will be equal to the winsorized values of these variables. The descriptive statistics before these adjustments can be found in Appendix A.

The explanatory variable *Family firms?* ranges from zero to one as it is a dummy variable. As described in the section 3.1, the sample consists of 47 non-family firms and 56 family firms which indicates that the sample is fairly evenly distributed. The dependent variable *Env score* ranges from zero to 100 and Table 2 shows that non-family firms on average outperform family firms. Non-family firms are furthermore on average relatively larger and

more profitable based on *Total Assets* and *ROA*, respectively. However, the are no differences between these group based on the results of Pearson's Chi-squared tests. The value of each of these Pearson's Chi-squared tests was insignificant, which indicates that there are no statistical differences between family and non-family firms.

Table 2

Summary statistics after the winsorizing-process

This table presents the descriptive statistics of all variables. The chosen time period is 2015-2018 for this sample, which consists of 103 unique companies and 412 firm-year observations.

Firm type	Variable	Mean	St.dev	Min.	Median	Max.	Obs.
Non-family firms	Env-score	80.694	14.184	39.860	83.780	99.110	188
	Leverage	91.277%	67.719	0.490%	66.275%	226.570%	188
	Total Assets	17.933	1.355	14.775	18.052	20.622	188
	ROA	5.918%	4,279	-1,970%	5.350%	16.480%	188
	Age	85.606	60.836	7	91.5	204	188
Family firms	Env-score	64.250	22.540	0.000	66.825	97.650	224
	Leverage	86.395%	78.053	0.490%	55.895%	226.570%	224
	Total Assets	16.75	1.52	13.95	16.38	21.45	224
	ROA	6.186%	4.625	-1.970%	5.695%	16.480%	224
	Age	99.857	69.015	11	88.5	350	224

Table 3 depicts a correlation matrix between the independent, dependent and control variables of the entire sample. The correlation between the independent variable, the environmental performance and the control variables is relatively low. In contrast to H1, the correlation between family firms and the environmental performance is negative. The sign of the correlation of the remaining variables is in accordance with what was expected based on existing literature, except for *ROA* and *Age*. Important to note is that the sign of the correlation of *Leverage* flips after the winsorizing-process and this signs therefore does align with the expectations. However, no conclusions should be drawn based on correlations. The matrix furthermore exhibits no signs of multicollinearity. Nevertheless, clustered standard errors are employed to avoid any statistical interference. I use clustered standard errors instead of robust standard errors as clustered standard errors account for both heteroskedacity and correlation in the error term. Table A.3 presents the correlation between the variables before the discussed adjustments.

Table 3

Correlation matrix after the winsorizing-process

This table presents the correlation between all the variables. The chosen time period is 2015-2018 for this sample, which consists of 103 unique companies and 412 firm-year observations.

	Family firm	**Env-score**	**Total Assets**	**Leverage**	**ROA**	**Age**
Family firm	1.00					
Env-score	-0.39	1.00				
Total Assets	-0.38	0.28	1.00			
Leverage	-0.03	0.04	0.31	1.00		
ROA	0.03	-0.02	-0.36	-0.35	1.00	
Age	0.11	0.04	-0.05	-0.04	-0.04	1.00

In order to evaluate the differences between family and non-family firms, Table 4 depicts correlation matrices per firm type. The signs and magnitude of the correlations are overall fairly similar between both firms types. However, the difference with regards to *ROA* stands out since the correlation between *ROA* and *Env-score* is larger and negative for non-family firms compared to family firms. Table A.4 presents the correlation before the winsorizing-process.

Table 4

Correlation matrix per firm type

This table presents the correlation between all the variables per firm type. The chosen time period is 2015-2018 for this sample, which consists of 103 unique companies and 412 firm-year observations.

		Env-score	**Total Assets**	**Leverage**	**ROA**	**Age**
Non-family	Env-score	1.00				
	Total Assets	0.19	1.00			
	Leverage	0.03	0.25	1.00		
	ROA	-0.18	-0.43	-0.16	1.00	
	Age	0.01	-0.04	-0.07	-0.12	1.00
		Env-score	**Total Assets**	**Leverage**	**ROA**	**Age**
Family	Env-score	1.00				
	Total Assets	0.15	1.00			
	Leverage	0.02	0.37	1.00		
	ROA	0.08	-0.35	-0.48	1.00	
	Age	0.13	0.02	-0.01	0.01	1.00

3.4 Methodology

To test my hypotheses, I adopt a general least squares (GLS) regression approach in order to estimate the relationship between firm type and environmental performance. As a result, this paper formulates the following model to test the first hypothesis concerning firm type and environmental performance:

$$ENV\text{-}score_{i,t} = \alpha_0 + \beta_1 Family\text{-}firm_{i,t} + \beta_2 Age_{i,t} + \beta_3 ROA_{i,t} + \beta_4 Leverage_{i,t} + \beta_5 Total\text{-}Assets_{i,t} + \mu_t + \mu_i + \nu_{i,t},$$

where $ENV\text{-}score_{i,t}$ denotes the environmental score based on the performance indicators and α_0 is a constant which remains stable over time and is the same for all cross-sectional units. $Family\text{-}firm_{i,t}$ is a dummy variable that equals one if a firm is considered a family firm based on the FB-index criteria and equals zero if these criteria are not met. $Age_{i,t}$ describes the age of a company in a certain sample year. $ROA_{i,t}$ measures the profitability of a company in a certain sample year. $Leverage_{i,t}$ equates to the Debt-Equity ratio. $Total\text{-}Assets_{i,t}$ is the logarithm of the Total Assets of a firm in certain sample year. Lastly, μ_i encapsulates all the variables which cross-sectionally have an influence on $ENV\text{-}score_{i,t}$ but do not vary over time, such as country and industry fixed effects, whilst $\nu_{i,t}$ is the individual error term per entity (Brooks, 2014). Every model includes firm fixed effects and every hypothesis contains several regression models which include industry and year fixed effects.

To test H2, I adopt the same approach as for H1. However, my dependent variable is a one year lagged $ROA_{i,t}$ and my independent variable is the $ENV\text{-}score_{i,t}$. I therefore formulate the following model to test the second hypothesis:

$$ROA_{i,t} = \alpha_0 + \beta_1 ENV\text{-}score_{i,t} + \beta_2 Age_{i,t} + \beta_3 Leverage_{i,t} + \beta_4 Total\text{-}Assets_{i,t} + \mu_t + \mu_i + \nu_{i,t},$$

To test H3, I performed GLS regressions on a sample that only consists of family firms. To measure a family's control I have constructed several variables: the ownership fraction, the percentage of BoD seats occupied by family members, the origin of the CEO and the origin of the Chairman of the BoD. To test H3 concerning the family's control and environmental performance, I formulate the following model:

$$ENV\text{-}score_{i,t} = \alpha_0 + \beta_1 Family\text{-}control_{i,t} + \beta_2 Age_{i,t} + \beta_3 ROA_{i,t} + \beta_4 Leverage_{i,t} + \beta_5 Total\text{-}Assets_{i,t} + \mu_t + \mu_i + \nu_{i,t},$$

where $Family\text{-}control_{i,t}$ is a variable that captures the level of control a family is able to exert over the company and α_0 is a constant which remains stable over time and is the same for all cross-sectional units. $Age_{i,t}$ describes the age of a company in a certain sample year. $ROA_{i,t}$

measures the profitability of a company in a certain sample year. $Leverage_{i,t}$ equates to the Debt-Equity ratio. $Total\text{-}Assets_{i,t}$ is the logarithm of the Total Assets of a firm in certain sample year. Lastly, μ_i encapsulates all the variables which cross-sectionally have an influence on $ENV\text{-}score_{i,t}$ but do not vary over time, whilst $v_{i,t}$ is the individual error term per entity (Brooks, 2014).

H4 concerns the relationship between the location of firm's headquarters and their environmental performance. The regression model to test H3 is identical with regards to the use of control variables. The independent variables, however, stands for the country in which a firm's headquarters are located. As a result, I formulate the following model:

$$ENV\text{-}score_{i,t} = \alpha_0 + \beta_1 Denmark_{i,t} + \beta_2 Sweden_{i,t} + \beta_3 Finland + \beta_4 Spain_{i,t} + \beta_5 Italy_{i,t} + \beta_6 Portugal_{i,t} + \beta_7 Greece_{i,t} + \beta_8 Belgium_{i,t} + \beta_9 Netherlands_{i,t} + \beta_{10} Luxembourg_{i,t} + \beta_{11} France_{i,t} + \beta_{12} Germany_{i,t} + \beta_{13} United\ Kingdom_{i,t} + \beta_{14} Switzerland_{i,t} + \beta_{15} Age_{i,t} + \beta_{16} ROA_{i,t} + \beta_{17} Leverage_{i,t} + \beta_{18} Total\text{-}Assets_{i,t} + \mu_t + \mu_i + v_{i,t},$$

where, the coefficients β_1- β_{14} are 14 dummy variables that equal one if a firm's headquarters are located in that specific country.

This paper deploys a random effects approach, which assumes that the intercepts for each cross-sectional unit will arise from a general intercept due to an unsystematic variable that does vary for each cross-sectional unit (Brooks, 2014). Both a random and fixed effects model propose different constant intercept terms for every entity. The main distinction between the two models, is that a fixed effects approach assumes that the relationship between the dependent and the independent is temporal and cross-sectional. However, the random effects approach can only be adopted as long as the error terms are uncorrelated with the independent variable. A violation of this condition will arise in biased and inconsistent parameters estimators, in which case the fixed effects approach is more appropriate. To test this condition, a Hausman test is conducted which has a H_o that there is no correlation between the independent variable and the error terms. The Hausman test computes a p-value of 0.8923, which is insignificant. The H_o is not rejected and a random effects model is the most appropriate model. The complete results of the Hausman test are presented in Table A.11.

4. Results

4.1 The influence of firm type on environmental performance

Table 5 presents the regression results regarding the relationship between firm type and environmental performance (H1). Through the use of the dummy variable *Family firm*, which is one if a firm meets the criteria of the FB index, I aim to evaluate H1. Model 1 indicates that *Family firm* has a significant negative ($p<0.01$) influence on environmental performance. The inclusion of year fixed effect in Model 2 and the addition of country fixed effects in Model 3 barely alter this relationship as the sign and the magnitude of the coefficient of *Family firm* are almost identical. All models contradict H1 as they suggest a negative influence of being a family firm on the environmental performance. I therefore reject H1 since I expected a positive relationship. This negative relationship is not in line with the findings of Berrone et al. (2010), which might be caused by different samples. Whilst both papers use public companies, this study applies a much higher threshold of ownership (32% of the shares versus 5%) to be considered a family firm. This threshold might explain the difference between the results. In the setting of Berrone et al. (2010) families with a relatively low level of ownership, share the financial uncertainty and risk of investments that are supposed to foster the environment. Yet, the family is the main beneficiary as the creation of socioemotional wealth through these investments is predominantly in the interest of the family. The tradeoff of environmental investments is therefore in favor of controlling families as the financial risk is divided over all shareholders, whilst these families benefit the most due to their socioemotional wealth perspective (Kellermans et al., 2012). However, as the threshold of ownership increases, the tradeoff becomes less skewed. In my sample, families control at least 32% of the company and the families thus carry the largest financial burden because the uncertainty and risk related to environmental investments is predominantly imposed on controlling families since the remaining shareholder base is smaller. This increase in risk families must carry, whilst the socioemotional benefits do not increase, might make these families more hesitant to engage in environmental investments. Previous literature furthermore suggests that proactive environmental behavior worsens the financial performance in the short term (Sarkis & Codeiro, 1997; Sarkis & Codeiro, 2001). The possible decrease in financial performance in combination with the increase in financial risk might cause families to deter from environmentally-friendly policies. This combination might therefore explain the negative, rather than positive, relationship between family firms and environmental performance.

