Corporate finance and climate efforts in family firms: European evidence

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Table of contents

Note: As Annex I and Annex II are embedded as published article versions, shown page numbers may differ from the rest of the document.

List of abbreviations

AOM	Academy of Management
BGD	Board gender diversity
BvD	Bureau van Dijk (commercial data provider)
CDP	Carbon Disclosure Project
CO2	Carbon dioxide
CP	Carbon performance
CSDDD	Corporate Sustainability Due Diligence Directive
CSR	Corporate Social Responsibility
CSRD	Corporate Sustainability Reporting Directive
EAA	European Accounting Association
EP	Environmental performance
EU	European Union
EU ETS	EU Emissions Trading System
EU GBS	EU Green bond standard
EURAM	European Academy of Management
FAT	Finance, Accounting, and Tax
FF	Family firm
FO	Family ownership
FP	Financial performance
GB	Green bond
GBP	Green bond principles
GMM	Generalized method of moments
ICMA	International Capital Market Association
LSEG	London Stock Exchange Group (commercial data provider)
SBT	Science-based target
SBTi	Science-based targets initiative
SEW	Socioemotional wealth
SLB	Sustainability-linked bond
SLBP	Sustainability-linked bond principles
SMEs	Small and medium-sized enterprises
VHB	Verband der Hochschullehrerinnen und Hochschullehrer für Betriebswirtschaft e.V.

List of tables

List of figures

1. Introduction

1.1. Motivation and relevance

As one of the most pressing environmental issues on a global scale, climate change and carbon emissions as a key source of environmental harm have attracted substantial research attention (Hahn et al. 2015). In line with the growing urgency of climate change mitigation, corporate climate efforts are under substantial public scrutiny (Qian and Schaltegger 2017). In the wider context of the corporate social responsibility (CSR) literature, carbon emissions represent one of the central research topics addressed under the environmental subpillar of CSR (Block et al. 2023). Within Europe, carbon emissions have been at the regulatory forefront for several years (Velte 2024a). Considering the EU Green Deal's climate neutrality objective until 2050, the dominant role of climate change materializes through extensive carbon reporting duties in line with the Corporate Sustainability Reporting Directive (CSRD), the EU Taxonomy Regulation, and the Corporate Sustainability Due Diligence Directive (CSDDD)[1]. Thus, given the strong emphasis on climate legislation, the European capital market provides a particularly apposite setting to explore corporate climate efforts.

Despite the strong emphasis on carbon emissions in regulatory practice and in research, the carbon literature is facing persistent challenges to differentiate between symbolic and substantive efforts, referred to as *'climate talk and walk'* (Coen et al. 2022; Bingler et al. 2024; Morrison et al. 2024). With the historical diffusion of voluntary reporting regimes such as the CDP (formerly: Carbon Disclosure Project) as well as the more recent uptake of mandatory sustainability reporting duties under the EU CSRD, the carbon footprint of European firms is becoming increasingly transparent (Hummel and Jobst 2024). Yet, although more firms account for their emissions and specify their management approaches to reduce them, it frequently

[1] Notably, at the time of writing, European sustainability legislation is being discussed controversially, as the pending 'Omnibus' discussions intend to simplify and revise several regulations, accompanied by a wider political shift to re-consider regulatory priorities on a European level (Velte et al. 2025).

remains challenging to distinguish between substantive and merely symbolic climate efforts (Coen et al. 2022; Bingler et al. 2024). While previous research has emphasized differences between symbolic and substantive climate efforts (Morrison et al. 2024; Taglialatela et al. 2024), the literature has not yet exploited the full potential to distinguish between climate talk and climate walk. Specifically, there are considerable research gaps to leverage data concerning the process of setting, validating, and finally achieving emission reduction targets as a new means to distinguish between climate talk and walk.

Against this background, analyses of carbon emissions are also becoming increasingly integrated with traditional business disciplines such as finance and accounting research. On the one hand, building on the 'business case for sustainability' concept, a rich stream of literature has focused on the financial performance (FP) consequences of carbon emissions (Busch and Lewandowski 2018; Schaltegger et al. 2019; Velte 2024b). Overall, while the carbon-FP relationship proves dynamic, prior results tend to suggest a positive link between carbon and FP (Busch and Lewandowski 2018; Bendig et al. 2023; Aswani et al. 2024). On the other hand, dedicated sustainable finance markets have emerged (Singhania et al. 2024), incorporating environmental objectives such as carbon emission reductions in novel financial products, e.g., green bonds or sustainability-linked bonds (Flammer 2021; Feldhütter et al. 2024).

These issues are of significant relevance for the particular group of family firms (FFs) (Block et al. 2023; Gómez-Mejía et al. 2025), which constitute one of the most prevalent organizational forms around the world (Carney et al. 2015; Miroshnychenko et al. 2022). FFs represent a large fraction of the European economy, contributing significantly to both the overall economic output and carbon emissions (Botero et al. 2015; Gregorič et al. 2022). Thus, family owners as key decision makers in many European firms are uniquely positioned to boost (or slow down) the green transformation of the European economy. Besides their economic relevance, research concerning the sustainability behaviours of FFs holds promising conceptual opportunities for

novel insights due to important overlaps between typical FF characteristics and the (environmental) sustainability literature (Ardito et al. 2024; Lorenzen et al. 2024; Miroshnychenko et al. 2024). This includes FF-specific motives such as long-term orientation (Memili et al. 2018; Dou et al. 2019; Kavadis and Thomsen 2023), the willingness to preserve value(s) across generations (Magrelli et al. 2022) as well as the accountability of the owning families within their respective communities (Richards et al. 2017), all of which tend to align well with supposed pro-environmental business conduct among family firms. Yet, empirical evidence remains mixed (Miroshnychenko et al. 2024).

Specific climate- and carbon-related investigations concerning FFs have emerged in the literature only more recently (Block et al. 2023; Borsuk et al. 2024; Oussii and Jeriji 2024; Gómez-Mejía et al. 2025). First results suggest that FFs emit less carbon, while also communicating less about their climate efforts (Borsuk et al. 2024; Dyck et al. 2024; Gómez-Mejía et al. 2025). At the same time, FFs have been found to be less sensitive to external stakeholder pressure in their decarbonization strategies (Block et al. 2023). Yet, these results are subject to several contingencies, questioning their validity among European publicly listed firms (Dyck et al. 2024; Lorenzen et al. 2024). Overall, this leaves several important research questions unanswered, including the likelihood of publicly listed European FFs to engage in symbolic and substantive climate efforts (see 1.1. for a more detailed discussion).

Considering the mixed prior evidence regarding environmental sustainability among FFs (Miroshnychenko et al. 2022; Miroshnychenko et al. 2024), scholars increasingly highlight the ambivalent nature of FFs. Several recent studies portray FFs as a breed of extremes which tends to “gravitate toward unusual and opposite extremes in their behavior toward stakeholders and their strategic initiatives” (Miller and Le Breton-Miller 2021). Accordingly, FFs have been found to exhibit distinct, non-homogeneous environmental strategies (Hsueh et al. 2023; Zhu et al. 2025). Therefore, it is crucial to acknowledge that not all FFs behave alike. Due to

significant variation within empirical research, previous studies emphasize the need to consider the nuanced differences among FFs (Fehre and Weber 2019; Neubaum et al. 2019). Reflecting the growing focus on differences among FFs, the theme of *family business heterogeneity* has elicited substantial research interest. Being defined as "the range of categorical and/or variational difference(s) between or among family firms" (Daspit et al. 2021), heterogeneity influences FFs in many different ways (Bauweraerts et al. 2020; Forés et al. 2022; Francesco et al. 2024). While heterogeneity as an overarching phenomenon also affects climate strategies among FFs, it extends to other research streams, too. Compared to the emerging literature of carbon emissions in FFs, other mature research fields have accumulated a more comprehensive body of evidence concerning the role of heterogeneity. This includes the second area of interest for this dissertation, namely finance, accounting and tax research among FFs. Heterogeneity has been found to affect FF financing behavior (Comino-Jurado et al. 2021), the way FFs manage and report their earnings (Umans and Corten 2022), and the extent to which FFs engage in tax avoidance (Temouri et al. 2021). Yet, although being identified as an important phenomenon (Michiels and Molly 2017), the understanding of heterogeneity remains fragmented. Especially, the scope of dissimilarities, their empirical operationalization, as well as the corresponding effects of heterogeneity remain largely unexplored, indicating opportunities for a comprehensive investigation into the role of heterogeneity across these domains.

The research gaps that underpin this dissertation, which have been briefly introduced above, will be elaborated in more detail in the next section. In line with the chronological order of the articles, first the role of heterogeneity for finance, accounting, and tax policies in FFs will be discussed (Article 1). The focus will then shift toward corporate climate efforts and their financial consequences during the further course of the analysis (Article 2 and 3).

1.2. Research gaps

Within the dissertation, three distinct research objectives will be addressed. These objectives extend across two key areas of interest: the role of family business heterogeneity in finance research as well as corporate climate efforts among European businesses. These domains share several interfaces throughout the dissertation, first and foremost because the unique governance structure of FFs is at the core of all research articles. Yet, the studies also reflect organic shifts in the research focus of the dissertation. Thus, in the following the underlying research gaps, their connections, but also their respective differences will be emphasized.

The first article addresses finance, accounting, and tax research among FFs, which has been subject to frequent inquiry (Prencipe et al. 2014; Michiels and Molly 2017; Carbone et al. 2025). Accordingly, FFs have been associated with idiosyncratic consequences for financing decisions (Thiele and Wendt 2017; Hansen and Block 2021; Vekemans et al. 2025), the way they manage and report their earnings (Achleitner et al. 2014; Umans and Corten 2022), as well as their corporate tax strategies (Kovermann and Wendt 2019; Bauweraerts et al. 2024; Cirillo et al. 2025). However, although FFs are collectively associated with distinct finance, accounting and tax (FAT) policies, notable inconsistencies persist in the literature (Michiels and Molly 2017; Brune et al. 2021). Researchers have increasingly focused on *heterogeneity among FFs* to explain and resolve conflicting evidence (Nordqvist et al. 2014; Daspit et al. 2018; Memili and Dibrell 2019). Thus, deviating from the prevailing view that tends to consider FFs as a homogeneous group, research concerning heterogeneity raises questions about potential dissimilarities among FFs that may explain distinct behaviors within specific sub-groups of FFs. Yet, while heterogeneity among FFs is linked to significant variation concerning FAT policies, the understanding of heterogeneity remains limited. Specifically, heterogeneity is frequently used as an umbrella term for a wide array of differences. The specific dimensions of heterogeneity are rarely explored in further detail, resulting in a largely insufficient

understanding concerning the scope and consequences of heterogeneity (Dibrell and Memili 2019; Daspit et al. 2021). This research gap is puzzling, given the broad consensus that family business heterogeneity represents an important contingency in FAT policies among FFs. Consequently, there are several calls for research to study the role of heterogeneity for financing decisions (Michiels and Molly 2017), dividend strategies (Molly and Michiels 2021), as well as tax planning and earnings management (Brune et al. 2021). Therefore, addressing these calls for research, the first objective of this dissertation is to develop a better understanding of family business heterogeneity in FAT policies (Research objective 1).

> ***Research objective 1****: Investigate the role of family business heterogeneity in FAT policies to understand the dimensions and consequences of heterogeneity, as well as derive recommendations for future research.*

Turning toward the second research area of interest, the focus of the dissertation then shifts to corporate climate efforts among European firms. As outlined in the introduction, there has been a strong uptake in research interest concerning the sustainability strategies of FFs, with an emerging literature focusing on the specific climate implications of family involvement (Block et al. 2023; Borsuk et al. 2024; Gómez-Mejía et al. 2025). As presumably long-term-oriented types of owners, family owners are associated with peculiar sustainability motives (Miroshnychenko et al. 2022; Kavadis and Thomsen 2023; Lorenzen et al. 2024). Considering the strong emphasis on climate matters within European sustainability legislation, as well as the urgent need for firms to contribute to the European climate neutrality ambition more generally, the role of European FFs in their quest to decarbonize business operations is crucial. In this regard, researchers have identified several ambivalent characteristics of FFs that may portray them as more conscious of their environmental and climate impacts, while also emphasizing that they may be less sensitive towards environmental harm under certain conditions (Kavadis and Thomsen 2023; Miroshnychenko et al. 2024). This has resulted in

growing scholarship explicitly stressing the 'dual' or 'bivalent' nature of family involvement across different aspects of sustainability (Miller and Le Breton-Miller 2021; Hsueh et al. 2023; Li et al. 2023). Specific studies with a distinct climate focus have only emerged more recently (Block et al. 2023; Borsuk et al. 2024; Gómez-Mejía et al. 2025). These indicate that FFs emit less carbon, especially after the Paris agreement, despite lower public commitments to reduce emissions (Borsuk et al. 2024). Moreover, FFs under the European Emission Trading System are found to exhibit better CP, from which they tend to benefit more financially (Gómez-Mejía et al. 2025). At the same time, family-owned small- and medium-sized enterprises (SMEs) tend to be less reactive towards external stakeholder pressures in their decarbonization strategies (Block et al. 2023). However, compared to other environmental outcomes, relatively little is known about the specific climate strategies of FFs overall (Miroshnychenko et al. 2022; Lorenzen et al. 2024).

This holds true especially in comparison to the wider carbon literature that has already comprehensively explored several important corporate governance determinants of climate efforts, including the the role of board governance (Villiers et al. 2011; Velte 2024b). The board of directors plays a crucial role in aligning corporate objectives with stakeholder demands to improve carbon outputs (Michelon and Parbonetti 2012; Dyck et al. 2023). As an important aspect of board composition, prior research has attributed particular attention to the role of board gender diversity (BGD), which is regarded as a 'sustainable' or 'renewable' governance mechanism in the sense that higher female representation may instill pro-environmental thinking within the board (Dyck et al. 2023; Velte 2025). Empirically, this notion tends to be supported, indicating positive consequences of BGD for carbon performance and reporting (Konadu et al. 2022; Nimer et al. 2024; Velte 2025). Yet, studies also raise questions as to what extent gender diverse boards actually catalyze substantive climate action beyond merely symbolic improvements (Haque 2017; Ghitti et al. 2024; Taglialatela et al. 2024).