Whilst the relationship between my independent and dependent variable is not in line with my expectations, the coefficients of the control variables correspond to the existing literature. The variable *Total assets* positively and significantly ($p<0.05$ and $0.05<p<0.1$) affects the environmental performance of firms in each model, but this relationship becomes insignificant after the inclusion of country fixed effects in Model 3. This corroborates previous findings that larger firms can better allocate resources to improve their environmental footprint (Grant et al. 2002; Sarkis & Codeiro, 2001; King & Lenox, 2002). The variables *ROA* and *Leverage* furthermore correspond to previous findings as these variables, respectively, positively and negatively affect environmental performance (Campbell, 2007; Dawkins & Fraas, 2011; McGuire et al., 1988). However these coefficients are insignificant in each model. Existing literature provided ambiguous results for the influence of company age on environmental performance. The coefficient of *Age* is positive in each model and significant ($p<0.1$) in model 3. These results therefore contradict the findings of Berrone et al. (2010), but are in accordance with Hasso and Dekker (2016). Contrary to younger companies, older companies are no longer in the growth stage and not solely focused on the pursuit of revenue growth. Older firms might therefore be able to partly shift their priorities to alternative objectives such as the environment. The coefficient of *Board size* is positive and insignificant in each model. Lastly, the results indicate that the environmental performance differs between certain years, industries and countries. Specifically, firms in the Banks/Savings & Loan sector significantly ($p<0.05$) outperform other firms, whilst being in the Insurances sector has a negative and significant ($p<0.05$) influence on the environmental performance. Moreover, compared to the baseline year of 2015, the environmental performance was significantly better in 2017 ($p<0.1$) and 2018 ($p<0.01$). Model 3 furthermore shows that being located in Portugal or Switzerland has a significant ($p<0.05$) positive effect on the environmental performance.

Table 5

Regression results of H1

This table presents the regression results concerning the influence of being a family firm on the environmental performance. Clustered standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Model 1	**Model 2**	**Model 3**
VARIABLES	**ENV-SCORE**	**ENV-SCORE**	**ENV-SCORE**
Family Firm	-15.250***	-15.999***	-16.231***
	(4.009)	(4.052)	(4.555)
Total Assets	3.532**	2.665*	2.234
	(1.511)	(1.503)	(1.622)
ROA	0.121	0.039	0.145
	(0.101)	(0.109)	(0.119)

Leverage	-0.027	-0.022	-0.009
	(0.020)	(0.020)	(0.016)
Age	0.050*	0.038	0.045*
	(0.027)	(0.027)	(0.026)
Board Size	0.241	0.063	0.174
	(0.168)	(0.134)	(0.118)
2016		-0.043	-0.048
		(0.517)	(0.573)
2017		1.561*	1.625**
		(0.850)	(0.767)
2018		2.709***	2.761***
		(1.026)	(0.992)
Utility	-7.471	-7.777	-5.042
	(6.713)	(6.794)	(5.889)
Transportation	-4.605	-3.141	-0.598
	(6.084)	(5.581)	(10.759)
Bank/Savings & Loan	5.818**	5.989**	5.208
	(2.847)	(2.899)	(5.141)
Insurance	-20.938**	-19.264**	-20.286**
	(8.491)	(8.629)	(8.367)
Other Financial	-30.329	-28.646	-34.826*
	(23.965)	(24.433)	(20.746)
Denmark			3.742
			(13.769)
Finland			11.107
			(14.754)
France			7.396
			(10.689)
Germany			6.826
			(10.575)
Greece			13.209
			(17.656)
Italy			9.631
			(12.319)
Luxembourg			5.286
			(20.401)
Netherlands			-6.524
			(11.196)
Portugal			30.274**
			(12.193)
Spain			12.089
			(11.495)
Sweden			16.516
			(12.079)
Switzerland			21.491**
			(10.569)
UK			8.938
			(10.061)
Constant	17.805	33.285	28.934
	(28.057)	(27.985)	(31.249)
Observations	412	412	412

Number of Companies	103	103	103
R^2	0.252	0.255	0.289
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	No	Yes	Yes
Country fixed effects	No	No	Yes

4.2 The influence of environmental performance on financial performance

The findings of Table 5 suggest that being a family firm has a negative impact on the environmental performance. It is unclear, however, what the financial consequences of environmental behavior are. To examine this relationship I have constructed a one year lagged variable of *ROA*, to identify the effects of environmental performance in 2015 on the financial performance of 2016 and so forth. Table 6 presents the regression results of H2 concerning the described relationship. I have divided my sample into family and non-family firms to examine whether this distinction has an effect on the results. As a result, Model 1 consists of family firms, while Model 2 consists of non-family firms. Both models include year, industry, and country fixed effects but for the sake of brevity these are not displayed in the models nor are they discussed as they do not vary considerably compared to Table 5.

The findings of Model 1 indicate that the environmental performance positively affects the financial performance, but the coefficient is insignificant. This means that there is no significant relationship between the environmental performance and the financial performance in the subsequent year of family firms. Model 2, however, suggests the existence of a negative significant ($p<0.05$) relationship. As a result, an increase in environmental performance is associated with a decrease of the financial performance in the subsequent year for non-family public companies. For the subsample of family firms I cannot reject nor accept H2 due to the insignificance of Model 1. For the subsample of non-family firms I reject H2 as my findings suggest, contrary to my expectations, the existence of a negative significant ($p<0.05$) relationship between the environmental performance and the financial performance in the subsequent year.

The difference between Model 1 and Model 2 might originate from the initial environmental behavior. The thought process behind environmental investments within family firms might me more focused on creating value for their stakeholders based on their socioemotional wealth perspective. Hence, family firms try to identify environmental investments that can also benefit the day-to-day operations and therefore the financial performance. Non-family firms might consider improving their environmental performance an

inconvenient task that they want to complete without spending too much time or valuable resources on. Hence, their environmental decisions are isolated from the day-to-day operations and do not foster the financial performance of these firms. These investments are therefore merely additional costs which might explain why improving the environmental performance through these investments decreases the financial performance in the subsequent year.

Table 6

Regression results concerning H2

This table presents the regression results concerning the influence of the environmental performance on the financial performance. Clustered standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Model 1	**Model 2**
VARIABLES	**ROA_L1**	**ROA_L1**
ENVSCORE	0.023	-0.061**
	(0.022)	(0.031)
Total Assets	-1.039***	-1.200***
	(0.372)	(0.378)
Leverage	-0.006	-0.003
	(0.006)	(0.006)
Age	-0.000	-0.005
	(0.008)	(0.009)
Board Size	-0.176	-0.149
Constant	22.499***	32.548***
	(5.877)	(6.663)
Observations	168	141
Number of Companies	56	47
R^2	0.205	0.368
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Country fixed effects	Yes	Yes

4.3 The drivers of environmental performance within family firms

4.3.1 H3: Family control

To examine the influence of the family over the day-to-day operations I have constructed several variables: the ownership fraction, the percentage of BoD seats occupied by family members, the origin of the CEO and the origin of the Chairman of the BoD. Table 7 presents the regression results of H3 concerning the influence of family control on the environmental performance. These results are based on a subsample that consists entirely of family firms. The independent variable in Model 1 is *Family share*, in Model 2 *Board participation*, in Model 3 *Family Chairman* and in Model 4 *Family CEO*. Model 1 demonstrates that *Family share* has a positive effect, yet this effect is insignificant. The coefficients of the independent variables of

Model 2, 3 and 4 are all negative, but insignificant. Due to this insignificance, I can neither reject nor accept H2.

In contrast to the independent variables, some control variables do significantly affect the environmental performance of family firms. In line with Table 5, compared to the baseline year of 2015, the environmental performance was significantly better in 2017 ($p<0.1$) in Models 3 and 4 and significantly better in 2018 ($p<0.05$) in each Model. The results furthermore indicate that the environmental performance differs between certain industries and countries. In the regressions with regards to H2 and H3 I use the industry division of the FB index rather than the division of the Worldscope database as the subsamples of these regression consist entirely of family firms. Specifically, firms in the Financial Services and the Technology, Media & Telecommunication (TMT) sector are significantly ($p<0.1$ and $p<0.05$) worse performers in every model, whilst being in the Health Sciences & Wellness sector has a positive and significant ($p<0.01$) influence on the environmental performance. Moreover, the results demonstrate that being located in Finland ($p<0.05$), France, Germany, Portugal and Spain ($p<0.01$) has a significant and positive influence on the environmental performance of family firms.

Table 7

Regression results concerning H3

This table presents the regression results concerning the influence of family control on the environmental performance. Clustered standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Model 1 ENV-SCORE	Model 2 ENV-SCORE	Model 3 ENV-SCORE	Model 4 ENV-SCORE
Family Control	0.009	-17.206	-0.004	-6.929
	(0.115)	(13.617)	(4.961)	(7.421)
Total Assets	2.092	1.937	2.127	2.097
	(3.383)	(3.282)	(3.355)	(3.375)
Tobin's Q	-2.931	-2.945	-2.853	-3.058
	(2.727)	(2.671)	(2.891)	(2.757)
Leverage	-4.851	-5.054	-4.797	-4.762
	(3.295)	(3.410)	(3.290)	(3.282)
Age	-0.016	-0.014	-0.015	-0.017
	(0.039)	(0.037)	(0.040)	(0.038)
Board Size	0.086	0.163	0.182	0.214
	(0.113)	(0.159)	(0.132)	0.(236)
2016	-0.302	-0.267	-0.277	-0.422
	(1.053)	(0.966)	(1.025)	(0.923)
2017	2.342	2.227	2.358*	2.244*
	(1.426)	(1.359)	(1.403)	(1.318)
2018	4.189**	4.117**	4.205**	3.971**
	(1.753)	(1.695)	(1.735)	(1.686)

Consumer	1.906	1.568	1.811	3.305
	(7.755)	(7.496)	(7.585)	(7.573)
Energy	4.034	3.608	3.963	3.614
	(10.069)	(10.058)	(10.097)	(10.037)
Financial Services	-25.540*	-26.486*	-25.751*	-27.416*
	(14.913)	(14.079)	(14.978)	(14.920)
Health Sciences & Wellness	26.378***	26.164***	26.164***	25.525***
	(9.139)	(8.948)	(8.911)	(8.978)
Smart Infrastructure	1.237	2.073	1.047	-0.237
	(10.425)	(10.233)	(10.300)	(10.559)
TMT	-24.839**	-26.186***	-24.895**	-24.121**
	(9.885)	(9.955)	(10.464)	(9.914)
Denmark	18.247	17.096	18.508	18.177*
	(11.239)	(10.712)	(11.297)	(10.757)
Finland	22.420**	24.343**	22.396**	21.142*
	(10.082)	(10.771)	(10.339)	(10.943)
France	30.719***	31.114***	30.669***	31.510***
	(8.771)	(9.350)	(8.692)	(9.595)
Germany	23.839***	21.516**	23.817***	22.596**
	(9.003)	(9.541)	(9.004)	(9.599)
Greece	10.185	8.883	10.183	12.085
	(9.082)	(9.413)	(9.051)	(9.910)
Italy	-3.829	-2.312	-3.811	0.605
	(9.468)	(10.919)	(9.498)	(10.085)
Luxembourg	20.187	20.159	20.233	25.715*
	(12.936)	(13.254)	(12.869)	(14.865)
Netherlands	15.250	13.659	15.279	13.434
	(11.076)	(11.061)	(10.897)	(12.223)
Portugal	31.820***	31.165***	31.903***	35.764***
	(9.610)	(10.441)	(9.575)	(11.668)
Spain	34.472***	34.668***	34.461***	34.653***
	(10.700)	(11.051)	(10.526)	(11.109)
Sweden	10.318	9.405	10.425	12.511
	(26.215)	(25.522)	(26.414)	(27.985)
Switzerland	4.017	3.175	4.064	3.461
	(9.104)	(9.274)	(8.943)	(9.594)
United Kingdom	32.089	31.869	32.296	30.380
	(19.564)	(19.742)	(19.749)	(19.508)
Constant	19.761	26.721	19.539	22.205
	(55.973)	(53.865)	(56.126)	(55.919)
Observations	224	224	224	224
Number of Companies	56	56	56	56
R^2	0.545	0.557	0.546	0.547
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes

4.3.2 H4: Location of Headquarters

Table 8 presents the regression results of H4 concerning the effect of the location of the headquarters on the environmental performance. Existing literature indicates that companies' environmental behavior is related to national regulatory pressure for environmentally-friendly policies (Chan & Welford, 2005; Sarkar, 2008). Companies' involvement in environmental innovative projects tends to be higher if institutions prioritize this involvement (Aguilera-Caracuel et al., 2013; Berrone et al., 2013). Delmas & Montes-Sancho (2010) also demonstrated that institutions have the power to persuade companies to initiate projects that foster the environment.

To measure the influence of the country of establishment, this paper uses the CCPI. This index measures the differences in national environmental performance and compares the climate progress and performance of individual countries. Essentially, the generated score could be considered to demonstrate a country's propensity to care about the environment. The sample period for this regression is 2016-2018 as 2016 is the first year that the CCPI was published. The generated score is on a scale of 0 to 100, with a higher score indicating a better environmental performance.

The results of Model 1 indicate that CCPI negatively and significantly ($p<0.05$) affects the environmental performance of family firms. Yet after the inclusion of year and industry fixed effects, this level of statistical significance disappears in Model 3. The negative coefficient of CCPI in Model 3 suggest that being located in environmentally progressive countries has a negative effect on the environmental performance of family firms. This relationship contradicts the findings of previous literature and is not in line with H3. Due to the insignificance, however, I can neither reject nor accept H3.

The composition of control variables is identical to the regressions of H2 and the results are similar as well. Compared to the baseline year of 2016, family firms appear to improve their environmental performance in 2017 and 2018 ($p<0.1$ and $p<0.05$, respectively). Furthermore, firms that are active in the Financial Services and the Technology, Media & Telecommunication (TMT) sector are significantly ($p<0.1$) worse performers in Model 3, whilst being in the Health Sciences & Wellness sector has a positive and significant ($p<0.1$) influence on the environmental performance.

Table 8

Regression results concerning H4

This table presents the regression results concerning the influence of the location of companies' headquarters on their environmental performance. Clustered standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Model 1	**Model 2**	**Model 3**
VARIABLES	**ENV-SCORE**	**ENV-SCORE**	**ENV-SCORE**
CCPI	-0.323**	-0.109	-0.089
	(0.156)	(0.173)	(0.177)
Total Assets	5.513	4.428	4.815
	(3.557)	(3.674)	(3.154)
Tobin's Q	-0.465	-1.679	-1.314
	(2.568)	(2.475)	(2.509)
Leverage	-3.740	-2.947	-1.778
	(3.845)	(3.634)	(3.649)
Age	0.051	0.043	0.031
	(0.034)	(0.034)	(0.044)
2017		2.348*	2.393*
		(1.215)	(1.260)
2018		3.651**	3.758**
		(1.736)	(1.798)
Consumer			3.388
			(6.192)
Energy			6.383
			(7.695)
Financial Services			-28.407*
			(14.581)
Health Sciences & Wellness			10.476*
			(6.340)
Smart Infrastructure			-0.613
			(7.867)
TMT			-19.633*
			(11.591)
Constant	-8.104	-3.242	-9.590
	(59.256)	(59.952)	(54.830)
Observations	168	168	168
Number of Companies	56	56	56
R^2	0.090	0.073	0.341
Year fixed effects	No	Yes	Yes
Industry fixed effects	No	No	Yes

4.4 Robustness checks

The results in the afore-mentioned sections contradict my hypotheses as I find a negative significant relationship between family firms and environmental performance and no significant relationship with regards to H2a-H3. In order to check the validity of these results, I implement several new variables. The variables *Net sales* and *Market cap* both serve as proxies for firm size, the variable *Net margin* is a proxy for firm profitability and the *Debt-Capital ratio*

is another approach to measuring the leverage of a company. All these variables are retrieved from the Worldscope database. A detailed description of these variables is presented in Table A.1.

The variable *Net sales* equates to a company's gross sales and other operating revenue minus discounts, returns and allowances, while *Market cap* is equal to a company's share price at the end of the year times the common shares outstanding. In line with *Total assets*, the natural logarithm of these variables is computed. The variable *Net margin* is equal to the sum of net income minus the bottom line divided by the net sales or revenues. Whilst the *Debt-Equity ratio* uses common equity as the denominator, the *Debt-Capital ratio* uses the total capital as the denominator. All these variables are frequently used as proxies as they take a different approach with regards to computing firm size, profitability and leverage. These variables are therefore suitable to act as a robustness check because the alternative calculations might alter the main findings.

The coefficients of the newly implemented variables are in line with their counterparts. *Net margin* and *Debt-Capital* do not have a significant influence on the environmental performance. *Net sales* positively and significantly ($p<0.01$) affects the environmental performance, yet the coefficient of *Market cap* is insignificant. This insignificance, however, does not have a substantial effect as the statistical significance of all the robustness models is in line with my original results, regardless of using *Net sales* or *Market cap*. The re-estimation of all my models does not lead to any changes to the statistical significance of my independent variables and I can therefore not draw any different conclusions with regards to H1-H3.

5. The interactive nature of family control variables

The insignificance of my results regarding H3 might be explained by the complex nature of family control variables. Recent research advocates that such variables interact with each other and that combinations of these variables might offer more valuable insights (Basco & Perez-Rodriguez, 2009, 2011; Garcia-Castro & Aguilera, 2014; Lindow et al., 2010; Samara et al., 2018). In order to analyze the range of possible combinations that affect the environmental performance of family firms, I use the fsQCA method. Ragin (2008) first developed this technique and since then it has often featured in family firm and management literature (Bell et al., 2014; Kraus et al., 2016; Samara & Berbegal-Mirabent, 2017). This method enables me to examine a range of combinations of causal variables which lead to a particular outcome, the dependent variable.

As fsQCA is capable of creating combinations of variables that influence the dependent variable, this technique has certain advantages over standard regression techniques. First of all, standard regressions distinguish between variables and allow only the analysis of one isolated variable, while fsQCA allows me to analyze the combined effect of variables on one dependent variable (Roig et al., 2016). I can therefore combine the effect of independent variables of hypothesis 3 rather than looking at each of them individually. Secondly, fsQCA assumes equifinality which means that there are heterogeneous possibilities of causal variables that explain the desired result (Fiss, 2007). For example, both high and low levels of ownership could lead to higher environmental performance depending on the configuration of the other conditions. Lastly, fsQCA might fit certain datasets better as it's not sensitive to outliers or sample size (Pappas et al., 2016; Fiss, 2011).

In my case, I will use fsQCA to identify which combinations of ownership, board presence, family CEO, gender of the CEO and country of residence lead to a higher and lower environmental performance. I select the first three variables to examine whether the fsQCA approach can clarify their influence on environmental performance since traditional regressions resulted in insignificant results (see H3). In line with Samara et al. (2018) I furthermore use the country of residence of firms to distinguish between Anglo-Saxon and non Anglo-Saxon countries since the approach to corporate governance varies between such countries. Anglo-Saxon countries put a large emphasis on the creation of shareholder value, while their counterparts are more focused on the interests of all stakeholders (La Porta et al., 1998, 2000; Yoshimori, 2005). These contrasting perspectives influence corporate decisions with regards to the appointment of executives and directors, such as the desired presence of outside or inside directors (García et al., 2013). I therefore take these contrasting perspectives into account to determine whether certain configurations apply exclusively to one set of countries. My final variable considers the gender of the CEO as Hambrick and Mason (1984) have demonstrated that characteristics of managers and directors affect corporate decisions. The presence of female board members, for example, has been credited with an increase in the corporate social responsibility of firms (Birindelli et al., 2019; Harjoto et al., 2015; Post et al., 2011). These findings are attributed to the fact that female directors are more stakeholder-oriented and are more aware of the environment. As such, the mere presence of a female CEO could potentially change the influence of a configuration on environmental performance. Based on these previous findings I expect the institutional frameworks and governing principles of the country of

residence and the gender of the CEO to play a crucial role in reaching higher environmental performance. I therefore formulate the following hypotheses:

Hypothesis 5a (H5a): The presence of a female CEO has a positive influence on the improvement of environmental performance.

Hypothesis 5b (H5b): The company headquarters being located in a non Anglo-Saxon country has a positive influence on the improvement of environmental performance.

Compared to H5a and H5b it is more difficult to predict the directional effect of my family control measures. Existing literature indicates that these variables could influence performance measures in both directions. Outside board members positively influence performance through their supervisory oversight and professionalism, yet their mere presence evokes the undesired feeling within families of losing control (Le Breton-Miller & Miller, 2016; Cuadrado-Ballesteros et al., 2015). Moreover, if a family member occupies the CEO position, the family has the ability to more directly affect the firm's operations, while this family CEO is also more aware of the preservation of the societal reputation of the company (Bingham et al., 2011; Sharma & Sharma, 2011). This combination of ability and societal incentives can lead to enhanced performance (De Massis et al., 2014). However, the presence of a family CEO could also give rise to familial disputes as other family members compete for control (Chirico & Bau, 2014). These conflicts could be detrimental to the environmental behavior of the firm (Campopiano et al., 2014). Lastly, high levels of ownership suggest that the transfer of generational wealth is an important subject (Bingham et al., 2011). Furthermore, as demonstrated by Campopiano et al. (2014) high levels of ownership result in a close attachment to the firm's operations. These families are therefore more inclined to pursue long-term objectives that benefit their reputation such as creating an environmentally-friendly image (Sharma & Sharma, 2011). On the other hand, high controlling families could focus company's resources on family-centered projects and could deploy arbitrary appointment protocols in favor of family members (Chrisman et al., 2012; Kidwell et al., 2012). This desire for control may induce negligence of stakeholders' interests and could deter families from expenditures that are beneficial to the environment (Kim et al., 2016; Neubaum et al., 2012).

Previous research does not offer a clear overview of the directional influence of my family influence measures. The findings of H2-H2d are furthermore no clear indication either as they are insignificant. As a result, I do not expect each of these family control measures to

have an isolated directional effect on environmental performance. Instead, I formulate the following hypothesis:

Hypothesis 5c (H5c): The presence or absence of family control variables lead to different combinations associated with superior environmental performance.

Hypothesis 5d (H5d): The presence or absence of family control variables lead to different combinations associated with inferior environmental performance.

5.1 Data and methodology

Compared to the sample of H1-H4, I expanded the sample by including global firms as well. I selected the 150 largest public family firms outside of Europe based on the Family Business index. However, during the collection process of both financial and family participation data due to a lack of information 39 more firms are excluded. As a result, I add 111 firms to the original sample of 56 European firms. The entire sample therefore consists of 167 family firms. Table A.15 presents a geographical overview of the sample.

The fsQCA approach varies slightly compared to standard regression analysis with regards to variable characteristics. FsQCA transforms variables into either crisp or fuzzy terms depending on their degree of membership to a certain criterium. Crisp variables are essentially dummy variables that take the value of "0" (absence of the variable) or "1" (presence of the variable). As an example, if a CEO is part of the family, the value of the variable will be "1". Fuzzy terms, on the other hand, are less straightforward and can reflect different degrees of membership. This is the case for variables which are ranked on a scale or for variables that are calculated as percentages. In order to determine 'full' (value of "1") or 'non-full' (value of "0") membership for these variables I use a calibration process. In line with standard practice, I use the 95th percentile as a cut-off point for full membership, the median value as my crossover point and the 5th percentile as the cut-off point for non-full membership (Ragin & Fiss, 2008; Ragin, 2009). Table 9 describes the definition of all variables and the calibration process.