Considering that the literature faces persistent difficulties to distinguish between symbolic and substantive climate efforts (Coen et al. 2022; Bingler et al. 2024; Morrison et al. 2024), several research gaps can be identified. For instance, it remains unclear to what extent female directors contribute to the formalization of decarbonization strategies by means of setting decarbonization targets and what role they subsequently play in meeting these commitments. Specifically, no prior study has analyzed the role of female board members in the process of setting, validating, and finally achieving decarbonization targets as a new means to distinguish between climate talk and walk. Meanwhile, the implications of gender equality within corporate governance have also been gaining increasing relevance within family business research (Dyck et al. 2023; Duran et al. 2025; Vastola et al. 2025). First studies have started to assess the nexus between FFs, BGD and carbon emissions (Oussii and Jeriji 2024), indicating promising research opportunities. From a heterogeneity perspective, the role of female directors in FFs can provide novel explanations for ambiguous research findings at the family- vs. non-family level. Integrating perspectives from the family business, gender and carbon literature may therefore help to advance the understanding of climate strategies in FFs, which are plagued by similar concerns to distinguish symbolic and substantive efforts (Miroshnychenko et al. 2022).

The European capital market provides a particularly suitable context for this analysis. This relates to the significant relevance of family owners in general, but also to the growing focus on gender equality in corporate governance (e.g., see EU BGD Directive discussed in Section 3.3). Thus, taking into account prior calls for research to investigate the non-trivial relationship between symbolic and substantive climate efforts, as well as the opportunities at the nexus between FO and BGD to understand the heterogeneous climate behavior of family-owned firms, the second article aims to answer the research question of how BGD and FO affect corporate climate action, and whether BGD and FO influence climate talk and walk differently (Research objective 2).

Research objective 2: *Investigate the joint and individual role of BGD and FO for symbolic and substantive climate strategies (talk and walk) within the European capital market*

Going beyond the underlying climate performance itself, scholars frequently raise the question whether *it pays to be green* (Ambec and Lanoie 2008; Bendig et al. 2023; Gangi et al. 2025). Accordingly, the financial performance (FP) implications of superior carbon performance (CP) have been subject to frequent inquiry. In line with the business case for sustainability concept, prior research tends to support the perspective of CP being associated with positive financial consequences (Busch and Lewandowski 2018; Velte et al. 2020). As an important intermediate mechanism between the intention to reduce emissions and subsequent action, also the role of emission reduction targets has gained increasing research attention (Ioannou et al. 2016; Callery and Kim 2024; Dahlmann 2024). However, although target setting is associated with similar positive consequences for FP (Bendig et al. 2023; Liu et al. 2023; Ben-Amar et al. 2024), prior research has until today largely neglected the *actual achievement* of these targets (i.e., measured at the individual target-level). Thus, it remains unclear whether meeting or not meeting emission reduction targets benefits FP in a similar fashion. Therefore, Bendig et al. (2023) have called for research to empirically assess the impact of *achieved* emission reduction targets on FP. This is of particular importance, as targets merely signal the intention to reduce emissions, but are frequently not achieved as intended (Malen 2022; Callery and Kim 2024; Dahlmann 2024). The role of FO in the relationship between target adherence and FP is an important determinant that has gained increasing research attention in recent studies (Combs et al. 2023; Gangi et al. 2025; Gómez-Mejía et al. 2025). Yet, results remain ambiguous, indicating additional research opportunities for this dissertation. Addressing these gaps in the literature, the third article explores the FP consequences of the adherence to emission reduction targets as well as the role of FO in this relationship.

Beyond the overall implications for FP, additional questions arise about potential mechanisms that may explain financial outperformance among firms that decarbonize their business operations successfully. One potential source of financial advantage that has been gaining increasing research attention is the emergence of new financial instruments, such as *sustainability-linked bonds* or *green bonds*. These new financial products provide a range of financial and non-financial incentives for sustainable bond issuers (Tang and Zhang 2020; Bhutta et al. 2022; Anderson and Kish 2024; Vulturius et al. 2024). These promise potential benefits in terms of cost of capital ('greenium'), better overall access to financing, or ways for firms to credibly signal their environmental ambition as part of their financing strategy (Flammer 2021; Feldhütter et al. 2024). Therefore, the issuance of sustainable bonds may represent a distinct channel for firms to exploit superior sustainability (carbon) performance in corporate financing. However, it remains unclear which firms actually seek to issue sustainable bonds. Specifically, it has not been studied whether carbon commitments and their achievement increase the likelihood of firms engaging in sustainable finance markets. Therefore, besides the general FP consequences of the adherence to emission reduction targets, the third article additionally explores sustainable bond issuance as a potential channel contributing to higher FP (Research objective 3).

> ***Research objective 3****: Investigate the financial performance (FP) consequences of the adherence to emission reduction targets and family ownership as well as analyze the issuance of sustainable bonds as a potential channel of financial advantage from corporate decarbonization*

1.3. Summary of research articles

This cumulative dissertation is composed of three distinct research articles. The articles are embedded within this framework, highlighting their connections within the overall course of analysis. Figure 1 depicts the relationship between the individual articles. The articles are

summarized in more detail in Table 1, including an overview of the relevant authorship information, study design, publication status, and conference presentation history. The full articles are included in Annex I, Annex II and Annex III. For the second and third article, which have been written in collaboration with other co-authors, a breakdown of individual contributions is provided in Annex IV. In the following, the research articles are summarized.

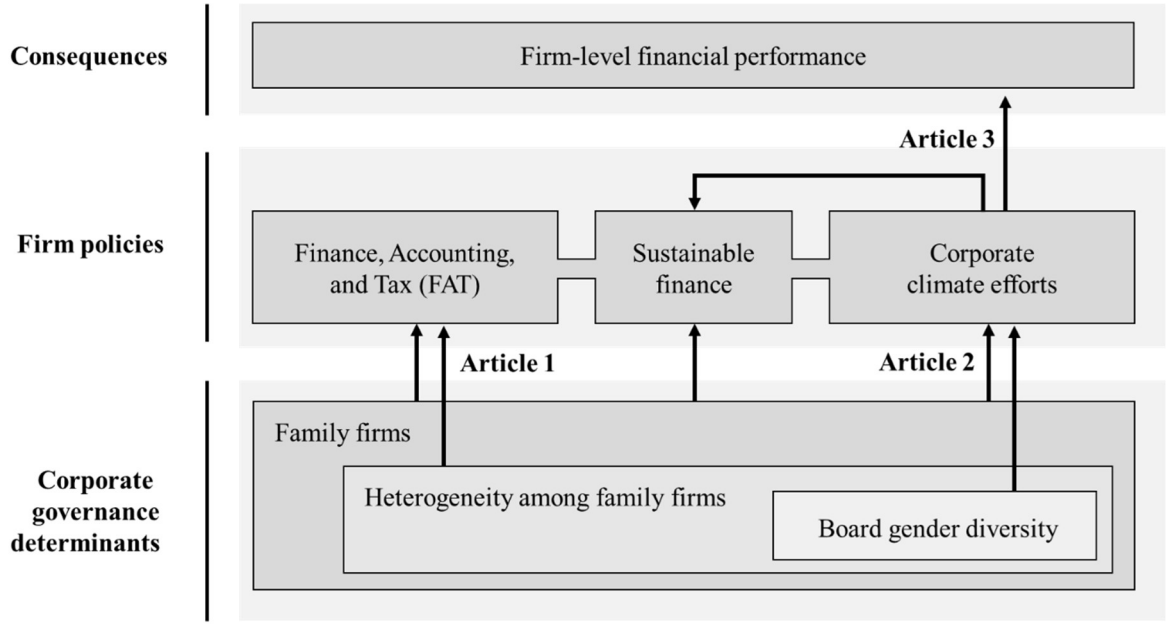

Figure 1. Overview of research articles

As shown in Figure 1, the articles of this dissertation consider three main levels of analysis: *corporate governance determinants*, their role for *firm policies*, as well as subsequent *consequences* for firm-level financial performance. FFs and their unique corporate governance systems are at the core of all three individual articles. Throughout the overall dissertation, different perspectives are taken on how family involvement shapes firm policies across the intersection of finance, accounting and tax policies (Article 1), corporate climate efforts (Article 2), as well as their respective financial consequences (Article 3). Thus, the individual articles share some interfaces within the overall course of the analysis, yet address distinct research questions across the family business, sustainability and corporate finance

literature. On a high-level, the first article focusses on the role of heterogeneity financial management of FFs which broadly includes their financing strategies, accounting- as well as tax policies. The second article subsequently turns toward their respective climate strategies. The third article is then dedicated to the financial consequences of the climate efforts studied in the second article, introducing sustainable finance as a conceptual link between finance and sustainability outcomes. The overall dissertation emphasizes different focal points and recombines findings across different levels of analysis (e.g., corporate governance determinants, firm policies, firm consequences) as well research fields (e.g., corporate finance and sustainability) to answer the research questions of this dissertation. The connections across the individual articles unfold in a number of different ways along the evolution of the research projects. Ideas of heterogeneity, being at the core of the first article, are re-iterated to some extent in the second article through a focus on BGD, representing one of the multiple dimensions of heterogeneity identified in the first article. Yet, representations of heterogeneity are both scarce and relatively difficult to implement within the FF sustainability literature, which is why a more comprehensive inclusion of heterogeneity into future research designs is a key recommendation for further analysis. Finally, content-wise the three articles tend to follow a logical sequence in which the first article addresses corporate finance in FFs, while the second turns toward their climate strategies. The third article then rounds off the dissertation by revisiting the financial consequences of the implied climate efforts, thereby connecting the separate research projects across the finance and sustainability domains. Below, the individual articles are summarized in more detail, briefly elaborating fundamental underlying ideas, their research design, specific findings, as well as their publication status.

The first article entitled “Heterogeneity in Family Firm Finance, Accounting and Tax Policies: Dimensions, Effects and Implications for Future Research”, takes a broad look at the phenomenon of *family business heterogeneity*. Building upon the observation that *heterogeneity*

represents an important contingency in FAT policies among FFs, Article 1 aims at developing a better understanding of the different forms and extent of heterogeneity that permeate family business studies, as well as their particular consequences for FAT policies in FFs (Research objective 1). After introducing family business heterogeneity as an important determinant of agency conflicts in FFs (Nordqvist et al. 2014; Villalonga et al. 2015), a systematic literature review has been conducted in line with recent methodological guidance (Hiebl 2021). Based on a systematic database-driven search strategy of relevant keywords in the Web of Science (Clarivate) and Scopus (Elsevier) databases, a total number of 1,818 articles have been retrieved. The search has been complemented by an additional consideration of previous influential review articles in the field, leading to a preliminary search output of 2,017 scientific articles. Based on the further sample selection process (incl. data cleaning and the application of content-/quality-related retention criteria), a final sample of 91 empirical-quantitative articles has been selected for the scope of the review (see Annex 1 for a detailed description).

As a result of the review, a predominant role of heterogeneity rooted in corporate governance has been documented (Nordqvist et al. 2014; Daspit et al. 2018). Amongst others, this has been reflected in the identification of 24 dimensions of family business heterogeneity, most of which are associated with corporate governance. Following Gillan (2006), these include differences among internal as well as external corporate governance mechanisms. Further differences have been associated with family-specific determinants of corporate purpose as well as other general differences, such as their age and firm lifecycle or their industry affiliation. Across the identified dimensions of heterogeneity, the review has subsequently documented that the most influential differences among FFs originate from variation within management, ownership structure, board composition, and transgenerational issues. Simultaneously, additional practical and conceptual challenges at the heterogeneity level of analysis have been identified. Building upon these findings, a model of FF heterogeneity has been introduced, conceptualizing heterogeneity a as

key determinant of agency conflicts in FFs. The model emphasizes the need to distinguish between FF-specific and FF-agnostic sources of heterogeneity, thereby proposing a more restricted approach toward family business heterogeneity compared to the extant literature.

Finally, several recommendations for future research have been developed. These include further research concerning heterogeneity from corporate governance (e.g., the role of conservatism in early generational family firms, differences between public and private FFs, the role of performance effects in the interaction with FF governance) as well as additional conceptual aspects (e.g., utilizing more diverse datasets or capturing heterogeneity in longitudinal research designs). Notably, these have been developed to contribute to the discourse on heterogeneity in family business research overall, beyond the particular scope of this dissertation. While fundamental ideas of heterogeneity have also been considered within the subsequent articles where possible, the recommendations developed in Article 1 have not been emphasized specifically due to data availability and organic shifts in the research focus of this dissertation. The first article has been developed as a single-author paper. Throughout its evolution, the article has been presented at different workshops and research conferences, e.g., the Fifth International Family Business Research Forum 2023 in Hasselt, Belgium. The article has been published in the *Journal of Business Economics* (ranked "B" in the VHB publication media rating 2024 for the sections 'Sustainability Management' and 'Banking and Finance').

In contrast to the first article, the *second article* opens a new research stream, exploring corporate climate efforts among European FFs and non-FFs. The study, entitled "Female directors, family firms, climate talk and climate walk: European evidence", investigates the role of BGD and FO for symbolic and substantive climate efforts, labelled as climate talk and climate walk. Despite substantial prior research into the role of BGD for CP (e.g., Konadu et al. 2022; Kordsachia et al. 2023; Toukabri and Jilani 2023), it remains difficult to distinguish between symbolic and substantive climate efforts (Haque 2017). Meanwhile, also the

environmental and climate consequences of FO are discussed controversially in the literature and empirical results remain ambiguous, overall (Miroshnychenko et al. 2024). Addressing these gaps in the literature, the second article investigates the role of BGD and FO for symbolic and substantive climate strategies (climate talk and climate walk) within the European capital market (Research objective 2).

Drawing from legitimacy theory, the article considers the joint and individual effects of BGD and FO for symbolic and substantive climate efforts. Specifically, moral versus pragmatic legitimacy-seeking strategies (Suchman 1995; Taglialatela et al. 2024) are used as a theoretical lens to discuss the supposed role of BGD and FO for corporate climate efforts. Empirically, besides using prevalent archival databases (LSEG and BvD Orbis Europe), the article extracts data from the widely used CDP survey, capturing different climate efforts along the continuum from symbolic to substantive climate efforts. This includes data concerning carbon reporting, emission reduction target setting, the validation of targets in line with climate science, as well as the subsequent adherence to these targets (for a full description, see Annex 2). These climate efforts are increasingly selective and allow for novel insights into climate actions from symbolism to substance, going beyond previous studies concerning carbon reporting and performance.

Based on CDP survey data (respondents and non-respondents), the sample generation process yields a cross-country sample of 9,597 firm-year observations from 1,387 distinct European publicly listed FFs and non-FFs within the period from 2010 to 2021. The main analysis consists of different random-effects panel regression models, which are complemented by a battery of robustness tests. These include variations in key explanatory variables to test the robustness to alternative definitions (e.g., Blau index, LSEG EmissionScore, different family ownership thresholds, family involvement in management). Furthermore, to account for the peculiar variable structure of the climate talk and walk measures, ordered logistic regression models are

employed (Fullerton 2009). Finally, the robustness of the results is tested using two-stage least squares (2SLS) regression models as well as coarsened exact matching (CEM) to alleviate endogeneity concerns and increase the causal reasoning of the results (Blackwell et al. 2009).

The results of this study indicate that BGD is associated with more symbolic climate talk, but not substantive climate walk. In contrast, the results document negative effects of FO with regards to climate walk and to a lesser extent also to climate talk. These results have been found to be sensitive to changes in the FO threshold as well as family involvement in management. The results also suggest a mitigating effect of female board members that reduces the negative direct effect of FO. Thereby, the results extend prior research on carbon performance and reporting by providing new evidence showing how firms translate their climate ambitions into actionable targets and how they subsequently deliver on those targets (see Section 5.2. for a detailed discussion). The article has been jointly developed with Patrick Velte and Ignacio Requejo and has been published in *Business Strategy and the Environment* (ranked "B" in the VHB publication media rating 2024 for the section 'Sustainability Management', IF 2024: 13.3). Meanwhile, the article has also been accepted at several leading conferences, including the European Accounting Association (EAA) 47th Annual Congress, European Academy of Management (EURAM) Conference 2025, and the Academy of Management (AOM) 85th Annual Meeting.

The *third article*, entitled "Family firms and the financial consequences of corporate decarbonization – European evidence", builds on the results of the second article. Complementing these findings, the third article focusses on the subsequent financial consequences of corporate climate efforts. While the second article has incorporated different sets of climate actions, the third paper focusses on the financial consequences of the most substantive climate efforts addressed in the second article, i.e., the adherence to emission

reduction targets. This focus is warranted, as the most relevant financial consequences are likely to be associated with the most substantive climate efforts (Bendig et al. 2023).

Drawing from the rich previous literature on the CP-FP relationship (e.g., Busch and Lewandowski 2018), the article investigates whether the adherence to emission reduction targets is associated with increased FP and how this relationship is affected by FO. Going beyond the consequences for FP, the article further explores sustainable bond issuance as a potential channel of financial advantage that may help explain superior FP among firms that reduce their emissions successfully (Research objective 3). Like the second article, the study design fundamentally relies on the CDP survey as a voluntary disclosure regime. Besides the CDP data, financial and governance information is matched from LSEG and BvD Orbis Europe. Additionally, as a fourth database, sustainable bond issuance data is added from ICMA. Overall, this yields a cross-country sample of 2,063 firm-year observations from European publicly listed firms. Compared to the second article, the sample size is reduced since the analysis builds on the adherence to targets as a more selective measure, assuming that firms need to participate in the CDP, define emission reduction targets, and finally, also report on the respective target achievement.

To study the relationship between emission reduction target adherence and FP, as well as the moderating role of FO in this relationship, generalized method of moments (GMM) regression models are introduced. GMM models have several advantages over other panel data methods such as random- or fixed-effects panel regression techniques (Wintoki et al. 2012). Specifically, these are chosen as the appropriate method to account for endogeneity problems that are associated with the carbon-FP relationship (Endrikat et al. 2014; Gómez-Mejía et al. 2025). Most notably, this includes concerns over reverse causality in the carbon-FP relationship which supposes that more profitable firms may be regarded as particularly capable to invest in emission reductions (Gómez-Mejía et al. 2025). For the second partial research objective of

Article 3, due to the cross-sectional nature of the bond issuance data as well as the binary character of key variables, logistic regression models are used.

The results of the third article indicate that the adherence to emission targets is associated with higher accounting-based FP, consistent with the business case for sustainability perspective. In contrast, the results for market-value-based FP (Tobin's Q) indicate no significant relationship. Further robustness analyses show that the positive effect of adherence toward FP mainly unfolds through SBTs, indicating that firms with ambitious climate objectives tend to benefit more financially. The adherence-FP relationship is moderated negatively by FO, adding to the negative view concerning the dual role of family involvement in climate performance. Meanwhile, the results also indicate that adherence to targets is positively linked to sustainable bond issuance. These results add to the credibility of sustainable bond markets, while also re-affirming the conceptual notion of sustainable bond issuance as a potential channel for financial advantage from corporate decarbonization. In turn, FFs are less likely to issue sustainable bonds, which has been discussed conceptually from a perspective of aversion toward control-diluting sources of capital among FFs. The article has been jointly developed with Stefan Prigge and is currently being revised for subsequent publication.

	Article 1	Article 2	Article 3
Research objectives	Research objective I	Research objective II	Research objective III
Title	Heterogeneity in family firm finance, accounting and tax policies: dimensions, effects and implications for future research	Female directors, family firms, climate talk and climate walk: European evidence	Family firms and the financial consequences of corporate decarbonization – European evidence
Author and year	Bergmann, Niklas (2024)	Bergmann, Niklas; Velte, Patrick; Requejo, Ignacio (2025)	Bergmann, Niklas; Prigge, Stefan (2025)
Points (own contribution)	Single author (1.0)	Co-author (0.7)	Co-author (0.9)
Method(s)	Systematic literature review	Empirical-quantitative • Random-effects panel regression • Ordered logistic regression • Coarsened exact matching (CEM) • 2SLS/IV regression	Empirical-quantitative • Generalized Method of Moments (GMM) regression, two-step system GMM estimator • Logistic regression
Sample	91 empirical-quantitative articles published between 1999 and 2021	9,597 firm-year observations of European publicly listed firms invited to participate in the CDP survey (incl. non-respondents) between 2010 and 2021	2,063 firm-year observations of European publicly listed firms that participate in the CDP survey (respondents only) between 2011 and 2021
Data sources	Keyword search of literature databases, Web of Science, Scopus, and complimentary review of defined seminal articles. Total search result of 2,017 scientific articles included in the sample selection process	CDP (formerly: Carbon Disclosure Project), LSEG (formerly: Refinitiv), and BvD Orbis Europe database	CDP (formerly: Carbon Disclosure Project), LSEG (formerly: Refinitiv), BvD Orbis Europe database, and ICMA Sustainable Bond market data
Workshops and conference presentations	• WIFU Family Business PhD Research Workshop 2021, (Witten University, Germany, 08.11.-11.11.2021) • International Family Business Research Forum 2022, (Hasselt University, Belgium, 27.09.-29.09.2022) • PhD Workshop "Contemporary Issues in Accounting, Auditing, Tax and Corporate Governance Research" (Leuphana University, online, 16.06.2023)	• FIFU Conference 2023, *received* ‚*Best Project Award'* (HSBA, Germany, 29.06.-01.07.2023) • European Accounting Association (EAA) 47th Annual Congress 2025 (accepted but withdrawn) • European Academy of Management (EURAM) Conference 2025, presented by I. Requejo (University of Florence, Italy, 22.06.-25.06.2025) • Academy of Management (AOM) 85th Annual Meeting 2025, presented by I. Requejo (Copenhagen, Denmark, 27.07.-29.07.2025)	
Publication status	Published	Published	Under revision
Journal	Journal of Business Economics	Business Strategy and the Environment	
Ranking	VHB-Rating 2024 (NAMA, BA-FI): **B**	VHB-Rating 2024 (NAMA): **B**	

Table 1. Description of research articles

1.4. Structure of the dissertation

In the following, the dissertation framework introduces the relevant theoretical perspectives that have informed the individual articles (Section 2). Given the multi-theoretical nature of contemporary family business research (Siebels and Knyphausen-Aufseß 2012; Payne 2018), different theoretical perspectives have been considered across the articles of this dissertation, namely agency theory, legitimacy theory as well as socioemotional wealth (SEW) theory. Subsequently, Section 3 discusses key concepts as well as the institutional context of the respective analyses and their research samples. This includes a review of prevailing approaches to define FFs based on their distinctive characteristics, as well as a brief discussion of family business heterogeneity as a driver variation within FFs. Considering the empirical focus on the European capital market (see research objectives 2 and 3), the European regulatory landscape is emphasized, specifically. Amongst others, this includes a review of European sustainability reporting duties and their respective evolution as well as a brief look into the European regulation on gender equality in corporate governance. In Section 4, a review of the extant literature is given, locating the dissertation's research objectives within the wider scholarly discourse. Subsequently, Section 5 discusses the results of the individual studies and highlights their contributions and implications for academia, regulators and corporate practice. Finally, Section 6 concludes the dissertation framework and provides a further outlook. Annex I to Annex III present the three individual research articles. Figure 2 summarizes the structure of the dissertation, accordingly.

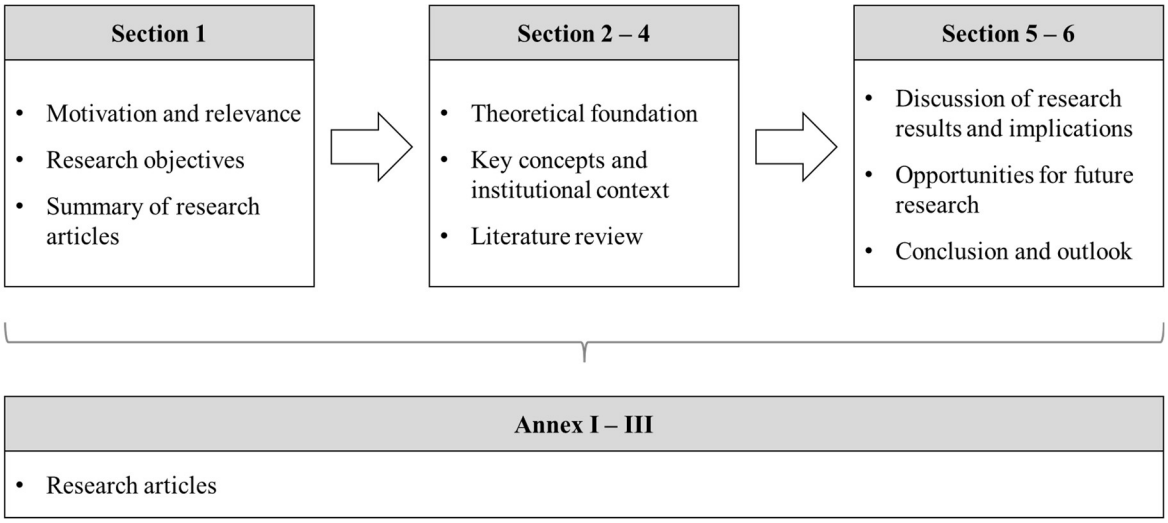

Figure 2. Structure of the dissertation

2. Theoretical foundation

Family business research frequently draws from multiple theoretical perspectives (Siebels and Knyphausen-Aufseß 2012). Given that the individual articles of this dissertation address phenomena from different research fields, including the finance and accounting as well as the sustainability and climate literature, a multitheoretical approach is necessary (Velte and Weber 2021). This call for a multitheoretical fundament relates to the need to reflect different underlying theoretical ideas across these fields but also originates from different theoretical assumptions and focal points of these theories. First and foremost, FFs are widely considered to prioritize family-centered objectives that are characterized as non-financial, affective endowments (Berrone et al. 2012). These considerations, which have led to the emergence of socioemotional wealth (SEW) theory, are rooted in the behavioral agency model (Wiseman and Gomez-Mejia 1998) and address behavioral aspects of managerial decision making not captured within agency theory, traditionally. Therefore, reflecting the variety of theoretical approaches observable across the literature streams relevant to this dissertation, several different theories have been integrated within the individual articles. These include agency theory (Jensen and Meckling 1976), legitimacy theory (Suchman 1995), as well as

socioemotional wealth theory (Gomez-Mejia et al. 2011). The respective theoretical approaches will be introduced below, providing a general overview while also emphasizing the specific theoretical perspectives which have informed the individual articles.