Table 9

Variables and calibration

Condition	Description	Membership threshold		
		Full non-membership	Crossover point	Full membership
Environmental performance[a]	The score for environmental performance	7 (0.05)	56 (0.5)	90 (0.95)
Family share[a]	Control over the firm through voting shares	33 (0.05)	50 (0.5)	77 (0.95)
Board presence[a]	The percentage of board seats occupied by the family	5 (0.05)	19 (0.5)	43 (0.95)
Family CEO[b]	Whether the CEO is a family member	0		1
CEO gender[b]	Whether the CEO is male	0		1
Anglo-Saxon[b]	Whether a country of residence is Anglo-Saxon	0		1

[a] In order to gain meaningful differences between the most environmentally-friendly, the highest level of ownership and the highest level of inside directors firms, certain threshold are implemented. Observations within the 95th (0.95) percentile represent full-membership, while values within the 1st (0.01) percentile indicate non-full membership. The median (0.5) acts as the crossover point.

[b] These variables are crisp-sets which act the same as dummy-variables; the value of 1 indicates the presence of that variable or 0 the absence.

After this calibration process, I can start my analysis by constructing a truth table. This table demonstrates all potential combinations of the 5 antecedent conditions and the number of firms that meet a particular combination. Even though there are 32 (2^5) possibilities, the truth table only depicts 24 combinations which contain at least one firm, as can be seen in Table A.10. If an antecedent condition has the value of "1" it indicates the presence of that condition in accordance with the calibration process. For instance, the first row demonstrates the existence of 58 observations of non Anglo-Saxon firms that have a family share and board presence above the crossover point, the median value, and that are governed by a male CEO.

In line with standard practice, I proceed to logically reduce the truth table by applying a frequency threshold of "1" and a consistency cut-off of 0.75-0.8 (Fiss, 2007; Ragin, 2008). The consistency cut-offs are similar to significance levels, 0.75 being a p-value of <0.05 and 0.8 being a p-value of <0.01. As a consequence of this reduction, I find five causal configurations that can enhance environmental performance and five causal configurations that can deteriorate environmental performance. In order to analyze these configurations two parameters must be taken into account: solution coverage and solution consistency. Both parameters are measured on a scale from 0-1, with both measures indicating a better statistical performance as their score approaches "1". A solution coverage of 0.6 indicates that the final configurations cover 60% of the sample. Hence, coverage resembles the effect size of traditional statistical models as both measurements define the relative importance of the result. Solution consistency tells how well

the overall solutions translate into the desired outcome. Solution consistency requires a score above the applied threshold of 0.75-0.8 and this parameter is therefore similar to significance values. In line with Ragin (2009), I present the findings of the intermediate solution. In contrast to the parsimonious and complex solutions, the intermediate solution employs counterfactuals analysis which is more suitable for smaller sample sizes. Following the notation of Ragin and Fiss (2008) black circles depict the presence of a condition, white circles the absence of a condition and blank cells mean that the condition is not binding in a certain combination.

5.2 Results

5.2.1 Improvement of environmental performance

Table 10 presents 5 causal configurations that foster the environmental performance of family firms. Since the solution consistency is 0.82, which is above the consistency cut-off of 0.81, the overall validity of these configurations meets the recommended threshold of Ragin (2008). The findings therefore suggest that these configurations are sufficiently related to environmental performance. The solution coverage of 0.42 means that the five configurations apply to 42% of the observations in my sample. While this appears to be low, this coverage value is higher than the results of existing literature concerning family firms and their financial performance (García et al., 2013; Kraus et al., 2016; Samara et al., 2018). The results of both parameters are therefore very promising. In order to determine the reliability of my configurations, I performed two robustness checks. I first changed the calibration of my board presence variable from the 5th to the 20th percentile so that a larger proportion of my sample consists of outside directors. Table A.13 demonstrates that the results vary only marginally from Table 10; the solution consistency remains 0.82 while the solution coverage decreases by 0.03 to a value of 0.39. Thereafter, I lowered the membership threshold from the 95th to the 80th percentile for my variable family share so that a larger proportion is considered to be a full member. In line with the previous robustness check, table A.14 shows only a slight variation compared to Table 10; the solution consistency increases by 0.01 to a value of 0.83 while the solution coverage decreases by 0.04 to a value of 0.38. While all five combinations enhance the environmental performance, the pathways differ for each combination. The first three configurations specifically apply to non Anglo-Saxon countries, while combination number four exclusively concerns Anglo-Saxon countries and combination number five presents a pathway in which geographic location is not relevant.

The first combination depicts that non Anglo-Saxon companies can enhance their environmental performance if the family share is relatively low (below the crossover point of

50%), the presence of inside directors is high (above the crossover point of 19%) whilst the CEO is not part of the controlling family. Shareholders in non Anglo-Saxon countries are usually more focused on long-term objectives and the interests of all stakeholders (García et al., 2013; Yoshimori, 2005). These objectives, however, might not be in accordance with the controlling family who could pursue irrational goals that solely benefit them. The absence of a family member being the CEO seems to be critical. The controlling family's decision to appoint a non-family member as CEO, despite their dominance of the board, indicates a level of professionalism. Samara et al. (2018) argue that family members as board directors are more aware of reputational damage and preserving generational wealth. In order to accomplish this objective, such family members value meritocracy during the application process of executives, which could make family members more suitable to occupy board seats than outsiders (Samara & Arenas, 2017). These circumstances assure that the high level of family involvement is not detrimental to the creation of socioemotional wealth. Dominant families in non Anglo-Saxon countries can thus improve their environmental performance by refraining from appointing family members as CEO so that a level of professionalism will contribute to the creation of socioemotional wealth.

The second configuration appears to be in line with existing literature that provides evidence for the positive relationship between family influence and corporate social responsibility (Dyer & Whetten, 2006; Marques et al., 2014). While Samara et al. (2018) advocate the importance of governing mechanisms, such as an outside board, for Anglo-Saxon firms, the composition of the board is not a binding condition in this second combination. The irrelevance of this composition could be explained by two variables. First, García-Castro and Aguilera (2014) demonstrate the country of residence is relevant since in non Anglo-Saxon countries a dominant family and a family CEO could foster financial performance. Secondly, this second combination suggests that female CEOs can influence the outcome. This corresponds to existing literature that credits female executives with improving corporate social behavior (Bear et al., 2010; Harjoto et al., 2015; Post et al., 2011). This combination thus expand the findings of previous research since the presence of an outside board is no longer crucial to balance high levels of family involvement. Both the gender of the CEO and the corporate governance principles could enhance the environmental behavior of family firms.

The third configuration is very similar to the first pathway. The difference concerns the position of the CEO as the origin is no longer a binding condition. However, the CEO must be

male if the family firm desires to enhance their environmental performance. I will expand on this configuration during the overview of the configurations of Table 11.

Configuration number four is the only one that applies exclusively to Anglo-Saxon countries. Similar to the second configuration, high family ownership combined with a family member as CEO can boost environmental performance. In line with Samara et al. (2018) this level of family involvement must be offset by an outside board (less than 19% insiders) in Anglo-Saxon countries. Outside directors can contribute to family firms through their objectivity and expertise to resolve possible familial tension. Recent research furthermore suggests that the presence of family members in executive positions, such as CEO, could attribute to an increase in corporate social responsibility either if the board is dominated by outsiders or if the level of familial ownership is high (Le Breton-Miller & Miller, 2016; Marques et al., 2014). The fourth configuration meets all this conditions and fits therefore perfectly to previous findings.

The fifth and final configuration is similar to the fourth combination with regards to the requirement of high ownership and an outside board. However, the final combination applies to all firms and states that firms could also increase their environmental performance if the firm is led by a female CEO that is not a member of the family. I will expand on this configuration during the overview of the configurations of Table 11.

Table 10

5 configurations leading to higher environmental performance

Configuration no.	**Antecedent conditions**					**Raw coverage**	**Unique coverage**	**Consistency**
	Family ownership	Board presence	Family CEO	CEO gender	Anglo-Saxon			
1	○	●	○		○	0.16	0.00	0.81
2	●		●	○	○	0.01	0.01	0.92
3	○	●		●	○	0.31	0.15	0.81
4	●	○	●	●	●	0.07	0.07	0.84
5	●	○	○	○		0.03	0.03	0.92

Solution coverage: 0.42
Solution consistency: 0.82
Frequency Cut-off: 1.00
Consistency Cut-off: 0.81

5.2.2 Deterioration of environmental performance

Besides examining pathways leading to an improvement of a selected dependent variable, fsQCA also offers the opportunity to create pathways leading into the opposite direction, a deterioration. While in traditional regression models only the sign of coefficient would change, the fsQCA's assumption of asymmetry means that the configurations for the inverse of the

dependent variable are not mere mirror images of the solutions presented in Table 10. Table 11 resembles Table 10 as it offers five different configurations resulting in lower environmental performance. The consistency cut-off for these configurations is 0.75 which is still within the recommended range by Ragin (2008). Since the solution consistency is 0.76, which is above the consistency cut-off of 0.75 the findings therefore suggest that these configurations are sufficiently related to environmental performance. However, both the threshold and the solution consistency are lower compared to Table 10, which indicates a slightly lesser degree of statistical significance. These differences could be compared to a p-value below 0.01 instead of a p-value below 0.05 in the traditional regression models. The solution coverage of 0.37 indicates that the five configurations apply to 37% of the observations in my sample, which again is slightly lower than Table 10. Table 11 presents three different pathways to lower environmental performance that apply exclusively to Anglo-Saxon countries, further strengthening the importance of differentiating between the two corporate governance principles (La Porta et al., 1998, 2000; García et al., 2013).

The first configuration suggests that a female non-family member as CEO will damage the environmental performance in non Anglo-Saxon countries if the family ownership is relatively low (below the crossover point of 50%). This configuration is almost the opposite of the first and third configuration of Table 10 since all three have low family ownership but a high level of board insiders as condition. The comparison of these three could therefore offer valuable insights. While the first configuration of Table 10 is indifferent with regards to the gender of the CEO, the third one requires the CEO to be male in order to boost environmental performance. The presence of a non-family CEO in the first configuration of Table 11 is a sign of professionalism of the family owners, which could benefit environmental performance (Samara & Arenas, 2017). However, the combination of a female CEO and non Anglo-Saxon governance principles, both individually beneficial to environmental performance, could potentially be superfluous. This possibility is confirmed by the second configuration of Table 10 where a female CEO is required to balance high family involvement. Because of her values and beliefs a female CEO could be overachieving with regards to the environment even though the ideal conditions are already in place to boost environmental behavior according to configurations number one and three of Table 10.

The second configuration is the only one in both tables that does not require any level of family ownership. Except for the Anglo-Saxon governing principles, this configuration is identical to the fourth configuration of Table 10. While Anglo-Saxon countries are more

focused on shareholder value, this fourth pathway illustrates the importance of family ownership because of their desire to pursue socioemotional wealth. The second configuration of Table 11 suggests that even in non Anglo-Saxon countries, which are more inclined to value their corporate social responsibility, the lack of a dominant family could be detrimental to the environmental performance of family firms.

The third and fourth configurations are very similar to the third and fourth, respectively, configuration of Table 10 apart from the geographical location. The mere fact that these family firms are governed by Anglo-Saxon principles decreases their environmental performance. All these combinations thus illustrate the relevance of the two contrasting governance principles.