2.1. Agency theory

Generally, agency theory considers the firm as a bundle of contracts, emphasizing potential conflicts arising from asymmetric information between utility-maximizing agents who act on behalf of a principal (Ross 1973; Jensen and Meckling 1976). Applying the fundamental tenets of agency theory to the particular case of FFs, Villalonga et al. (2015) have introduced a dedicated framework concerning agency conflicts within FFs. In their framework, they describe FFs as "*host to a multi-tier, concatenated agency structure in which managers (both family and nonfamily) act as agents for shareholders, including the controlling family shareholders who appoint them*" (p. 636). Deviating from classical agency theory, this multi-tier agency structure introduces the family at large as the 'superprincipal' of the controlling family shareholders. Overall, this implies four distinct agency problems: conflicts of interest between owners and managers (AP I), controlling family shareholders and minority shareholders (AP II), shareholders and creditors (AP III) and between family shareholders and the family at large (AP IV). As the separation between owners and managers is less clearly defined in FFs, up to the point of identity between family owners and managers (Goel et al. 2012), the classical agency conflict between owners and managers (AP I) is on average less salient in FFs (Chrisman et al. 2004; Prigge and Thiele 2019). Even where ownership is separated from management, family owners frequently possess both the ability and incentive to monitor managers efficiently because of large, concentrated shareholdings (Morck et al. 1988; Anderson and Reeb 2003; Audretsch et al. 2013)

Yet, this gives rise to agency conflicts among principals (AP II), in which minority owners are more exposed to potential opportunistic behavior of powerful majority owners (Morck et al.

2005; Villalonga and Amit 2006). Besides agency conflicts among minority/majority owners, additional potential for intra-family agency conflicts arises between different family owners (Zellweger and Kammerlander 2015). Regarding conflicts of interest between shareholders and creditors (AP III), prior research indicates that the incentives of family shareholders are more aligned with those of creditors than for other types of shareholders, giving them better and cheaper access to credit (Villalonga et al. 2015). Finally, conflicts of interest can also arise between family shareholders and the family at large (AP IV). This agency problem is unique to FFs, as it introduces the family at large as the superprincipal, taking important decisions as part of the firm's governance systems through various types of contracts such as family constitutions, prenuptial agreements or wills (Villalonga et al. 2015).

Overall, FFs are on average associated with similar agency dynamics (Miller and Le Breton-Miller 2006). On the one hand, this relates to the likelihood and extent of certain agency problems (e.g., AP I is less dominant, whereas AP II is on average reinforced) but also introduces unique agency problems within the owning family that do not exist across other types of firms (e.g., AP II among different family owners; AP IV which introduces principal-superprincipal conflicts). However, although FFs share similar attributes in terms of their governance structures that expose them to similar agency dynamics, FFs are also found to differ significantly from one another (Michiels and Molly 2017; Brune et al. 2021). Variation within the corporate governance system of FFs has been directly linked to the concept of family business heterogeneity (Nordqvist et al. 2014), as introduced in the previous section. From an agency theoretical point of view, family business heterogeneity represents an important constituent that alters FFs' distinct agency conflicts. Following this notion, prior research documents that FFs should be viewed as a heterogeneous group, rooted in firm-level differences in the severity of agency conflicts (Ali et al. 2007; Chen et al. 2021). Re-affirming these findings, Yoshikawa and Rasheed (2010) suggest that the agency setting in FFs is considerably

more nuanced. Consequently, the notion that agency problems would be reduced in the presence of concentrated ownership or that family owners would naturally be inclined to appropriate the wealth of minority shareholders constitutes an oversimplification. Rather, they suggest applying agency theory to the particular case of FFs by theorizing based on the understanding of the "*players […] and the context of the interaction*" (p. 292), which essentially describes the idea of heterogeneity. Following this idea, especially the first research article considers heterogeneity among FFs as determinants of agency conflicts, resulting in considerable variation among FAT polices (see Section 4.1, 5.1., and Annex I).

2.2. Legitimacy theory

Legitimacy has been defined as a '*generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions*' (Suchman 1995). This suggests that firms exist as part of broader social systems in which they gain legitimacy by aligning organizational interests with the expectations of the superordinate social system as part of an ongoing social contract, often referred to as 'license to operate' (Shocker and Sethi 1973; Dowling and Pfeffer 1975). Legitimacy theory is widely prevalent in the carbon literature as it offers rich perspectives to understand firms in their quest to gain and maintain legitimacy through their approaches toward sustainability, also in the particular context of FFs (Panwar et al. 2014; Richards et al. 2017; Nuber and Velte 2021). In line with the growing urgency of climate change, the implied stakeholder expectations are evolving, too. Previously, firms may have gained legitimacy by means of measuring and disclosing carbon emissions (Deegan 2002), yet expectations have grown and shifted to the underlying carbon performance as a means to gain legitimacy (Qian and Schaltegger 2017). The increasing expectations are also reflected in (as well as caused by) growing regulatory and stakeholder pressure on firms' climate actions (Block et al. 2023), which aggravates the incentives for firms to engage in symbolic climate efforts to maintain a

legitimate stance. Therefore, climate issues represent some of the most pressing legitimacy threats for companies, as these are highly quantifiable (e.g., compared to other sustainability objectives) as well as at the regulatory forefront across many jurisdictions, especially within Europe.

In line with the objectives of the second article, this section therefore emphasizes a legitimacy theory perspective to the joint and individual role for BGD and FO for substantive and symbolic climate efforts. Following prior research (Taglialatela et al. 2024), the distinction between *moral* versus *pragmatic legitimacy* based on Suchman (1995) is used as a theoretical lens to explore the implications of BGD and FO for symbolic and substantive climate efforts. According to Suchman (1995), moral legitimacy depends on a normative evaluation of the organization's activities based on the audience's socially constructed value system, whereas pragmatic legitimacy rests on the self-interested calculations of an organization's audiences, rendering the latter more transactional in nature.

From a legitimacy theory perspective, BGD plays an important role with regards to symbolic and substantive climate efforts. Generally, strengthening sustainable board dynamics to improve carbon reporting and performance helps to align organizational activities with societal expectations and ultimately favour firm legitimacy (Suchman 1995; Nuber and Velte 2021; Khatri 2024). Sustainable board composition, such as gender diversity among directors, affects its monitoring ability and thereby impacts carbon efforts (Villiers et al. 2011). Female directors are characterized as particularly sensitive to environmental harm due to gender-specific socialization, emphasizing values such as altruism, benevolence, and universalism (Glass et al. 2016; Liu 2018; Nadeem et al. 2020). BGD is therefore considered as an important contingency in the process of gaining and maintaining legitimacy in climate matters. However, BGD tends to play a 'dual' role in this context: increasing gender equality in corporate governance is generally perceived positively, adding to the firm's legitimacy more widely. Thus, BGD not

only affects the pursuit of legitimacy through climate efforts, but in itself is viewed as a factor contributing positively to gaining and maintaining the firm's legitimacy.

Given greater sensitivity for environmental impact, gender diverse boards are regarded as more likely to respond adequately to environmental stakeholder interests, thereby presumably favouring legitimacy-seeking strategies. Yet, there can be different implications of BGD for specific legitimacy-seeking strategies. Building on Suchman's distinction between moral and pragmatic legitimacy, Taglialatela et al. (2024) suggest *'a higher proportion of women on the board could spur moral legitimacy seeking strategies that consist of increasing participation in public discourse proxied by more communication efforts'* (p. 2894). This implies that gender-diverse boards are more likely to adopt environmental strategies that focus on green communications (moral legitimacy-seeking) compared to environmental strategies that focus on implementing green practices (pragmatic legitimacy-seeking). This in turn raises the question whether firms with more gender diverse boards are also more likely to engage in symbolic climate efforts (e.g., voluntary disclosure of carbon emissions) but not more likely to engage in substantive climate efforts (e.g., meeting emission reduction targets).

Legitimacy theory and the specific distinction between moral and pragmatic legitimacy can be equally applied to the nexus between FO and symbolic or substantive climate efforts (Suchman 1995; Taglialatela et al. 2024). From a legitimacy perspective, prior research has highlighted that FFs are generally very mindful of their reputation, putting significant attention to maintaining their legitimacy (Brunelli et al. 2023; Ma 2023; Maughan 2023). As the owning families' reputation is directly linked to the business, the pursuit of legitimacy generally tends to be an important issue in FFs (Sageder et al. 2018; Bammens and Hünermund 2020). Yet, in their quest to gain and maintain legitimacy, FFs may prioritize engaging in other areas of corporate social responsibility beyond environmental matters. Specifically, prior research indicates that FFs may favour social over environmental issues. For instance, FFs are found to

focus on strong social ties within their local communities (Herrero et al. 2024; Kim et al. 2024; Miroshnychenko et al. 2024), while also attributing particular attention toward internal stakeholder groups (Block et al. 2023; Rivera-Franco et al. 2024).

In line with these findings, Richards et al. (2017) theorize that FFs predominantly derive moral legitimacy from well-established close relationships with stakeholders in the 'domestic world', reducing the need to communicate their sustainable practices more widely (Baumann-Pauly et al. 2013). Correspondingly, as FFs often enjoy considerable trust in their communities, they are likely to believe that their family legacy and reputation guarantees sufficient legitimacy, diminishing their desire to engage in sustainability-related communications (Richards et al. 2017). Furthermore, FFs with more concentrated shareholdings and dominant family owners answer to a smaller investor base compared to firms with dispersed ownership (Villalonga et al. 2015), reducing the need to communicate their climate efforts to a larger audience. Applying this perspective to the case of symbolic climate-related communications (e.g., voluntary emission disclosure), FFs are regarded as less likely to seek moral legitimacy through symbolic climate efforts.

The 'domestic world' metaphor as a source for legitimacy in FFs described by Richards et al. (2017) suggests a particular focus on more proximate stakeholder groups, through direct personal relationships among non-anonymous, local parties. This has clear conceptual overlaps with the pragmatic legitimacy construct introduced by Suchman (1995), in which firms gain legitimacy by more directly addressing the needs of self-interested stakeholders, such as customers or suppliers (Taglialatela et al. 2024). This implies a more transactional give-and-take logic of legitimacy compared to moral legitimacy. To protect their reputation in the 'domestic world', FFs thus seek to satisfy measurable demands of their direct audiences (e.g., realized carbon emission reductions). Therefore, in contrast to the supposed under-engagement

in symbolic climate efforts, FFs can be regarded as equally likely to engage in substantive climate efforts.

2.3. Socioemotional wealth theory

Socioemotional wealth (SEW) theory constitutes one of the most prevalent theoretical perspective concerning finance in family business (Michiels and Molly 2017) and is also widely used in the FF sustainability and carbon literature (Gómez-Mejía et al. 2025). SEW, which is rooted in the behavioral agency model (Wiseman and Gomez-Mejia 1998), refers to "*non-financial aspects of the firm that meet the family's affective needs, such as identity, the ability to exercise family influence, and the perpetuation of the family dynasty*" (Gómez-Mejía et al. 2007). Thereby, SEW emphasizes the unique non-financial aspects that affect decision making in FFs beyond financial motives, indicating that gains or losses in SEW represent a crucial frame of reference when making major strategic choices and policy decisions (Berrone et al. 2012). Traditionally, SEW has been introduced as a multidimensional construct around its five core dimensions ('FIBER'), namely:

1. *Family control and influence*
2. *Family members' identification with the firm*
3. *Binding social ties*
4. *Emotional attachment.*
5. *Renewal of family bonds to the firm through dynastic succession*

(Berrone et al. 2012)

Recent theoretical advancements around SEW have been concerned with both the validity of operationalizing important SEW constructs (Debicki et al. 2016; Brigham and Payne 2019; Gómez-Mejía and Herrero 2022), as well as suggestions for conceptual refinement, e.g., by distinguishing restricted versus extended SEW. Restricted SEW suggests more family-centered priorities, whereas extended SEW is more expansive in scope, including the business and its stakeholders more widely (Miller and Le Breton–Miller 2014).

The tenets of SEW theory are applied in the third article, considering the financial consequences of corporate climate efforts (adherence to emission reduction targets). In terms of financial performance implications, SEW theory suggests that FFs may extract '*more bang for their buck'* (Combs et al. 2023). Accordingly, Combs et al. (2023) suggest that SEW considerations such as the family owners' desire for identification with the firm, binding stakeholder relationships as well as transgenerational control foster *SEW resources* which should help family firms to better leverage their CSR strategies in favor of financial gain.

Extending this notion to the particular case of carbon emissions, Gómez-Mejía et al. (2025) elaborate that FFs enjoy certain advantages that can make environmental initiatives more valuable. Referring to the 'more bang for their buck' notion of Combs et al. (2023), Gómez-Mejía et al. (2025) also suggest that "*socially responsible actions that family firms take to build and preserve SEW also generate SEW resources that can augment the potential financial gains from those initiatives*" (p. 6).

However, the role of family involvement remains ambivalent in the literature (Miroshnychenko et al. 2022; Miroshnychenko et al. 2024). Li et al. (2023) suggest that prior research has overlooked the dual nature of SEW, which may explain inconsistent results concerning environmental strategies in family firms. They argue that the distinction between extended and restricted SEW shapes environmental behaviors in family firms, leading to distinct, non-homogenous strategies. Similarly, Hsueh et al. (2023) suggest that the same SEW dimensions may lead to polar strategic choices. This aligns with recent evidence that FFs tend "*to gravitate toward unusual and opposite extremes in their behavior toward stakeholders and their strategic initiatives*" (p. 663), that is, bivalent qualities that ultimately depend on the family owners' individual preferences (Miller and Le Breton-Miller 2021). Thus, although SEW can drive positive behaviors, its 'dark side' can emerge when an excessive focus on family control leads to neglect broader stakeholder interests (Zhu et al. 2025).

3. Key concepts and institutional context

3.1. Defining the family firm

Defining *what constitutes a family firm* is among the fundamental questions underpinning the field of family business research, overall. Yet, family business scholars have struggled for decades to define and measure what it means to be considered a FF (Anglin et al. 2017). Different approaches persist in the literature, indicating that there is no single, widely accepted definition (Chrisman et al. 2012). The fact that there are various operational definitions has plagued family business research empirically and theoretically, raising concerns about comparability and generalizability of research findings (Sharma 2004; Rutherford et al. 2008; Rau et al. 2018).

As the most straightforward and intuitive approach to define FFs, the *components of involvement* approach is widely prevalent (Zellweger et al. 2010). The components of involvement approach captures the visible involvement of the family within firm governance, which can take different forms, such as family ownership or the involvement of (one or multiple) family members in management (Chrisman et al. 2012). Yet, even for these salient characteristics across the governance bodies of the FF, definitions based on the components of involvement approach differ within the empirical literature. For instance, different family ownership thresholds are used as cut-off points to define FFs, operationalized either at the direct shareholder level or at the global ultimate ownership level (Rau et al. 2018; Molly and Michiels 2021). Mindful of these differences, within the empirical articles, the sensitivity to different ownership thresholds will be controlled for. However, even when FFs possess the same governance characteristics that would objectively classify them as family businesses, these firms may not self-identify as FFs or exhibit typical family business behaviors (Rutherford et al. 2008; Chrisman et al. 2012).

Therefore, an alternative approach to define FFs has gained popularity in literature, namely the *essence approach*. In contrast to the components of involvement approach, the essence approach suggests that family involvement should be focused and directed toward behaviors that produce distinctiveness before the firm can be classified as a family firm (Pearson et al. 2008; Zellweger et al. 2010). Building on the earlier works of Chua et al. (1999) on defining the family business by behavior, the essence approach considers family involvement in the firm as a necessary, yet insufficient condition. Thus, family involvement is considered to not automatically translate into the unique organizational outcomes that make FFs stand out vis-á-vis their non-family counterparts (Zellweger et al. 2010). Rather, the essence of FFs is associated with additional criteria, e.g., the realization of family influence in the firm, the existence of intergenerational control intentions or sharing a FF-specific vision and distinctive behavior (Chrisman et al. 2012). Overall, this suggests that "family involvement is a necessary condition for the existence of a family firm but is not sufficient to ensure that a family firm will behave in a fashion that differs from that of nonfamily firms. […] Thus, family involvement is an invariant characteristic of family firms while family essence occurs only in some family firms" (Chrisman et al. 2012: 285). Yet, the essence approach is also criticized for relying on circular logic that blends determinants and outcomes: "Taken to the extreme, the essence approach would suggest that a firm that (1) does not pursue a vision cannot be a family firm, even if its dominant coalition is a family; (2) only firms that behave in a family-specific way can be labeled a family firm; and (3) all family firms to a certain extent behave in a similar way" (Rau et al. 2018: 201).

Irrespective of this criticism, some convergence can be observed in the literature on how to define FFs. Accordingly, most scholars tend to agree that key criteria relate to family ownership, family involvement in the firm, and transgenerational succession intentions (Stanley et al. 2017). Nevertheless, it is crucial to reflect on the underlying definitions and report their

respective empirical application transparently. In this regard, researchers face important trade-offs in terms of the theoretical depth of underlying FF definitions, but also the viability to empirically observe and capture relevant variables (Zellweger et al. 2010). Within the first article (systematic literature review), a broad approach to define FFs is considered, including both components of involvement (e.g., size of shareholdings, dispersion within and beyond the owning family, different roles in the governance bodies of the family firm) as well as essence aspects (e.g., transgenerational control intentions or FF goals, culture and values). In the subsequent empirical articles that address large publicly listed FFs, an ownership-based definition is the most reasonable approach, in line with other extant studies (Dyck et al. 2024; Gómez-Mejía et al. 2025).

3.2. Heterogeneity among family firms

Overall, it is not surprising that researchers have struggled to grasp what makes FFs unique. In fact, FFs are likely to differ substantially in the types of involvement and in the nature and extent to which the family's influence is exerted (Chrisman et al. 2012). Thus, given the complexities and heterogeneity associated with family enterprises, drawing clear boundaries between FFs and non-FFs is inherently challenging (Anglin et al. 2017). Thereby, the question *how to define FFs* (i.e., what makes them unique as a group) is directly connected to the question *how do FFs differ from one another* (i.e., in which ways do they stand out on a firm-level). Considering the difficulties in defining FFs as well as significant variation within empirical studies concerning FF behavior more generally, the idea of family business heterogeneity has gained popularity within literature (Dibrell and Memili 2019). Family business heterogeneity entails the range of categorical and/or variational difference(s) between or among family firms at a given time or across time (Daspit et al. 2021). If scholars omit such differences in their research designs, they are at risk of oversimplifying empirical reality, leading to limited explanatory power of their findings (Chua et al. 2012).

Within the literature, the roots of heterogeneity are commonly discussed in a goals, governance, and resources framework (Michiels and Molly 2017). In FAT research more specifically, a governance perspective toward heterogeneity tends to be predominant, whereas goals and resources are less frequently addressed (Nordqvist et al. 2014; Michiels and Molly 2017; Daspit et al. 2018). The increasing acknowledgement of heterogeneity entails important conceptual and theoretical implications. That is, on the one hand, different dimensions of heterogeneity tend to add layers of refinement in empirical designs, contributing to increased scientific precision (Daspit et al. 2021). This may help to reconcile some conflicting evidence in the literature that could otherwise not be resolved at the family- vs. non-family level of analysis (Rau et al. 2018). On the other hand, the concept of heterogeneity also challenges the implicit core of family business research. Research concerning FFs has been built around the notion that family involvement gives rise some unique characteristics shared among all FFs that separates them from non-FFs in a meaningful way. Taken to the extreme, the concept of heterogeneity challenges this notion, thereby also raising questions about the validity of family business research as a whole.

Yet, although heterogeneity has been identified as a key issue in FF research, it is frequently not considered in empirical studies sufficiently (Michiels and Molly 2017). This is directly related to practical problems in terms of data availability (Neubaum 2018). Data concerning FFs generally tends to be relatively inaccessible (e.g., compared to publicly listed non-FFs), and heterogeneity data in particular tends to be scarce. These issues concerning data availability have also affected the second and third article of the dissertation, which incorporates ideas of heterogeneity, yet not to the extent initially anticipated. Besides data availability, practical problems to incorporate heterogeneity in study designs may also be owed to the fact that family business heterogeneity has different meanings to different researchers (Daspit et al. 2021). Therefore, to address this issue, the first article of this dissertation takes stock of the existing

literature to assess in which ways heterogeneity has been considered in prior studies. Thereby, the article offers pathways for future research to effectively incorporate aspects of heterogeneity in future research design, despite concerns related to data availability. Accordingly, Section 4.1. and 5.1. dive deeper into the empirical operationalizations of heterogeneity as well as their consequences.

3.3. Institutional and regulatory environment

In line with the dissertations' empirical focus on the European capital market, this section introduces the relevant regulatory context from a European perspective. As indicated in Figure 3, the analyses of this dissertation are mainly affected across two areas, namely European sustainability regulations and legislation concerning gender equality in corporate governance. These will be elaborated below with a particular emphasis on the EU Green Deal as the overarching policy framework, stressing the dominant role of climate objectives that are of particular relevance for the given dissertation.

Figure 3. European regulatory framework

3.3.1. European sustainability legislation

The European Green Deal constitutes the EU's overarching policy framework to achieve climate neutrality by 2050, positioning environmental sustainability as a central pillar of economic and social transformation within the EU (European Comission 2019). To achieve the objective of climate neutrality by 2050, European Climate law further establishes a mid-term

target of a 55% reduction in GHG emissions by 2030 relative to 1990 levels (Regulation 2021/1119/EU). To facilitate the green transformation of the European economy, three main regulatory pillars have been introduced: the Corporate Sustainability Reporting Directive (CSRD), the EU Taxonomy Regulation, and the Corporate Sustainability Due Diligence Directive (CSDDD). Notably, already before the EU Green Deal project, the Non-Financial Reporting Directive (NFRD) had been established in 2014. Under the NFRD, certain public interest entities (PIE) have been required to disclose non-financial information across different environmental, social, and governance aspects since the fiscal year 2017 (Directive 2014/95/EU). Yet, despite its regulatory groundwork to bring sustainability reporting into the spotlight, the NFRD faced widespread criticism, e.g., in terms of its reliability, the extent of standardization across reporting entities, as well as the selection of companies required to report under the NFRD (Venturelli et al. 2022; Hummel and Jobst 2024).

Broadening the scope of sustainability reporting requirements significantly, the CSRD has been passed in 2022 (Directive 2022/2464/EU). The CSRD introduced far-reaching sustainability reporting duties, such as the inclusion of the sustainability report within the management report, subject to mandatory auditing at the limited assurance level (Hummel and Jobst 2024). Accompanying the CSRD implementation, the Delegated Act 2023/2772/EU further operationalized the reporting requirements through the European Sustainability Reporting Standards (ESRS). As part of the first reporting wave, initially firms with more than 500 employees have been required to publish a sustainability report in accordance with CSRD for the fiscal year 2024. A detailed discussion of the scope of firms affected, the timeline of the initial reporting periods for each wave is provided by Velte et al. (2025). In the context of this dissertation, it is crucial to note that both the CSRD as well as the ESRS strongly emphasize climate change, in line with the Green Deal's climate neutrality objective. As part of the first set of ESRS, the 'ESRS E1 - Climate Change' operationalizes key reporting requirements and

stresses the dominant climate focus of this regulation. Among other aspects, reporting entities must disclose information regarding their emissions (scope 1, 2 and 3), emission reduction targets, the integration of sustainability-related performance in incentive schemes, as well as specific transition plans for climate change mitigation, to name only a few distinct climate-related requirements outlined in ESRS E1 (Velte 2024c). Furthermore, the strong dominance of climate matters is also reflected within the empirical sustainability reporting practice, e.g., climate change consistently ranks among the most material issues disclosed by Wave 1 firms. Complementing the sustainability reporting requirements as per CSRD/ESRS, the EU has further introduced the Corporate Sustainability Due Diligence Directive (CSDDD). The CSDDD has been passed in 2024 (Directive 2024/1760/EU) and applies to large European firms (e.g., more than 1000 employees and 450mn EUR in turnover), but also includes non-EU firms with substantial turnover, implying extraterritorial application of the CSDDD (Petrovic 2025). Imposing substantial due diligence obligations, the CSDDD requires firms to identify, prevent, and mitigate adverse impacts on human rights and the environment in their operations and supply chains. From a climate perspective, the CSDDD further mandates firms to adopt a climate transition plan for climate change mitigation compatible with a 1.5°C scenario in line with the Paris Agreement, cross-referencing the climate neutrality objective for 2050 derived from Regulation 2021/1119/EU as introduced above.

Another pillar is the EU Taxonomy Regulation (Regulation 2020/852/EU). The EU Taxonomy establishes a comprehensive classification system to determine whether an economic activity is environmentally sustainable, with the goal of (re)directing capital flows to benefit the EU's climate and environmental objectives (Garcia-Torea et al. 2024; Brabec and Macháč 2025). The disclosure requirements established via the EU Taxonomy are aligned with the scope of firms required to report under the CSRD, for a detailed discussion see Velte et al. (2025). Specifically, the EU Taxonomy defines six environmental objectives and sets technical screening criteria to

measure substantial contribution to at least one of these objectives, as well as further do-no-significant-harm principles and minimum social safeguards. Firms must disclose how and to what extent their activities align with the Taxonomy, indicating *taxonomy-eligible and taxonomy-aligned* turnover as well as capital and operational expenditures (Brabec and Macháč 2025). Among the EU taxonomy's six environmental objectives, climate change mitigation represents the most quantifiable and arguably also the most regulated objective (Velte 2024a).

The taxonomy regulation also has direct interfaces with contemporary sustainable finance markets, as the EU Green Bond Standard integrates the EU Taxonomy as the underlying classification system for eligible sustainable projects to be financed through green bond proceeds (Regulation 2023/2631/EU). Sustainable finance instruments such as green bonds (GBs) and sustainability-linked bonds (SLBs) have given issuers as well as investors novel opportunities to consider sustainability within financing and investment, promising potential benefits for the cost of capital ('greenium'), better overall access to financing, or ways for firms to credibly signal their environmental ambition as part of their financing strategy (Flammer 2021; Feldhütter et al. 2024). There are two key groups of standards that provide guardrails for the issuance of sustainable bonds from a European perspective. On the one hand, ICMA has published two voluntary process guidelines for the issuance of sustainable bonds, the Green Bond Principles (GBPs) and Sustainability-Linked Bond Principles (SLBPs), respectively (ICMA 2021, 2024). On the other hand, in 2023 the EU introduced their own EU Green Bond Standard (EU GBS), aiming to introduce a harmonized framework for the issuance of sustainable bonds (Regulation 2023/2631/EU). Although the EU GBS only refers to green bonds in its title, it also entails provisions concerning SLBs.

Similar to the ICMA principles, the application of the EU GBS is voluntary, yet binding if issuers want to issue sustainable bonds under the EU GBS label. These standards share several common characteristics but also exhibit important differences. Generally, the EU GBS

addresses a similar scope of recommendations. However, the EU GBS is widely regarded as more rigid and prescriptive (Brückbauer et al. 2023; Pyka 2023). Besides the narrower definition concerning the use of proceeds in line with EU Taxonomy, the EU GBS also raises additional requirements concerning external verification, only allowing reviewers approved by the European Securities and Markets Authority (ESMA) (Brückbauer et al. 2023; Pichlmayer and Lehner 2024). Thus, on an aggregate level, the issuance of sustainable bonds is subject to a wide range of requirements which include the documentation in a sustainable finance framework, different stages of reviews and verifications through independent external parties, as well as subsequent ongoing reporting duties concerning the use of proceeds or the achievement of the predefined sustainability targets (Dorfleitner et al. 2022; Anderson and Kish 2024; Pichlmayer and Lehner 2024).