The final combination is characterized by a low level of family involvement as the family ownership is relatively low, the board is dominated by outsiders and the CEO is not a family member. The family potentially lacks the influence to drive their socioemotional wealth agenda which results in a deterioration of environmental behavior. As indicated by this final combination, families' desire for preservation of generational wealth and reputation can not be underestimated.

Table 11

5 configurations leading to lower environmental performance

Configuration no.	Antecedent conditions					Raw coverage	Unique coverage	Consistency
	Family ownership	Board presence	Family CEO	CEO gender	Anglo-Saxon			
1	○	●	○	○	○	0.0	0.0	0.76
2		○	●	●	○	0.16	0.16	0.72
3	○	●		●	●	0.13	0.08	0.77
4	●	○	●	○	●	0.02	0.02	0.99
5	○	○	○		●	0.11	0.06	0.78

Solution coverage: 0.37
Solution consistency: 0.76
Frequency Cut-off: 1.00
Consistency Cut-off: 0.75

Table 10 and 11 demonstrate that there exist several pathways to both increase and decrease the environmental performance of family firms. Both tables depict two pathways of female CEOs being necessary for the respective outcomes, while both tables also present two combinations of male CEOs being necessary for the respective outcome. Table 10 and 11 furthermore do not show a conclusive pattern that indicates the ideal working circumstances for a female CEO. Each configuration varies with regards to the level of ownership, board presence, family CEO and country of residence. As a result, I can not draw any conclusions regarding the effect of

female CEOs on environmental performance, but it is clear that a female does not always positively affect the environmental performance. I therefore reject H5a.

In contrast to this ambiguous result, the Anglo-Saxon variable presents a clearer picture. The findings of Table 10 indicate that for 3 configurations having your headquarters located in countries governed by non Anglo-Saxon principles will result in higher environmental performance, while Table 11 depicts the exact opposite. Despite the fact that the first two configurations of Table 11 state that being located in non Anglo-Saxon countries can deteriorate the environmental performance, the evidence suggests that non Anglo-Saxon institutions and principles have a predominantly positive effect on environmental behavior. I can therefore, with a reasonably high degree of certainty, accept H5b.

In line with the ambiguity of H5a, the interactions between the trio of family control variables are flexible. Among all the 10 combinations of Table 10 and 11 the existence of certain partnerships can not be found. For instance, the combination of relatively high ownership and an outside board leads to positive and negative outcomes depending on the presence, absence or even non-binding condition of the family CEO variable. These findings are in line with recent research that also provide evidence for the fluidity of these variables and emphasize the fact that different circumstances can lead to different outcomes. These findings are in line with my expectations since neither Table 10 nor Table 11 presents a pattern for any family control variable to have an isolated directional effect. Rather than being isolated, the variables interact with each other leading to different pathways that influence superior or inferior environmental performance. I therefore accept H5a and H5b.

6. Discussion and conclusion

The environmental behavior of firms has seen an increase in media attention, which forces firms to take action and improve their behavior (Flammer, 2013). As a result of this increase in public awareness, companies have to find the right balance between making a profit without harming the environment; how to do well while doing good (Guenster et al., 2011)?

Family firms, especially, are well-positioned to walk this line as certain characteristics set these family firms apart from non-family firms. Family firms, for instance, could have alternative objectives, next to the obvious financial objectives, due to differences in their socioemotional wealth perspective (Dekker & Hasso, 2016). As a result, these firms might pursue strategies that are not necessarily driven by economic logic but rather by the family's preferences (Berrone et al., 2012). These investment decisions could be explained by a family's

desire to improve their reputation, their standing in the community, or the state of the world (Berrone et al., 2010). Despite the intentions of controlling families, the empirical literature has not provided conclusive evidence with regards to the relation between family firms and environmental performance. The aim of this paper is to provide more clarity on the relationship between family firms and firms' environmental performance. The results of Table 5 suggest that there exists a negative and significant ($p<0.01$) relationship between family firms and environmental performance. I therefore reject H1 as this result is in contrast with my expectations of a positive relationship.

Whilst the environmental performance of H1 is an important objective for family firms through their socioemotional wealth perspective, the main objective of every company, even of family firms, is the bottom line. I therefore examined the influence of environmental expenditures on financial performance (H2). Berrone et al. (2012) suggest that environmental investments are not necessarily driven by economic logic and this type of investments might therefore be detrimental to the financial performance of the firm. More recent literature suggests that improving environmental behavior can positively affect firms' financial performance (Clarkson et al., 2011; Hart & Dowell, 2011; Singal, 2014). The results of Table 6 suggest that the environmental performance has no significant influence on the financial performance in the subsequent year within family firms. However, Model 2 of Table 6 demonstrates a negative significant ($p<0.05$) relationship within non-family firms. The financial performance of these firms thus deteriorates after an increase in the environmental performance in the previous year. As a result, I can neither reject nor accept H2 with regards to family due to the insignificant results, whilst I reject H2 with regards to non-family firms as the negative relationship is in contrast with my expectations.

I furthermore extend my analysis to examine the drivers of environmental behavior within family firms. I use a sample which consists entirely of family firms to evaluate the influence of ownership fraction, board seats occupied by family members, the origin of the Chairman, the origin of the CEO and the location of the company's headquarters (H4) on the environmental performance of family firms. Each independent variable in H3 allowed the controlling family to exert more control over the firm and daily operations. Based on the desire of families to pursue socioemotional wealth, I thus hypothesize that each independent variable in H3 would have a positive effect on the environmental performance. While some control variables have a significant influence, none of the above-mentioned independent variables

appear to have a significant influence on the dependent variable, the environmental performance. As a result, I am not able to reject or accept H3.

My fourth hypothesis concerns the location of the company's headquarters. Companies' involvement in environmental innovative projects tends to be higher if institutions prioritize this involvement (Aguilera-Caracuel et al., 2013; Berrone et al., 2013). To measure the influence of the country of establishment, this paper uses the CCPI. This index could be considered to demonstrate a country's propensity to care about the environment. The generated score is on a scale of 0 to 100, with a higher score indicating a better environmental performance. The negative coefficient of CCPI in Table 8 suggest that being located in environmentally progressive countries has a negative effect on the environmental performance of family firms. This relationship contradicts the findings of previous literature and is not in line with H4. Due to the insignificance, however, I can neither reject nor accept H4. In order to establish the validity of the above-mentioned results, I subject every regression to robustness checks through the use of different control variables. These robustness checks do not alter the statistical significance of any of my models.

My final hypothesis (H5) concerns the interactive nature of the same family control variables I use for H3. Recent research advocates that such variables interact with each other and that combinations of these variables might offer more valuable insights (Basco & Perez-Rodriguez, 2009, 2011; Garcia-Castro & Aguilera, 2014; Lindow et al., 2010; Samara et al., 2018). In order to analyze the range of possible combinations that affect the environmental performance of family firms, I use the fsQCA method. I will use fsQCA to identify which combinations of ownership, board presence, family CEO, gender of the CEO and country of residence lead to a higher and lower environmental performance. The presence of female board members has been credited with an increase in the corporate social responsibility of firms (Birindelli et al., 2019; Harjoto et al., 2015; Post et al., 2011). I hypothesize that the presence of a female CEO has a positive influence on the improvement of environmental performance. Table 10 and 11, however, do not show a conclusive pattern that indicates the positive influence of a female CEO. I therefore reject H5a. In line with existing literature and my expectations, being located in a non Anglo-Saxon country has a predominantly positive influence on environmental performance. I can therefore, with a reasonably high degree of certainty, accept H5b. In line with the ambiguity of H5a, the interactions between the trio of family control variables are flexible. Among all the 10 combinations of Table 10 and 11 the existence of certain partnerships can not be found. These findings are in line with recent research that also provide evidence for

the fluidity of these variables and emphasize the fact that different circumstances can lead to different outcomes. Rather than being isolated, the variables interact with each other leading to different pathways that influence superior or inferior environmental performance. I therefore accept H5a and H5b.

Despite my contributions to academic literature, my research is not without limitations. First and foremost, my sample size is relatively small as it consists of 103 individual companies, 56 family firms and 47 non-family firms. One should therefore be cautious with drawing any conclusions based on this sample. As a result of the use of the FB index my sample might furthermore be subject to selection bias problems. This might cause problems establishing the generality of my findings as my sample consists of the largest family firms in the world whilst the majority of family firms belongs to the SME segment. The generality of my findings lastly suffers from the fact that my sample comprises public firms even though the majority of family firms are private companies. However, it must be noted that owing to the setup of the FB index the high level of family control in my sample resembles the ownership percentages normally found in private firms. Yet, as a result of the differences in governance structures and access to financial markets any extrapolation of these findings to a sample of private firms is most likely invalid. Moreover, my sample period is relatively short due to data collection restrictions. My findings may therefore be a reflection of a phenomenon that occurred specifically during my sample period rather than a trend that can be identified in the long term. Lastly, the results of Table 6 concerning H2 suggest the existence of a simultaneity bias since financial performance affects the environmental performance, but financial performance itself is also affected by environmental performance.

The aforementioned shortcomings also offer possible avenues for future research. First of all, the problems regarding the selection bias can be overcome. Future research could for example gather data on a sample of smaller public family firms (Miller et al., 2007). Future research could solve the selection bias if it decides to use a large sample of private firms, which in turn could also improve the generality of the research outcomes. The issues relating to the simultaneity bias are difficult to resolve as they require an instrumental variable approach. Current literature has yet to create an instrumental variables that overcomes the bidirectional relationship between financial and environmental performance. To instrument for investments in sustainability, Henderson and Ryabova (2020) used the random variation in rainfall. However, while certain investments are closely related to environmental performance, this approach was deployed on a sample of almond farms. This is a specific industry which is

affected by the weather conditions, whilst it is unlikely that this applies to a sample of large public companies. The issue of an appropriate instrument therefore remains unresolved, but it offers an interesting avenue for future research with potentially groundbreaking implications.

The role of younger generations within the family firm is furthermore an interesting avenue for future research. The participation of the younger generations in family firms is rising as millennials are reaching a certain age at which they are actively getting involved in the business. According to the Deloitte Global Millennial Survey 2020, this generation places a higher value on companies that act in accordance with their own morals and beliefs. Millennials prefer people and planet over profits and they aim to implement their values into the investment strategies of their family businesses. In 2021, the FB index will publish a new version of their index which will contain an indicator on the involvement of younger generations. This new indicator could provide valuable insights as it enables future research to examine the influence of the younger generations whose involvement might improve the environmental performance compared to family firms in which this involvement is relatively low. Next to the role of younger generations, future research might focus on specific intangible aspects. The existing literature indicates that a family's values and beliefs influence the behavior of the firm. Whilst it is difficult to evaluate a family's beliefs and values, the ethnical or religious background could be interesting proxies that might capture these intangible features. Religion and ethnicity prioritize certain values and behavior and can therefore serve as an interesting distinction between families. Insights into these personal characteristics could shed more light on families' motives with regards to the environment. Future research could lastly pursue both the 'intention' and the 'outcome' approach with regards to the assessment of environmental performance. This research and prior research deploy these approaches separately, but it is interesting to see whether the intentions align with the outcome of these intentions.