Overall, the different regulations introduced throughout this section call for a profound transformation of the European economy, making sustainability a legal imperative. Firms must reflect the growing requirements in their business strategy, corporate governance, and operations to be compliant. Yet, it should be noted that at the time of writing, the Green Deal and its related initiatives are also subject to ongoing political debate, indicating potential future disruptions. Amongst others, the pending 'Omnibus' discussions intend to simplify and revise several regulations, accompanied by a wider political shift to re-consider regulatory priorities on a European level (Nicolo et al. 2025; Velte et al. 2025). The proposed amendments relate to a significant reduction in the scope of companies required to report under CSRD and the EU Taxonomy, mainly to shield small- and medium-sized enterprises from considerable reporting duties. This is of particular relevance for family businesses, as potentially many family SMEs will be excluded from reporting duties (Pizzi and Coronella 2024; Nicolo et al. 2025). For firms still required to implement the CSRD (Wave 2), a postponement of the first reporting period by two additional years is being discussed. Furthermore, although the CSRD initially anticipated

a shift of the assurance requirements of the sustainability report in accordance with CSRD from limited assurance to reasonable assurance, this is being reconsidered as part of the Omnibus discussions. Meanwhile, also a reduction concerning the number of data points to be reported in line with ESRS requirements is under consideration.

Although the main objective of the Omnibus law is to strengthen the linkage between these regulations and prevent excessive reporting burden to preserve the competitiveness of European firms, these are subject to widespread criticism (Velte et al. 2025). On the one hand, this relates to the legislative process in itself. On the other hand, the proposed policy changes threaten the viability of the Green Deal objectives to achieve a climate-neutral economy by 2050. Notably, these changes have no direct effect on the empirical analyses of this dissertation, which consider the pre-CSRD time period (2010 to 2021). Yet, as these controversial discussions concerning the revision of the sustainability reporting landscape within the EU are pending, the results of this dissertation must be considered in the context of these wider shifts. Therefore, key developments have been briefly introduced, focusing on the predominant role of climate change mitigation as part of the EU Green Deal and the related carbon reporting duties under the CSRD, Taxonomy and CSDDD.

3.3.2. Gender equality in corporate governance

The second article, which addresses the role of female directors for symbolic and substantive climate efforts among publicly listed European firms, is subject to different regulations concerning gender equality in corporate governance, both on national and European level. Generally, these regulations represent standalone regulatory initiatives. Yet, they also have interfaces with the wider sustainability legislation on a European level, as the CSRD/ESRS itself require several disclosures concerning gender equality, while prior evidence also suggests that more gender-diverse boards tend to catalyze climate reporting and performance outcomes (Velte 2024c). Following several years of regulatory deadlock, in 2022 the EU passed Directive 2022/2381, referred to as 'EU BGD Directive' hereafter. The EU BGD Directive aims at improving gender balance within the corporate boards of listed firms. Overall, it mandates public firms with more than 250 employees as well as more than 50 million EUR turnover or 43 million EUR in total assets to meet a 40% gender quota among non-executive directors or a 33% quota among all board members, respectively (Velte 2024c). Accordingly, until June 2026 firms must take measures to ensure compliance with these objectives by 2027.

Preceding the EU BGD Directive, several EU member states had already introduced national regulations (Arndt and Wrohlich 2019). Overall, these regulations vary in terms of their target quota of female directors, the governance bodies affected (e.g., all directors vs. non-executive directors only), their legislative timelines, or the scope of firms affected by these national regulations. Within the second article, these national differences concerning BGD legislation are exploited as instruments within the two-stage least squares (instrumental variable) regressions. While the effect of BGD quotas has been discussed controversially in research and practice, recent evidence suggests that national gender quotas on corporate boards are associated with substantial improvements beyond tokenism. I.e., quotas facilitate change

beyond merely symbolic appointments of female directors, leading to actual differences in the underlying power structures (Torchia et al. 2011; Duran et al. 2025).

Overall, in terms of the institutional and regulatory environment, it can be concluded that the different research areas of this dissertation (e.g., climate reporting and performance, gender equality in corporate governance, sustainable finance) are subject to comprehensive regulation from a European perspective, which has been growing rapidly in recent years. Although a lot of legislation has been passed very recently, discussions concerning the future course of European sustainability reporting requirements are pending at the time of writing. Therefore, this section provided a high-level overview of the relevant context of the empirical studies of this dissertation. The next section summarizes the relevant status quo of the scholarly literature across the relevant research streams of this dissertation.

4. Literature review

Given the breadth of the introduced research objectives and the corresponding literature streams relevant to the individual articles, a concise overview and status quo concerning the literature within these (sub-)fields is provided. Considering that the individual articles include dedicated literature review sections, within this framework particular attention is drawn to the overall connection across the articles. Furthermore, as the first research article constitutes a systematic literature review, only key aspects relevant to the overall course of the dissertation are briefly introduced to avoid repetition of the full articles presented in the Annex.

4.1. Heterogeneity in finance, accounting and tax policies

4.1.1. Dimensions of heterogeneity

As introduced in the previous sections, FFs are found to differ significantly from one another (Daspit et al. 2021). Yet, the scope and empirical operationalization of these differences, referred to as family business heterogeneity, have been understood only

insufficiently to date. Therefore, based on a systematic review of the empirical-quantitative literature regarding FAT policies in FFs, a comprehensive overview has been compiled (see Table 2).

		Source of heterogeneity
Ownership (External CG)	HD1	Ownership structure
	HD2	Ownership concentration (dispersion) and other blockholders
	HD3	Control enhancing mechanisms and excess control rights
	HD4	Affiliation with business groups
	HD5	Public vs. private
	HD6	Corporate opacity
Board and Management (Internal CG)	HD7	Family vs. non-family management
	HD8	Board
	HD9	CEO and founder
	HD10	CFO, financial managers and accountants
	HD11	Generation and succession
	HD12	Collective differences in family involvement/control/influence
	HD13	Family governance practices
	HD14	Network ties, relational strength and political connections
	HD15	Auditors, advisors and consultants
Family-specific determinants of corporate purpose	HD16	Family goals and preferences
	HD17	Socio-emotional wealth
	HD18	Family firm culture, values and ethics
	HD19	Family firm identity
General firm characteristics	HD20	Size
	HD21	Industry
	HD22	Age and firm lifecycle
	HD23	Current and historic financial situation
	HD24	Firm- and industry-level performance environment

Table 2. Sources of heterogeneity

The results represent the outcome of an iterative approach (Hiebl 2021). First, all variables in the primary studies satisfying the definition of FF heterogeneity (i.e., 'variational or categorical

differences between or among family firms at a given time or across time' according to Daspit et al. 2021) have been collected. Building on a large initial list of items of heterogeneity, clusters have been built and refined iteratively until a comprehensive level of aggregation was achieved. This final list of heterogeneity dimensions has then been used to code all variables to ensure alignment across all sample articles. This process has yielded 24 relevant dimensions of FF heterogeneity, abbreviated as heterogeneity dimension (HD). The literature review indicates that differences rooted in the corporate governance of FFs take precedence over other sources of variations. As a modification of Michiels and Molly (2017) and using the framework of internal vs. external corporate governance mechanisms (Gillan 2006), Table 2 thus introduces all items of heterogeneity captured in the empirical FAT literature, broken down by corporate governance characteristics (internal/external), general firm characteristics, as well as family-specific determinants of the corporate purpose. These dimensions of heterogeneity serve as a framework that allows for a structured assessment of the most relevant consequences of heterogeneity in the next section.

4.1.2. Consequences for finance policies

For the sake of coherence and focus on mutual connections across articles, this section specifically emphasizes the consequences of heterogeneity for *finance policies*, paying less attention to accounting and tax policies (which have also been in the wider scope for the first article, see Annex 1). As finance policies in FFs are subsequently revisited in the latter empirical articles (e.g., in terms of sustainable bond issuance), this focus is warranted. The systematic literature review has identified several areas of corporate finance decisions that are influenced by different elements of FF heterogeneity. Accordingly, the review shows that FFs are affected by considerations of heterogeneity across several different areas of their financial management, including capital structure decisions, their approaches toward debt capital (e.g., preference for debt, access to funding, lender relationships, cost etc.) as well as equity (e.g., IPO behavior).

FF financing decisions have been subject to frequent inquiry, especially in the context of family-specific objectives to retain family control (avoiding the dilution of control rights via equity financing) as well as aversion toward risk (avoiding excessive leverage) (Mishra and McConaughy 1999; Croci et al. 2011; González et al. 2013; Keasey et al. 2015). Given these conflicting preferences, Burgstaller and Wagner (2015) indicate that it is no surprise that research concerning FF financing has yielded diverging results. Overall, meta-analytic evidence from 613 primary studies suggests a slightly negative significant relationship between FF status and firm leverage, supporting the argument of risk-averse FF (Hansen and Block 2021). Beyond this general tendency, the results of the literature review indicate that the relationship is subject to several aspects of heterogeneity.

In terms of FF heterogeneity from *internal corporate governance* mechanisms, prior studies have predominantly focused on the role of the FF generation as well as transgenerational succession, more specifically. Prior studies on the link between FF generations and debt have yielded conflicting evidence, indicating that later-generation FFs tend to use more debt financing (Blanco-Mazagatos et al. 2007; González et al. 2013; Hansen and Block 2021), less debt financing (Bjuggren et al. 2012; Comino-Jurado et al. 2021) or that founder- and descendant-controlled firms do not differ in terms of their capital structure (Burgstaller and Wagner 2015). These seemingly inconsistent results may be explained by studies suggesting potential non-linear dynamics. Molly et al. (2012) document that debt levels decrease after succession events between the first and the second generation, while debt levels tend to increase for transfers among later generations. This aligns with the results of González et al. (2013), who find a non-linear relationship between firm age and debt levels (i.e., debt levels initially decrease with firm age but start to increase again over time). Yet, besides non-linear effects of FF generations, also interaction effects with firm growth may explain conflicting evidence (Molly et al. 2012). Further effects of FFs generations on capital structures decisions

include lower sensitivity of debt levels toward fluctuations in the cash flow in first-generation FFs (Pindado et al. 2015) as well as observations that later-generation FFs adjust faster to their target debt ratio (Sardo et al. 2022). A potential explanation for this result may be that young family firms are also found to manage cash levels more aggressively (Lozano and Durán 2017). In conjunction, these arguments suggest that more deliberate cash management policies in earlier generations lead to lower demand (and speed) to acquire debt capital.

Beyond generational differences, especially family CEOs have been found to affect finance policies in FFs from a heterogeneity perspective. Family CEOs (and founder CEOs as a particular case of family CEOs) are associated with higher discretion in capital structure decisions, expressed through better ability to react to deviations from the target debt ratio (Burgstaller and Wagner 2015), as well as better ability to extend debt maturity structures after going public (Jain and Shao 2015). Similar observations have been made regarding active family management, especially in early generations, as a precondition for flexibility and discretion in FF funding decisions (Schmid 2013; Pindado et al. 2015). Overall, family CEOs are associated with lower leverage (González et al. 2013). In contrast, the appointment of external (non-family) CEOs is associated with significant increases in debt levels and short-term maturities in particular (Amore et al. 2011). Meanwhile, also the *cost of debt* is affected by heterogeneity. Results indicate a trust-enhancing effect of family CEOs, observable through lower cost of debt (Ebihara et al. 2014). Similarly, Yen et al. (2015) indicate favorable loan conditions among founding FFs, albeit the favor tends to decrease when family members act as the CEO, which is contrary to prior results.

In terms of FF heterogeneity rooted in *external corporate governance* mechanisms, especially ownership concentration and the specific role of blockholder owners stand out. In their seminal article, Schulze et al. (2003) showed that debt among private FFs follows a curvilinear (u-

shaped) relationship with the dispersion of ownership among voting members of the board, which has subsequently been re-confirmed by Bjuggren et al. (2012). The review further indicates that concentrated ownership is associated with higher leverage (King and Santor 2008; Keasey et al. 2015), consistent with objective to maintain a dominant equity position within the owning family. Other blockholders, which may contest respective controlling ownership positions are associated with lower short-term debt (Shyu and Lee 2009) and lower debt ratios overall (Schmid 2013). Other blockholders are also associated with more pronounced pecking-order behavior (Pindado et al. 2015). Yet, leverage has been found to increase in the presence of multiple controlling shareholders with comparable voting rights (Santos et al. 2014).

Generally, studies addressing the role of heterogeneity in *equity financing* are rather scarce in literature. In terms of the general preference to use equity financing, Wu et al. (2007) show that family ownership and management have little direct effects on equity financing. Yet, their respective interaction is associated with higher unwillingness for public equity financing. Moreover, the reviewed literature particularly emphasizes FF initial public offerings (IPOs). Cirillo et al. (2015) find that family firm IPO valuations increase with higher levels of family involvement, whereas intergenerational control reduces this positive effect. Overall, FFs tend to exhibit higher IPO underpricing, subject to further contingencies such as board size and international lead managers, as strong external quality signals (Leitterstorf and Rau 2014; Keasey et al. 2015).

Overall, across all reviewed studies concerning capital structures FFs, especially transgenerational differences have been emphasized. Several competing effects regarding FF generations and their role in capital structure decisions have been elaborated. Other key drivers of heterogeneity include the role of family CEOs, which are associated with higher financial discretion, lower debt levels, and a trust-enhancing perception among lenders. Furthermore,

variation in FF ownership structures suggests that more concentrated ownership is linked with higher leverage, following a U-shaped trajectory once ownership becomes more dispersed.

One particularly noteworthy finding from the literature review on the role of heterogeneity in the financing behavior of FFs has been that previous research has been largely silent concerning the role of family involvement for the use of *sustainable finance instruments*. While this has not been in the initial scope of the systematic literature review concerning the role of heterogeneity in finance policies, this research gap has already become apparent at this research stage. Although fundamental concepts concerning the preference of FFs to use debt capital also tend to apply to the particular case of sustainable finance products, there are several additional implications of sustainable debt products and their usage among FFs. These have been addressed in Article 3, representing an important connection across these articles. A more detailed review of this literature stream is provided in Section 5.3. Yet, before turning to the subsequent sustainable finance consequences, corporate climate efforts will be reviewed more generally in the next Section.

4.2. Climate talk and climate walk: From symbolic to substantive climate efforts

4.2.1. Measuring carbon emissions: Reporting, performance, and targets

As the scholarly interest toward carbon outcomes has grown considerably, a number of different carbon-related variables are being operationalized within the literature. Figure 4 presents a schematic overview of different carbon-related constructs relevant throughout this dissertation. Most importantly, the literature distinguishes between *carbon reporting* and *carbon performance* outcomes (Le Luo and Tang 2014; Qian and Schaltegger 2017; Velte et al. 2020). As an important intermediate mechanism formalizing corporate climate objectives, *emission reduction targets* are of particular relevance for this dissertation, representing an important linking element between ambition and action (Bendig et al. 2023; Ben-Amar et al. 2024).

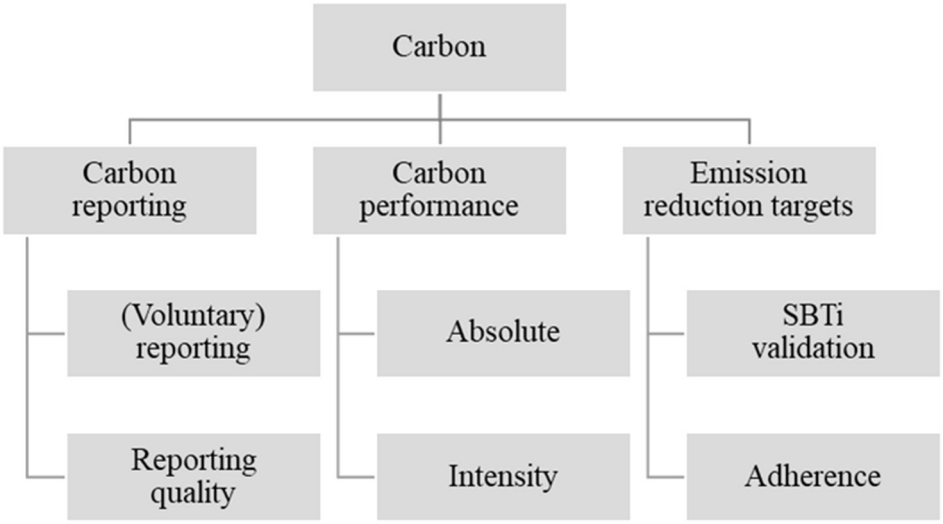

Figure 4. Carbon emissions: Reporting, performance and emission reduction targets

With the emergence of voluntary carbon reporting schemes such as the CDP, the literature has paid significant attention to the firms participating in respective voluntary reporting schemes. Carbon reporting has frequently been considered in a dummy setting, indicating whether firms do or do not disclose carbon information voluntarily (Kordsachia et al. 2022; Caby et al. 2024; Furtuna and Sönmez 2024). With the increasing diffusion of carbon reporting practices, researchers have further extended their focus to assess the quality of the respective carbon reporting, including self-created measures of reporting quality, automated text analyses, as well as CDP scores and subitems (Houqe and Khan 2023; Azuma and Higashida 2024; Velte 2024b). However, carbon reporting studies face some limitations in terms of their explanatory power, as the extent of standardization increases and mandatory carbon reporting duties are becoming more prevalent, gradually crowding out voluntary reporting as a useful indicator (Hummel and Jobst 2024).

Besides reporting and disclosure, *carbon performance* (CP) has been of major research interest. CP refers to absolute or relative variation in (firm-level) emissions over time (Hoffmann and Busch 2008; Velte et al. 2020; Aswani et al. 2024). Thus, CP captures the actual change in emissions, which can be measured in absolute terms (absolute CP) or in relation to specific units of productive output such as revenue, activity or products (intensity-based CP) (Busch et al. 2022; Aswani et al. 2024). CP has been widely covered in extant research, addressing the role of several determinants of CP, including the role of different corporate governance mechanisms (e.g., Haque 2017; Altunbas et al. 2022; Khatri 2024). The determinants of particular relevance for this dissertation are BGD and FO, which are reviewed in more detail in Section 4.2.2. and 4.2.3. below.

Besides absolute or intensity-based CP, the role of *emission reduction targets* has been gaining increasing research attention (Callery and Kim 2024; Nimer et al. 2024; García-Sánchez et al. 2025). Emission reduction targets have a direct interrelationship with CP, as the achievement of emission reduction targets by definition reflects positively in CP metrics. However, emission reduction targets and their achievement are not identical to CP measures in terms of their information content. Specifically, emission reduction targets convey information not captured by CP metrics directly. They entail signals concerning the willingness or ambition to reduce emissions, adding an explicit layer of intent to corporate decarbonization. Thus, CP can be seen as a 'second-order' representation of the change in actual emission values, whereas emission reduction targets logically precede CP, as they formalize the firms' level of ambition and specify corporate decarbonization objectives in detail (Privato et al. 2024). Like other CP metrics, emission reduction targets may be operationalized in several different ways, including differences in underlying carbon performance measures (absolute vs. intensity targets), varying emission scopes (Scope 1, 2 and 3), varying extents of emissions categories covered within a given scope (e.g., scope 3 use-phase emissions excluded), different time horizons (base, start

and end-year), differences in estimation methods (e.g., market vs. location-based scope 2 estimation). Overall, this implies significant difficulties to compare targets across firms, industries and regions (Busch and Lewandowski 2018).

Regardless of comparability, some targets may be better than others. For instance, researchers tend to disagree on the overall merit of carbon-intensity targets (Aswani et al. 2024; Dahlmann 2024). While Dahlmann (2024) criticizes intensity-based targets for decoupling emission reduction objectives from absolute growth (e.g., firms could meet intensity targets while growing in terms of absolute emissions), Aswani et al. (2024) argue that emission intensity is the more appropriate approach to analyze emissions on a firm-level. Yet, both approaches tend to agree on the fact that intensity targets can only leverage their potential if an absolute emission cap on the economy-level exists. In other words, firm-level intensity targets, which represent emission reductions as measured in relation to productive output, only contribute positively to reducing global carbon emissions if less carbon-efficient firms are crowded out of the market.

Another important prerequisite when analyzing emission reduction targets is the underlying *target materiality* and *ambitiousness*. Targets are not necessarily substantive by design but are only meaningful if they are material to the firms' emission profile as well as ambitious in terms of their anticipated emission reduction (Privato et al. 2024). In this regard, the validation of emission reduction targets through the Science-based Targets initiative (SBTi) has been considered in studies as a means to assess the validity of targets (e.g., Bendig et al. 2023; Ben-Amar et al. 2024; Mateo-Márquez et al. 2025). Accordingly, SBTs "differ fundamentally from firms' ordinary emission targets, because their target setting is guided by climate science. As a result, these emission targets are more challenging to achieve than ordinary corporate reduction objectives" (Bendig et al. 2023). This reasoning is grounded amongst others in the independent external assessment through SBTi which applies stringent validation criteria (e.g., exclusion of carbon credits), leading researchers to favor SBTs over other general targets (Dahlmann et al.

2019; Walenta 2020; Ben-Amar et al. 2024). Yet, while SBTs are commonly regarded as superior, the SBTi framework is also subject to criticism. Accordingly, concerns persist that even validated targets sometimes remain intransparent. Similarly, it is not clear that firms will be able to fulfill their commitments (Giesekam et al. 2021; Bjørn et al. 2022; Dahlmann 2024). Generally, in line with the burgeoning interest in corporate carbon pledges, there have been rising warnings that not all commitments are likely to be made with good intentions, which has been reinforced by companies trimming down their carbon reduction commitments (Malen 2022; Aldy et al. 2023; Callery and Kim 2024).

Therefore, besides the existence of reduction targets and their validation by SBTi, it is crucial to also take into account the actual *adherence* to these targets, which has been raised as a gap in the literature (Bendig et al. 2023). The adherence (i.e., partial/full achievement) of emission reduction targets has gained comparably little research attention compared to CP metrics more generally (Ioannou et al. 2016). As discussed, the adherence to targets has a direct correlation with CP, as the achievement of targets is also reflected in positive CP developments. Yet, as elaborated above, there are also conceptual differences as targets entail additional information not captured by CP metrics. Being a relative measure of the firm's decarbonization success, this strongly depends on the underlying characteristics of the target itself. In other words, the adherence to targets 'inherits' the empirical challenges that apply to emission reduction targets (comparability, level of ambition etc.). Thus, if a given target is not material or ambitious, the relative achievement of the target is also not indicative of any meaningful decarbonization success.

Given this broad spectrum of different carbon and climate measures, there are significant risks that firms engage in symbolic climate efforts without meaningful fundamental improvements. This has given rise to a dedicated stream of the literature addressing the question whether corporate climate efforts are genuine, or in other words, whether firms focus more on climate

talk or climate walk (Coen et al. 2022; Herman et al. 2024; Morrison et al. 2024). Empirically, the dissertation addresses this divide between symbolic and substantive climate efforts by considering different aspects of the firm's approach to managing carbon emissions, through disclosure, target setting, target validation as well as the subsequent adherence to these targets, allowing for novel insights into symbolic and substantive climate strategies.

4.2.2. The role of board gender diversity

As one important corporate governance determinant of carbon outcomes, previous research has attributed significant attention to the role of BGD for carbon reporting and performance. In terms of *carbon reporting*, prior studies find that BGD is positively associated with the (voluntary) disclosure of carbon information (e.g., Park et al. 2023; Caby et al. 2024; Taglialatela et al. 2024). Besides the existence of carbon reporting under voluntary reporting regimes, also the *quality* of the disclosed carbon information is affected positively, indicating that BGD is linked to higher carbon reporting quality (Houqe and Khan 2023; Nimer et al. 2024; García-Sánchez et al. 2025). For instance, this includes evidence suggesting that female directors contribute positively to corporate carbon disclosures, e.g., through increased transparency regarding decarbonization targets, timelines, strategic levers, and performance metrics (García-Sánchez et al. 2025). While many studies rely on non-European international settings, a positive link between BGD and carbon reporting is also supported for European firms (Jizi 2017; Tingbani et al. 2020; Taglialatela et al. 2024). The positive effect of BGD is particularly robust among corporate boards in which female directors represent a critical mass (Nuber and Velte 2021; Gavana et al. 2024).

With regards to *carbon performance* (CP), the extant literature similarly supports a positive role of BGD. This effect tends to hold across different measures of CP, based on absolute emissions (García Martín and Herrero 2020; Konadu et al. 2022; Kreuzer and Priberny 2022; Kyaw et al. 2022; Marchini et al. 2022; Valls Martínez et al. 2022; Kordsachia et al. 2023;

Oyewo 2023; Issa and In'airat 2024; Muktadir-Al-Mukit and Bhaiyat 2024) as well as emission intensity (Elsayih et al. 2021; Lu and Wang 2021; Nuber and Velte 2021; Altunbas et al. 2022; Rjiba and Thavaharan 2022; Kordsachia et al. 2023; Toukabri and Jilani 2023; Benlemlih and Yavaş 2024). Emission reduction targets as an intermediate mechanism translating environmental ambition into quantifiable objectives have been relatively under-researched to date. First evidence suggests that BGD is positively associated with the establishment of emission reduction targets (Nimer et al. 2024), yet several opportunities for future research remain unexplored.

Despite the abundant support for the positive BGD–carbon relationship, an increasing number of researchers also raises questions as to what extent BGD actually leads to substantive climate improvements (Haque 2017; Ghitti et al. 2024; Taglialatela et al. 2024). For instance, some evidence suggests that although BGD is linked to more carbon reduction initiatives or better reporting, this may not materialize in the form of actual emission reductions (Haque 2017; Córdova Román et al. 2021; Narsa Goud 2022). Accordingly, Haque (2017) indicated that while gender diverse boards are more likely to engage in carbon reduction initiatives (process-oriented), they do not achieve actual improvements in CP. In the same vein, Taglialatela et al. (2024) found that BGD is associated with a preponderance of green communication over implementation. These diverging findings open up promising avenues for further inquiry, suggesting a potential divide between the symbolic and substantive climate implications of BGD. Meanwhile, the implications of gender equality within corporate governance have also been gaining increasing relevance within family business research recently, as documented by timely special issues (Bannò et al. 2024) as well as increasing coverage in high-impact journals (Dyck et al. 2023; Duran et al. 2025; Vastola et al. 2025).

4.2.3. The role of family ownership

As the second important determinant of climate efforts analyzed in the second Article, the current knowledge regarding the role of FO is briefly introduced. Compared to the abundant evidence on the role of BGD, specific carbon- and climate-related studies that take into account FO are relatively scarce in the literature. The low prevalence of studies concerning carbon emissions among FFs gives rise to significant opportunities to contribute novel insights to the literature across the empirical articles of this dissertation.