References

Aguilera-Caracuel, J., & Ortiz-de-Mandojana, N. (2013). Green Innovation and Financial Performance. *Organization & Environment*, *26*(4), 365-385. https://doi.org/10.1177/1086026613507931

Anderson, R., & Reeb, D. (2003). Founding-Family Ownership and Firm Performance: Evidence from the S&P 500. *The Journal Of Finance*, *58*(3), 1301-1328. https://doi.org/10.1111/1540-6261.00567

Arregle, J., Hitt, M., Sirmon, D., & Very, P. (2007). The Development of Organizational Social Capital: Attributes of Family Firms. *Journal Of Management Studies*, *44*(1), 73-95. https://doi.org/10.1111/j.1467-6486.2007.00665.x

Barth, E., Gulbrandsen, T., & Schønea, P. (2005). Family ownership and productivity: the role of owner-management. *Journal Of Corporate Finance*, *11*(1-2), 107-127. https://doi.org/10.1016/j.jcorpfin.2004.02.001

Basco, R., & Pérez Rodríguez, M. (2009). Studying the Family Enterprise Holistically. *Family Business Review*, *22*(1), 82-95. doi: 10.1177/0894486508327824

Basco, R., & Pérez Rodríguez, M. (2011). Ideal types of family business management: Horizontal fit between family and business decisions and the relationship with family business performance. *Journal Of Family Business Strategy*, *2*(3), 151-165. doi: 10.1016/j.jfbs.2011.07.004

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*(2), 207-221. doi: 10.1007/s10551-010-0505-2

Bell, R., Filatotchev, I., & Aguilera, R. (2014). Corporate Governance and Investors' Perceptions of Foreign IPO Value: An Institutional Perspective. *Academy Of Management Journal*, *57*(1), 301-320. doi: 10.5465/amj.2011.0146

Bennedsen, M., Nielsen, K., Perez-Gonzalez, F., & Wolfenzon, D. (2007). Inside the Family Firm: The Role of Families in Succession Decisions and Performance. *The Quarterly Journal Of Economics*, *122*(2), 647-691. https://doi.org/10.1162/qjec.122.2.647

Berle, A., & Means, G. (1933). The Modern Corporation and Private Property. *Virginia Law Review*, *20*(1), 132. https://doi.org/10.2307/1066523

Berrone, P., Cruz, C., & Gomez-Mejia, L. (2012). Socioemotional Wealth in Family Firms. *Family Business Review*, *25*(3), 258-279. https://doi.org/10.1177/0894486511435355

Berrone, P., Cruz, C., Gomez-Mejia, L., & Larraza-Kintana, M. (2010). Socioemotional Wealth and Corporate Responses to Institutional Pressures: Do Family-Controlled Firms Pollute Less?. *Administrative Science Quarterly*, *55*(1), 82-113. https://doi.org/10.2189/asqu.2010.55.1.82

Berrone, P., Fosfuri, A., Gelabert, L., & Gomez-Mejia, L. (2013). Necessity as the mother of 'green' inventions: Institutional pressures and environmental innovations. *Strategic Management Journal*, *34*(8), 891-909. https://doi.org/10.1002/smj.2041

Bertrand, M., Johnson, S., Samphantharak, K., & Schoar, A. (2008). Mixing family with business: A study of Thai business groups and the families behind them. *Journal Of Financial Economics*, *88*(3), 466-498. https://doi.org/10.1016/j.jfineco.2008.04.002

Bingham, J., Gibb Dyer, W., Smith, I., & Adams, G. (2010). A Stakeholder Identity Orientation Approach to Corporate Social Performance in Family Firms. *Journal Of Business Ethics*, *99*(4), 565-585. doi: 10.1007/s10551-010-0669-9

Binz, C., Ferguson, K., Pieper, T., & Astrachan, J. (2017). Family business goals, corporate citizenship behaviour and firm performance: disentangling the connections. *International Journal Of Management And Enterprise Development*, *16*(1/2), 34. doi: 10.1504/ijmed.2017.082549

Birindelli, G., Iannuzzi, A., & Savioli, M. (2019). The impact of women leaders on environmental performance: Evidence on gender diversity in banks. *Corporate Social Responsibility And Environmental Management*. doi: 10.1002/csr.1762

Braam, G., Uit de Weerd, L., Hauck, M., & Huijbregts, M. (2016). Determinants of corporate environmental reporting: the importance of environmental performance and assurance. *Journal Of Cleaner Production*, *129*, 724-734. https://doi.org/10.1016/j.jclepro.2016.03.039

Breton-Miller, I., & Miller, D. (2016). Family firms and practices of sustainability: A contingency view. *Journal Of Family Business Strategy*, *7*(1), 26-33. doi: 10.1016/j.jfbs.2015.09.001

Burkart, M., Panunzi, F., & Shleifer, A. (2003). Family Firms. *The Journal Of Finance*, *58*(5), 2167-2201. https://doi.org/10.1111/1540-6261.00601

Campbell, J. (2007). Why would corporations behave in socially responsible ways? An institutional theory of corporate social responsibility. *Academy Of Management Review*, *32*(3), 946-967. https://doi.org/10.5465/amr.2007.25275684

Campopiano, G., De Massis, A., & Chirico, F. (2014). Firm Philanthropy in Small- and Medium-Sized Family Firms. *Family Business Review*, *27*(3), 244-258. doi: 10.1177/0894486514538450

Carney, M. (2005). Corporate Governance and Competitive Advantage in Family–Controlled Firms. *Entrepreneurship Theory And Practice*, *29*(3), 249-265. https://doi.org/10.1111/j.1540-6520.2005.00081.x

Cennamo, C., Berrone, P., Cruz, C., & Gomez–Mejia, L. (2012). Socioemotional Wealth and Proactive Stakeholder Engagement: Why Family–Controlled Firms Care More about their Stakeholders. *Entrepreneurship Theory And Practice*, *36*(6), 1153-1173. doi: 10.1111/j.1540-6520.2012.00543.x

Chan, J., & Welford, R. (2005). Assessing corporate environmental risk in China: an evaluation of reporting activities of Hong Kong listed enterprises. *Corporate Social Responsibility And Environmental Management*, *12*(2), 88-104. https://doi.org/10.1002/csr.88

Chirico, F., & Bau', M. (2014). Is the Family an "Asset" or "Liability" for Firm Performance? The Moderating Role of Environmental Dynamism. *Journal Of Small Business Management*, *52*(2), 210-225. doi: 10.1111/jsbm.12095

Chrisman, J., Chua, J., & Sharma, P. (2005). Trends and Directions in the Development of a Strategic Management Theory of the Family Firm. *Entrepreneurship Theory And Practice*, *29*(5), 555-575. https://doi.org/10.1111/j.1540-6520.2005.00098.x

Chrisman, J., Chua, J., Pearson, A., & Barnett, T. (2012). Family Involvement, Family Influence, and Family–Centered Non–Economic Goals in Small Firms. *Entrepreneurship Theory And Practice*, *36*(2), 267-293. doi: 10.1111/j.1540-6520.2010.00407.x

Chua, J., Chrisman, J., & Sharma, P. (1999). Defining the Family Business by Behavior. *Entrepreneurship Theory And Practice*, *23*(4), 19-39. https://doi.org/10.1177/104225879902300402

Chua, J., Chrisman, J., Steier, L., & Rau, S. (2012). Sources of Heterogeneity in Family Firms: An Introduction. *Entrepreneurship Theory And Practice*, *36*(6), 1103-1113. https://doi.org/10.1111/j.1540-6520.2012.00540.x

Claessens, S., Djankov, S., Fan, J., & Lang, L. (2002). Disentangling the Incentive and Entrenchment Effects of Large Shareholdings. *The Journal Of Finance*, *57*(6), 2741-2771. https://doi.org/10.1111/1540-6261.00511

Craig, J., & Dibrell, C. (2006). The Natural Environment, Innovation, and Firm Performance: A Comparative Study. *Family Business Review*, *19*(4), 275-288. https://doi.org/10.1111/j.1741-6248.2006.00075.x

Cronqvist, H., & Nilsson, M. (2003). Agency Costs of Controlling Minority Shareholders. *The Journal Of Financial And Quantitative Analysis*, *38*(4), 695. https://doi.org/10.2307/4126740

Cuadrado-Ballesteros, B., Rodríguez-Ariza, L., & García-Sánchez, I. (2015). The role of independent directors at family firms in relation to corporate social responsibility disclosures. *International Business Review*, *24*(5), 890-901. doi: 10.1016/j.ibusrev.2015.04.002

Davis, J., Schoorman, F., & Donaldson, L. (1997). Toward a Stewardship Theory of Management. *The Academy Of Management Review*, *22*(1), 20. https://doi.org/10.2307/259223

Dawkins, C., & Fraas, J. (2010). Coming Clean: The Impact of Environmental Performance and Visibility on Corporate Climate Change Disclosure. *Journal Of Business Ethics*, *100*(2), 303-322. https://doi.org/10.1007/s10551-010-0681-0

De Massis, A., Kotlar, J., Chua, J., & Chrisman, J. (2014). Ability and Willingness as Sufficiency Conditions for Family-Oriented Particularistic Behavior: Implications for Theory and Empirical Studies. *Journal Of Small Business Management*, *52*(2), 344-364. doi: 10.1111/jsbm.12102

Dekker, J., & Hasso, T. (2014). Environmental Performance Focus in Private Family Firms: The Role of Social Embeddedness. *Journal Of Business Ethics*, *136*(2), 293-309. https://doi.org/10.1007/s10551-014-2516-x

Delmas, M., & Montes-Sancho, M. (2009). Voluntary agreements to improve environmental quality: symbolic and substantive cooperation. *Strategic Management Journal*, n/a-n/a. https://doi.org/10.1002/smj.826

Dyer, W., & Whetten, D. (2006). Family Firms and Social Responsibility: Preliminary Evidence from the S&P 500. *Entrepreneurship Theory And Practice*, *30*(6), 785-802. https://doi.org/10.1111/j.1540-6520.2006.00151.x

Eddleston, K., & Kellermanns, F. (2007). Destructive and productive family relationships: A stewardship theory perspective. *Journal Of Business Venturing*, *22*(4), 545-565. https://doi.org/10.1016/j.jbusvent.2006.06.004

Fiss, P. (2007). A set-theoretic approach to organizational configurations. *Academy Of Management Review*, *32*(4), 1180-1198. doi: 10.5465/amr.2007.26586092

Fiss, P. (2011). Building Better Causal Theories: A Fuzzy Set Approach to Typologies in Organization Research. *Academy Of Management Journal*, *54*(2), 393-420. doi: 10.5465/amj.2011.60263120

Flammer, C. (2013). Corporate Social Responsibility and Shareholder Reaction: The Environmental Awareness of Investors. *Academy Of Management Journal*, *56*(3), 758-781. https://doi.org/10.5465/amj.2011.0744

Flören, R., Uhlaner L. M., & Berent-Braun M. M. (2010). Family business in the Netherlands: Characteristics and Success Factors. Retrieved from https://surfsharekit.nl/public/22bec8e8-d99e-4f31-9440-c674b95a3aad

Garcia-Castro, R., & Aguilera, R. (2014). Family involvement in business and financial performance: A set-theoretic cross-national inquiry. *Journal Of Family Business Strategy*, *5*(1), 85-96. doi: 10.1016/j.jfbs.2014.01.006

García-Castro, R., Aguilera, R., & Ariño, M. (2013). Bundles of Firm Corporate Governance Practices: A Fuzzy Set Analysis. *Corporate Governance: An International Review*, *21*(4), 390-407. doi: 10.1111/corg.12024

Gómez-Mejía, L., Haynes, K., Núñez-Nickel, M., Jacobson, K., & Moyano-Fuentes, J. (2007). Socioemotional Wealth and Business Risks in Family-controlled Firms: Evidence from Spanish Olive Oil Mills. *Administrative Science Quarterly*, *52*(1), 106-137. https://doi.org/10.2189/asqu.52.1.106

Grant, D., Bergesen, A., & Jones, A. (2002). Organizational Size and Pollution: The Case of the U.S. Chemical Industry. *American Sociological Review*, *67*(3), 389. https://doi.org/10.2307/3088963

Habbershon, T., & Williams, M. (1999). A Resource-Based Framework for Assessing the Strategic Advantages of Family Firms. *Family Business Review*, *12*(1), 1-25. https://doi.org/10.1111/j.1741-6248.1999.00001.x

Hambrick, D. (2007). Upper Echelons Theory: An Update. *Academy Of Management Review*, *32*(2), 334-343. https://doi.org/10.5465/amr.2007.24345254

Hambrick, D., & Mason, P. (1984). Upper Echelons: The Organization as a Reflection of Its Top Managers. *Academy Of Management Review*, *9*(2), 193-206. doi: 10.5465/amr.1984.4277628

Harjoto, M., Laksmana, I., & Lee, R. (2014). Board Diversity and Corporate Social Responsibility. *Journal Of Business Ethics*, *132*(4), 641-660. doi: 10.1007/s10551-014-2343-0

Jensen, M., & Meckling, W. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal Of Financial Economics*, *3*(4), 305-360. https://doi.org/10.1016/0304-405x(76)90026-x

Karim, S., Manab, N., & Ismail, R. (2019). The dynamic impact of board composition on CSR practices and their mutual effect on organizational returns. *Journal Of Asia Business Studies*, *14*(4), 463-479. doi: 10.1108/jabs-07-2019-0214

Kidwell, R., Kellermanns, F., & Eddleston, K. (2011). Harmony, Justice, Confusion, and Conflict in Family Firms: Implications for Ethical Climate and the "Fredo Effect". *Journal Of Business Ethics*, *106*(4), 503-517. doi: 10.1007/s10551-011-1014-7

Kim, J., Fairclough, S., & Dibrell, C. (2016). Attention, Action, and Greenwash in Family-Influenced Firms? Evidence From Polluting Industries. *Organization & Environment*, *30*(4), 304-323. doi: 10.1177/1086026616673410

King, A., & Lenox, M. (2002). Exploring the Locus of Profitable Pollution Reduction. *Management Science*, *48*(2), 289-299. https://doi.org/10.1287/mnsc.48.2.289.258

Kraus, S., Mensching, H., Calabrò, A., Cheng, C., & Filser, M. (2016). Family firm internationalization: A configurational approach. *Journal Of Business Research*, *69*(11), 5473-5478. doi: 10.1016/j.jbusres.2016.04.158

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1998). Law and Finance. *Journal Of Political Economy*, *106*(6), 1113-1155. doi: 10.1086/250042

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (2000). Investor protection and corporate governance. *Journal Of Financial Economics*, *58*(1-2), 3-27. doi: 10.1016/s0304-405x(00)00065-9

Lindow, C. (2012). A Strategic Fit Perspective on Family Firm Performance. *A Strategic Fit Perspective On Family Firm Performance*, 49-93. https://doi.org/10.1007/978-3-8349-7167-8_4

Lindow, C., Stubner, S., & Wulf, T. (2010). Strategic fit within family firms: The role of family influence and the effect on performance. *Journal Of Family Business Strategy*, *1*(3), 167-178. doi: 10.1016/j.jfbs.2010.08.004

Marques, P., Presas, P., & Simon, A. (2014). The Heterogeneity of Family Firms in CSR Engagement. *Family Business Review*, *27*(3), 206-227. doi: 10.1177/0894486514539004

McConaughy, D., Walker, M., Henderson, G., & Mishra, C. (1998). Founding family controlled firms: Efficiency and value. *Review Of Financial Economics*, *7*(1), 1-19. https://doi.org/10.1016/s1058-3300(99)80142-6

McGee, J. (1998). Commentary on 'corporate strategies and environmental regulations: an organizing framework' by A. M. Rugman and A. Verbeke. *Strategic Management Journal*, *19*(4), 377-387. https://doi.org/10.1002/(sici)1097-0266(199804)19:4<377::aid-smj988>3.0.co;2-s

McGuire, J., Sundgren, A., & Schneeweis, T. (1988). Corporate Social Responsibility and Firm Financial Performance. *Academy Of Management Journal*, *31*(4), 854-872. https://doi.org/10.5465/256342

Melin, L., & Nordqvist, M. (2007). The reflexive dynamics of institutionalization: the case of the family business. *Strategic Organization*, *5*(3), 321-333. https://doi.org/10.1177/1476127007079959

Miller, D., & Le Breton-Miller, I. (2005). Managing for the long run: lessons in competitive advantage from great family businesses. *Choice Reviews Online*, *43*(04), 43-2306-43-2306. https://doi.org/10.5860/choice.43-2306

Miller, D., Le Breton-Miller, I., Lester, R., & Cannella, A. (2007). Are family firms really superior performers?. *Journal Of Corporate Finance*, *13*(5), 829-858. https://doi.org/10.1016/j.jcorpfin.2007.03.004

Minichilli, A., Corbetta, G., & MacMillan, I. (2010). Top Management Teams in Family-Controlled Companies: 'Familiness', 'Faultlines', and Their Impact on Financial Performance. *Journal Of Management Studies*, *47*(2), 205-222. https://doi.org/10.1111/j.1467-6486.2009.00888.x

Morck, R., & Yeung, B. (2003). Agency Problems in Large Family Business Groups. *Entrepreneurship Theory And Practice*, *27*(4), 367-382. https://doi.org/10.1111/1540-8520.t01-1-00015

Neubaum, D., Dibrell, C., & Craig, J. (2012). Balancing natural environmental concerns of internal and external stakeholders in family and non-family businesses. *Journal Of Family Business Strategy*, *3*(1), 28-37. doi: 10.1016/j.jfbs.2012.01.003

Nordqvist, M., Sharma, P., & Chirico, F. (2014). Family Firm Heterogeneity and Governance: A Configuration Approach. *Journal Of Small Business Management*, *52*(2), 192-209. https://doi.org/10.1111/jsbm.12096

Pappas, I. O., Giannakos, M. N., & Sampson, D. G. (2016, April). Making sense of learning analytics with a configurational approach. In *proceedings of the workshop on smart environments and analytics in video-based learning (SE@ VBL), LAK2016*.

Post, C., Rahman, N., & Rubow, E. (2011). Green Governance: Boards of Directors' Composition and Environmental Corporate Social Responsibility. *Business & Society*, *50*(1), 189-223. doi: 10.1177/0007650310394642

Poza, E., Hanlon, S., & Kishida, R. (2004). Does the Family Business Interaction Factor Represent a Resource or a Cost?. *Family Business Review*, *17*(2), 99-118. https://doi.org/10.1111/j.1741-6248.2004.00007.x

Ragin, C. C. (2008).User's guide to fuzzy-set/qualitative comparative analysis.[www.fsqca.com. Fromwww.fsqca.com].

Ragin, C. C. (2009). Qualitative comparative analysis using fuzzy sets (fsQCA). *Configurational comparative methods: Qualitative comparative analysis (QCA) and related techniques*, *51*, 87-121.

Ragin, C. C., & Fiss, P. C. (2008). Net effects analysis versus configurational analysis: An empirical demonstration. *Redesigning social inquiry: Fuzzy sets and beyond*, *240*, 190-212.

Roig-Tierno, N., Huarng, K., & Ribeiro-Soriano, D. (2016). Qualitative comparative analysis: Crisp and fuzzy sets in business and management. *Journal Of Business Research*, *69*(4), 1261-1264. doi: 10.1016/j.jbusres.2015.10.089

Roxas, B., & Coetzer, A. (2012). Institutional Environment, Managerial Attitudes and Environmental Sustainability Orientation of Small Firms. *Journal Of Business Ethics*, *111*(4), 461-476. https://doi.org/10.1007/s10551-012-1211-z

Samara, G., & Arenas, D. (2017). Practicing fairness in the family business workplace. *Business Horizons*, *60*(5), 647-655. doi: 10.1016/j.bushor.2017.05.008

Samara, G., & Berbegal-Mirabent, J. (2017). Independent directors and family firm performance: does one size fit all?. *International Entrepreneurship And Management Journal*, *14*(1), 149-172. doi: 10.1007/s11365-017-0455-6

Samara, G., Jamali, D., Sierra, V., & Parada, M. (2018). Who are the best performers? The environmental social performance of family firms. *Journal Of Family Business Strategy*, *9*(1), 33-43. doi: 10.1016/j.jfbs.2017.11.004

Sarkar, R. (2008). Public policy and corporate environmental behaviour: a broader view. *Corporate Social Responsibility And Environmental Management*, *15*(5), 281-297. https://doi.org/10.1002/csr.167

Sarkis, J., & Cordeiro, J. (2001). An empirical evaluation of environmental efficiencies and firm performance: Pollution prevention versus end-of-pipe practice. *European Journal Of Operational Research*, *135*(1), 102-113. https://doi.org/10.1016/s0377-2217(00)00306-4

Schulze, W., Lubatkin, M., & Dino, R. (2003). Exploring the Agency Consequences of Ownership Dispersion Among The Directors of Private Family Firms. *Academy Of Management Journal*, *46*(2), 179-194. https://doi.org/10.5465/30040613

Sciascia, S., & Mazzola, P. (2008). Family Involvement in Ownership and Management: Exploring Nonlinear Effects on Performance. *Family Business Review*, *21*(4), 331-345. https://doi.org/10.1177/08944865080210040105

Sharma, P., & Nordqvist, M. (2008). A Classification Scheme for Family Firms: From Family Values to Effective Governance to Firm Performance. *Family Values And Value Creation*, 71-101. https://doi.org/10.1057/9780230594227_5

Sharma, P., & Sharma, S. (2011). Drivers of Proactive Environmental Strategy in Family Firms. *Business Ethics Quarterly*, *21*(2), 309-334. https://doi.org/10.5840/beq201121218

Sirmon, D., & Hitt, M. (2003). Managing Resources: Linking Unique Resources, Management, and Wealth Creation in Family Firms. *Entrepreneurship Theory And Practice*, *27*(4), 339-358. https://doi.org/10.1111/1540-8520.t01-1-00013

Starik, M., & Rands, G. (1995). Weaving an Integrated Web: Multilevel and Multisystem Perspectives of Ecologically Sustainable Organizations. *The Academy Of Management Review*, *20*(4), 908. https://doi.org/10.2307/258960

Tokarczyk, J., Hansen, E., Green, M., & Down, J. (2007). A Resource-Based View and Market Orientation Theory Examination of the Role of "Familiness" in Family Business Success. *Family Business Review*, *20*(1), 17-31. https://doi.org/10.1111/j.1741-6248.2007.00081.x

Villalonga, B., & Amit, R. (2006). How do family ownership, control and management affect firm value?. *Journal Of Financial Economics*, *80*(2), 385-417. https://doi.org/10.1016/j.jfineco.2004.12.005

Yoshimori, M. (2005). Does Corporate Governance Matter? Why the Corporate Performance of Toyota and Canon is Superior to GM and Xerox. *Corporate Governance: An International Review*, *13*(3), 447-457. doi: 10.1111/j.1467-8683.2005.00439.x

Zellweger, T. (2015). The 500 largest family firms in the world. *Global family business index.*

Appendix

Table A.1

Description of variables

Variable	Description
ENV-score	The score a company receives based on the performance indicators of the Datastream database
Family firm (dummy)	If a firm is a family firm based on the conditions of the FB index, this variable will be 1
Family share	The percentage of control a family has over the company
Family members in the BoD (dummy)	If a family member is a BoD member, this variable will be 1
Family BoD participation	The percentage of board seats that is occupied by family members
Chairman of the BoD (dummy)	If a family member is the Chairman of BoD, this variable will be 1
CEO (dummy)	If a family member is the CEO, this variable will be 1
ROA	(Net Income – Bottom Line + ((Interest Expense on Debt-Interest Capitalized) * (1-Tax Rate))) / Average of Last Year's and Current Year's Total Assets * 100
Net margin	Net Income – Bottom Line / Net Sales or Revenues * 100
Anglo-Saxon (dummy)	If a country is considered to be part of the Anglo-Saxon governance principles, this variable will be 1
Country	The country in which the headquarters are located (see Table A.6 and A.7)
Region	Family firms are divided over 5 different European regions: Benelux, Rhineland countries, Southern Europe, United Kingdom, Scandinavia (see Table A.6)
Sector	The industry in which the company's operations are focused
Total assets	The sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets
Company age	The difference between the founding year of the company and a particular year used in the regression
Debt-Equity ratio	(Long Term Debt + Short Term Debt & Current Portion of Long Term Debt) / Common Equity * 100
Debt-Capital ratio	(Long Term Debt + Short Term Debt & Current Portion of Long Term Debt) / (Total Capital + Short Term Debt & Current Portion of Long Term Debt) * 100
Market cap	The number of common shares outstanding times the share price at the end of the year
Net sales	The gross sales and other operating revenue minus discounts, returns and allowances
CCPI	The measure of a country's environmental performance given by the CCPI

Table A.2

Summary statistics before the winsorizing-process

This table presents the descriptive statistics of all variables. The chosen time period is 2015-2018 for this sample, which consists of 103 unique companies and 412 firm-year observations.

Firm type	Variable	Mean	St.dev	Min.	Median	Max.	Obs.
Non-family firms	Env-score	80.694	14.184	39.860	83.780	99.110	188
	Industry	1.766	1.421	1.000	1.000	6.000	188
	Leverage	-18,591%	1848	-25130%	66.275%	1671%	188
	Total Assets	17.933	1.355	14.775	18.052	20.622	188
	ROA	6.653%	7.203	-4.650%	5.350%	44.570%	188
	Age	85.606	60.836	7	91.5	204	188
Family firms	Env-score	64.250	22.540	0.000	66.825	97.650	224
	Industry	1.214	0.797	1.000	1.000	6.000	224
	Leverage	89.365%	420.97	-2920%	55.895%	4596%	224
	Total Assets	16.75	1.52	13.95	16.38	21.45	224
	ROA	6.269%	5.28	-11.800%	5.695%	26.660%	224
	Age	99.857	69.015	11	88.5	350	224

Table A.3

Correlation matrix before the winsorizing-process

This table presents the correlation between all the variables. The chosen time period is 2015-2018 for this sample, which consists of 103 unique companies and 412 firm-year observations.

	Family firm	Env-score	Total Assets	Leverage	ROA	Age	Industry
Family firm	1.00						
Env-score	-0.39	1.00					
Total Assets	-0.38	0.28	1.00				
Leverage	0.04	-0.01	0.01	1.00			
ROA	-0.03	-0.02	-0.29	-0.01	1.00		
Age	0.11	0.04	-0.05	0.05	-0.03	1.00	
Industry	-0.24	-0.04	0.35	0.03	-0.20	0.14	1.00

Table A.4

Correlation matrix per firm type before the winsorizing-process

This table presents the correlation between all the variables per firm type. The chosen time period is 2015-2018 for this sample, which consists of 103 unique companies and 412 firm-year observations.

		Env-score	Total Assets	Leverage	ROA	Age	Industry
Non-family	Env-score	1.00					
	Total Assets	0.19	1.00				
	Leverage	0.02	0.02	1.00			
	ROA	-0.18	-0.34	0.01	1.00		
	Age	0.01	-0.04	0.07	-0.07	1.00	
	Industry	-0.03	0.42	0.06	-0.3	0.27	1.00
		Env-score	**Total Assets**	**Leverage**	**ROA**	**Age**	**Industry**
Family	Env-score	1.00					
	Total Assets	0.15	1.00				
	Leverage	-0.02	0.07	1.00			
	ROA	0.07	-0.32	-0.1	1.00		
	Age	0.13	0.02	0.01	0.02	1.00	
	Industry	-0.31	0.15	-0.06	-0.05	0.06	1.00

Table A.5

Activities of family members

The final sample consists of 56 family firms over a period of 4 years (2015-2018). As a result there are 224 firm-year observations. This table shows the participation of family members within the company.

Family participation	Number of firms
Board of Directors (BoD)	
Family members within the BoD	205
No family members within the BoD	19
Chairman of the Board	
Family member is the Chairman	122
Outside Chairman	102
CEO	
Family member is the CEO	72
Outside CEO	152

Table A.6

Geographical division of family firms

The family firms are located in 14 different countries: Belgium, Denmark, Finland, France, Germany, Greece, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. However the companies are not distributed equally over all the countries. Europe is furthermore categorized in 5 regions: Anglo-Saxon countries, Benelux, Rhineland countries, Scandinavia and Southern Europe.

Region	Country of residence	Number of family firms
Scandinavia	Denmark	1
	Finland	1
	Sweden	2
	Total	**4**
Southern Europe	Portugal	2
	Italy	3
	Spain	4
	Greece	2
	Total	**11**
Benelux	Belgium	5
	the Netherlands	3
	Luxembourg	2
	Total	**10**
Rhineland countries	France	12
	Switzerland	7
	Germany	10
	Total	**29**
Anglo-Saxon countries	the United Kingdom	2
	Total	**2**
Europe	**Total**	**56**

Table A.7

Geographical division of Stoxx Europe 50 companies

The SE50 companies are located in 9 different countries: Belgium, Denmark, France, Germany, Italy, the Netherlands, Spain, Switzerland and the United Kingdom.

Country of residence	**Number of SE50 companies**
Belgium	1
Denmark	1
France	9
Germany	9
Italy	2
the Netherlands	1
Spain	3
Switzerland	5
the United Kingdom	16
Total	**47**

Table A.8

Industry overview of the entire sample

The entire sample consists of 103 companies. The Worldscope database assigns each company to one of the following six industries: Industrial, Utility, Transportation, Bank/Savings & Loan, Insurance and Other Financial.

Industry	**Number of companies**
Industrial	84
Utility	7
Transportation	3
Bank/Savings & Loan	3
Insurance	4
Other Financial	2
Total	**103**

Table A.9

Industry overview of the family firms sample

The sample of family firms consists of 56 companies. The FB index assigns each family firm to one of the seven following industries: Advanced Manufacturing & Mobility, Consumer, Energy, Financial Services, Health Sciences & Wellness, Smart Infrastructure and Technology, Media & Telecommunication.

Industry	**Number of firms**
Advanced Manufacturing & Mobility	10
Consumer	18
Energy	10
Financial Services	4
Health Sciences & Wellness	3
Smart Infrastructure and Technology	5
Technology, Media & Telecommunication (TMT)	6
Total	**56**

Table A.10

Climate Change Performance Index scores

The CCPI measures the differences in national environmental performance from 2016-2018. The generated score could be considered to demonstrate a country's propensity to care about the environment.

Country	**2016**	**2017**	**2018**
Belgium	68.73	62.08	49.60
Denmark	71.19	61.87	59.49
Finland	58.27	56.28	66.55
France	65.97	66.17	59.80
Germany	58.39	56.58	56.58
Greece	55.06	58.29	47.86
Italy	62.98	60.72	59.65
Luxembourg	62.47	62.86	55.54
the Netherlands	54.84	57.10	49.49
Norway	54.65	52.90	67.99
Portugal	59.52	62.47	59.16
Spain	52.63	56.14	48.19
Sweden	69.91	66.15	74.32
Switzerland	62.09	61.66	61.20
the United Kingdom	70.13	66.10	66.79

Table A.11

Overview of the Hausman test

	Coefficients			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	FE	RE	Difference	S.E.
Total assets	.179	2.665	-2.486	1.900
ROA	.016	.039	-.024	.0370
Leverage	-.029	-.022	-.007	.005
Age	1.037	.038	.999	.285
Year				
2016	-.931	-.043	-.887	.
2017	-.300	1.561	-1.861	.

b= consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(12) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 2.28

Prob>chi2 = 0.8923

Table A.12

Truth table

Antecedent conditions					Sample	
Family share	**Board presence**	**Family CEO**	**CEO gender**	**Anglo-Saxon**	**# Firms**	**%**
1	1	1	1	0	58	11,4
1	0	0	1	0	52	10,2
1	1	0	1	0	43	8,5
1	0	0	1	1	31	6,1
1	1	1	1	1	26	5,1
1	0	1	1	0	22	4,3
1	1	0	1	1	12	4,1
1	0	0	0	1	6	1,2
1	0	1	0	1	6	1,2
1	0	1	1	1	6	1,2
1	0	0	0	0	3	0,6
1	0	1	0	0	2	0,4
1	1	1	0	0	1	0,2
1	1	0	0	0	0	0
1	1	0	0	1	0	0
1	1	1	0	1	0	0
0	0	0	1	0	49	9,7
0	1	0	1	0	36	7,1
0	1	1	1	0	31	6,1
0	0	1	1	0	21	4,1
0	0	0	1	1	21	4,1
0	1	1	1	1	18	3,6
0	0	1	1	1	17	3,4
0	1	0	1	1	10	2,0
0	1	1	0	0	6	1,2
0	1	0	0	0	3	0,6
0	0	0	0	1	3	0,6
0	0	0	0	0	0	0
0	0	1	0	0	0	0
0	1	0	0	1	0	0
0	0	1	0	1	0	0
0	1	1	0	1	0	0

Table A.13

5 configurations leading to higher environmental performance: board presence increased from 5th percentile to 20th percentile

Configuration no.	Antecedent conditions					Raw coverage	Unique coverage	Consistency
	Family ownership	Board presence	Family CEO	CEO gender	Anglo-Saxon			
1	○	●	○		○	0.15	0.00	0.81
2	●		●	○	○	0.01	0.01	0.92
3	○	●		●	○	0.28	0.15	0.81
4	●	○	●	●	●	0.07	0.07	0.84
5	●	○	○	○		0.03	0.03	0.92

Solution coverage: 0.39
Solution consistency: 0.82
Frequency Cut-off: 1.00
Consistency Cut-off: 0.81

Table A.14

5 configurations leading to higher environmental performance: Family share decreased from 95th percentile to 80th percentile

Configuration no.	Antecedent conditions					Raw coverage	Unique coverage	Consistency
	Family ownership	Board presence	Family CEO	CEO gender	Anglo-Saxon			
1	○	●	○		○	0.15	0.00	0.81
2	●		●	○	○	0.01	0.01	0.92
3	○	●		●	○	0.27	0.13	0.82
4	●	○	●	●	●	0.07	0.07	0.86
5	●	○	○	○		0.03	0.03	0.86

Solution coverage: 0.38
Solution consistency: 0.83
Frequency Cut-off: 1.00
Consistency Cut-off: 0.81

Table A.15

Geographical overview of the sample

The family firms are located in 32 different countries: Australia, Belgium, Brazil, Canada, Chile, China, Denmark, Finland, France, Germany, Greece, Hong Kong, India, Indonesia, Israel, Italy, Japan, Luxembourg, Malaysia, Mexico, the Netherlands, Philippines, Portugal, Singapore, South-Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, United Kingdom, United States.

Region	Country of residence	Number of family firms
	China	8
	Hong Kong	6
	India	8
	Indonesia	3
	Israel	1
	Japan	4
Asian	Malaysia	3
	Philippines	3
	Singapore	1
	South-Korea	7
	Taiwan	3
	Thailand	1
	Total	**48**
	Portugal	2
	Italy	3
	Spain	4
	Greece	2
	Belgium	5
	the Netherlands	3
	Luxembourg	2
Europe	France	12
	Switzerland	7
	Germany	10
	Denmark	1
	Sweden	2
	Finland	1
	Total	**54**
	the United Kingdom	2
	the United States	36
Anglo-Saxon countries	Canada	14
	Australia	1
	Total	**53**

South-America	Brazil	1
	Chile	2
	Mexico	9
	Total	**12**
Global sample	**Total**	**167**