Overall, prior studies indicate non-linear consequences of FO for carbon reporting, with negative implications for moderate levels of FO, turning positive under absolute majority ownership (Terlaak et al. 2018). Furthermore, Qosasi et al. (2022) found a positive relationship between FO and carbon reporting, especially when the controlling family is involved in management. In terms of CP, recent publications provide first insights into the role of family involvement for carbon performance outcomes. The results of Borsuk et al. (2024) show that FFs exhibit better CP, especially after the Paris agreement. Similarly, Dyck et al. (2024) found that family-controlled firms exhibit equal CP and even outperform non-family firms in countries with weak climate regulation. Furthermore, the results of Gómez-Mejía et al. (2025) suggest that FFs under the EU emission trading system pollute less, in line with the seminal work of Berrone et al. (2010). Contrary to these findings, Oussii and Jeriji (2024) identified a negative moderating effect of family ownership for the BGD–CP relationship. Generally, in terms of their decarbonization strategies, family-owned firms tend to be less attentive toward external stakeholder pressures (Block et al. 2023)

Besides the overall consideration of CP outcomes among FFs, the prior literature further emphasizes particular family-specific dynamics concerning the likelihood of FFs to engage in symbolic/substantive climate efforts. Accordingly, FFs are found to engage less in public displays of their commitments despite better or at least equal CP (Borsuk et al. 2024; Dyck et

al. 2024). As such, ‘family firms tackle carbon emissions with actions and are simply not interested in producing formal policy statements or engaging in “box-checking”’ (Dyck et al. 2024), indicating that while polluting less, FFs also communicate less about it (Borsuk et al. 2024). Meanwhile, FFs are also found to connect environmental attention with subsequent action, being less likely to greenwash (Kim et al. 2017). However, these results are subject to several contingencies, questioning their validity among European publicly listed firms, which is the empirical context of this dissertation. Namely, the results may not apply to European countries, publicly listed firms, and ownership-based FF definitions (Dyck et al. 2024; Lorenzen et al. 2024). More generally, the results are subject to considerable uncertainty. On the one hand, the number of carbon-related studies among FFs is very small, overall. On the other hand, the larger body of evidence concerning environmental performance has documented several contradictory findings which are likely to spill over to FF carbon studies, too (Hsueh et al. 2023; Miroshnychenko et al. 2024).

Building on these findings concerning firms’ climate efforts, in the following the implied financial consequences of corporate decarbonization will be elaborated. Looking into the financial consequences of corporate decarbonization thus connects the first article (corporate finance) with the second article (corporate climate efforts), e.g., by analyzing the implications for financial performance as well as sustainable finance instruments.

4.3. Financial consequences of corporate decarbonization

4.3.1. Carbon emissions and financial performance

Generally, there is a rich body of literature addressing the link between carbon and financial performance (CP/FP), referring to the fundamental notion whether it pays to be green (e.g., Ambec and Lanoie 2008; Bendig et al. 2023; Gangi et al. 2025). Conceptually, this literature frequently builds on the ‘business case for sustainability’ concept, indicating that sustainable

business conduct may be associated with financial benefits, also in the particular context of corporate climate strategies (Busch and Lewandowski 2018; Schaltegger et al. 2019).

Empirically, this perspective tends to be supported, as the majority of extant studies suggests a positive relationship between CP and FP. Based on meta-analysis of 32 primary studies covering 101,775 observation, Busch and Lewandowski (2018) show that carbon emissions are inversely related with FP, i.e., that good CP is associated with higher FP. Similarly, based on a systematic literature review, Velte et al. (2020) also arrive at the conclusion that CP is associated with higher FP. Given the extensive prior inquiry into the CP-FP relationship, the subsequent focus lies on additional contingencies affecting this relationship, as well as the wider application of these ideas to the particular case of emission reduction targets. Besides the general support for a positive CP-FP link, prior research suggests that there are several factors affecting this relationship, including measurement choices regarding emissions (e.g., absolute vs. intensity), FP (e.g., accounting- vs. market-based measures) or considerations of non-linearity (Nuber et al. 2020; Velte et al. 2020; Aswani et al. 2024). Moreover, the literature concerning the CP-FP link is facing considerable empirical challenges associated with endogeneity. Among other sources of endogeneity, this relates to concerns over reverse causality (Gómez-Mejía et al. 2025), which need to be taken into account for our study design.

More recently, the role of *emission reduction targets* has attracted particular attention (Ioannou et al. 2016; Callery and Kim 2024; Dahlmann 2024). Overall, results suggest a positive relationship of emission reduction targets with FP. Besides the generally positive link, extant studies also specifically emphasize the dominant role of SBTs. Accordingly, prior research indicates that SBTs are associated with positive financial consequences (Ben-Amar et al. 2024). Unisono, Bendig et al. (2023) find that CP is positively related to FP among firms that have set themselves SBTs. Likewise, Li et al. (2025) suggest that adopting SBTs represents a long-term sustainable investment that helps reduce emissions, while not harming profitability.

Yet, despite prior research into emission reduction targets, Bendig et al. (2023) note that the actual achievement of emission reduction targets so far has been under-researched, leaving significant untapped research opportunities for the third article. Generally, this research gap is puzzling because carbon reduction targets entail several complexities that are not reflected in prevailing carbon performance metrics (Ioannou et al. 2016; Dahlmann 2024), raising the need for dedicated research into target adherence. Most importantly, there is growing evidence documenting different kinds of malpractices when failing to meet emission reductions targets. Both Malen (2022) as well as Callery and Kim (2024) report similar findings of firms 'moving the goalpost' or engaging in 'deceptive parameter changes', i.e., subsequent adjustments to emission reduction targets to conceal underperformance. While both the voluntary nature of many climate commitments and the limited extent of standardization pave the way for these practices (Dahlmann 2024), this raises the question whether prior research findings concerning the CP-FP relationship equally apply to emission reduction targets.

The relationship between carbon emissions and FP has also been subject to increasing attention within family business research. Recent analyses have addressed the particular question whether FFs are more capable in reaping the financial benefits of their decarbonization efforts (Gómez-Mejía et al. 2025), environmental responsibility (Gangi et al. 2025), or their CSR initiatives more widely (Combs et al. 2023). This resonates with the lively discussions in the literature whether FFs act more or less responsible in different areas of sustainability (Miroshnychenko et al. 2022; Lorenzen et al. 2024; Miroshnychenko et al. 2024; Caccialanza 2025), including their carbon emissions (Borsuk et al. 2024; Gómez-Mejía et al. 2025). As outlined in Section 2.3., Combs et al. (2023) have established the notion that FFs may get 'more bang for their buck'. Specifically, they argue that SEW resources may help FFs better leverage their CSR strategies in favor of financial gain. Extending this idea to the context of carbon emissions, Gómez-Mejía et al. (2025) show that FFs tend to benefit more financially from their

carbon performance. However, the role of family involvement remains ambivalent (Miroshnychenko et al. 2022; Miroshnychenko et al. 2024). Li et al. (2023) suggest that prior research has overlooked the dual nature of SEW, which may explain inconsistent results concerning environmental strategies among FFs. Accordingly, they raise the need to distinguish between extended and restricted SEW, resulting in distinct, non-homogenous environmental strategies. In the same vein, Hsueh et al. (2023) found that "that the same SEW dimensions may lead to polar strategic choices" (p. 191). This is in line with the results of (Miller and Le Breton-Miller 2021), suggesting that FFs tend to gravitate toward unusual and opposite extremes in their behavior toward stakeholders and their strategic initiatives. Thus, these bivalent qualities ultimately depend on the family owners' individual preferences, reducing the wider generalizability of findings (Miller and Le Breton-Miller 2021). Thus, although SEW can drive positive behaviors, its 'dark side' can emerge when an excessive focus on family control leads to neglect broader stakeholder interests (Zhu et al. 2025).

Overall, these arguments suggest that FO plays an important moderating role in the relationship between the adherence to decarbonization targets and FP. However, considering the more optimistic pro-environmental perspectives (e.g., Combs et al. 2023; Gómez-Mejía et al. 2025) but also the contrary view which emphasizes the dual/polar nature of positive and negative environmental choices among family firms (e.g., Li et al. 2023; Miroshnychenko et al. 2024), the specific consequences of FO remain largely unknown. In turn, this gives rise for novel research opportunities to be addressed in this dissertation.

4.3.2. Green and sustainability-linked bonds

Considering the positive evidence on the CP-FP link discussed in the prior section, the use of sustainable finance instruments can provide novel insights into potential sources of financial advantage from corporate decarbonization (Khan and Vismara 2025). Generally, sustainable finance instruments promise potential cost of capital advantages, representing a supposed

channel for firms to benefit financially from their decarbonization efforts (Löffler et al. 2021). With a particular climate-focus, two types of sustainable bonds have emerged, namely *green bonds* (GBs) and *sustainability-linked bonds* (SLBs) (Flammer 2021; Feldhütter et al. 2024). GBs represent financial instruments where the proceeds will be exclusively applied to finance eligible green projects (ICMA 2021). Meanwhile, SLBs complement the use of proceeds model of GBs by tying general purpose debt finance to issuers' sustainability performance against predefined targets (Vulturius et al. 2024). In other words, while GBs and SLBs both intend to facilitate the green transition of their issuers, they rely on different ways to attain them. While GBs restrict the use of proceeds to fund eligible green projects, SLBs reward (or penalize) bond issuers through pre-defined sustainability targets that correspond to a coupon step-up/step-down (Flammer 2021; Feldhütter et al. 2024). These financial instruments have become subject to increasing regulatory scrutiny and standardization, including the ICMA GBPs/SLBPs as well as the EU GBS (see Section 3.3.1. for a detailed discussion).

Prior empirical research concerning GBs and SLBs has largely focused on market-level phenomena, including empirical attempts to capture the margin discount of green bonds ('greenium'), which remains a controversial issue (Larcker and Watts 2020). Overall, prior research suggests cost of capital advantages among GBs and SLBs (Hachenberg and Schiereck 2018; Löffler et al. 2021; MacAskill et al. 2021; Dorfleitner et al. 2022; Feldhütter et al. 2024). These studies report positive evidence on the existence of a greenium, which tends to be more pronounced for 'dark-green' issues validated by strong external second party opinions (Dorfleitner et al. 2022). Similar analyses concerning the cost of capital impact of SLB issuances indicate that investors are willing to accept a 1-2 basis points lower yield (Feldhütter et al. 2024). In contrast, Larcker and Watts (2020) reach a different conclusion. Based on a sample of matched green and non-green bond issues among US municipalities they provide robust evidence against a cost of capital advantage for green bond issuers, suggesting

conflicting findings concerning the existence and size of a supposed greenium. More generally, GBs and SLBs are frequently associated with positive consequences for firm-level decarbonization post bond issuance (Flammer 2021; Berrada et al. 2024; Demski et al. 2025). Accordingly, SLB issuers are found to decarbonize six percentage points faster than non-issuers (Berrada et al. 2024), in line with similar positive results concerning post-issuance decarbonization among GB issuers (Flammer 2021). Yet significantly less is known about *who is accessing these sustainable finance markets*. Therefore, as part of the additional analysis of Article 3, the issuance of sustainable bonds is studied in relation to the adherence to emission reduction targets as a potential channel to explain superior FP among 'good decarbonizers'.

5. Research results and implications

In this section, the results of the individual articles are discussed in the context of the research objectives established in Section 1.2. For the sake of brevity, the findings will be presented in a condensed manner based on the original articles of the dissertation, which are provided as supplements (see Annex I to III). The particular focus of this section is to summarize key findings and highlight their connections in the overall context of this dissertation. Besides the emphasis on the results achieved, opportunities for future research are introduced. The results are discussed in chronological order based on the individual articles, addressing the role of family business heterogeneity in FAT policies (Article 1), the role of FO and BGD for climate talk and walk (Article 2), as well as the subsequent financial consequences of these climate efforts (Article 3).

5.1. Heterogeneity in finance, accounting and tax policies

On aggregate, the results clearly support the perspective of family firms being a heterogeneous group, in line with prior calls for research (Chua et al. 2012; Michiels and Molly 2017; Brune et al. 2021). Going beyond previous studies, the review systematically documented the scope and consequences of heterogeneity. The most influential drivers of heterogeneity evolve around

FF management, variations in ownership structure and board composition as well as transgenerational issues. Thus, the results show that a governance angle toward heterogeneity is predominant in the FAT literature. Across the identified dimensions of heterogeneity, several nuanced consequences have been outlined. For instance, the review has stressed the particular role of family CEOs who have been found to affect financing behavior, observable through higher financial discretion, lower debt levels, and a trust-enhancing perception among lenders (Schmid 2013; Burgstaller and Wagner 2015; Jain and Shao 2015).

Collectively, these results suggest a particularly dominant role of powerful individuals within the corporate governance system of FFs. These include the role of family CEOs in general, the role of the founder in particular, as well as the board chair. Overall, the results indicate that heterogeneity among FFs may strongly relate to these individuals and their respective behavior and intentions. It is reasonable to assume that these protagonists are more influential in FFs as their power is less contested, especially where family control is high. Therefore, they may exert stronger influence on FAT policies in FFs, as documented in the review. These observations have interesting overlaps with the CEO power literature, which is also frequently addressed in non-family context (Gull et al. 2023). This suggests that these protagonists, including the CEO, founder and board chair are of central importance for understanding FF heterogeneity. Such individual-level differences may hold substantial insights for heterogeneity among FFs. Delving deeper into the role of these individuals and its consequences for FF heterogeneity and FAT policies thus represents a promising research direction (see Research opportunity 1).

> ***Research opportunity 1****: Analyze in which ways corporate protagonists (e.g., founder, CEO, board chair) determine whether FFs behave more alike or more heterogeneously*

Furthermore, throughout the review it has become apparent that FF heterogeneity is a multidimensional construct frequently used to capture a large variety of different effects. The fact that 'heterogeneity' is used as an umbrella term for various underlying phenomena causes

a number of challenges. Although distinguishing FFs along several dimensions of heterogeneity has resolved conflicting results at the level of family vs. non-family firms, inconsistencies also prevail at the heterogeneity level. This includes practical problems in terms of the robustness and comparability of research results across studies, as considerations of heterogeneity introduce an additional layer of complexity. More generally, it has been discussed critically how heterogeneity challenges the generalizability of findings at the family- vs. non-family level of analysis overall.

To resolve some of these issues and advance the understanding of heterogeneity in FAT polices among FFs, a model has been developed which (re)conceptualizes family business heterogeneity. To get closer to the presumed core of the family business heterogeneity construct, the results suggest the necessity to further narrow down the current broad understanding of heterogeneity, focusing more on strictly FF-specific sources of variation, thereby excluding other differences that exceed the FF-level per se. In turn, by separating *FF-agnosti*c and *FF-specific* sources of variation, this raises an important direction for future research. Implicitly, this relates to the wider question how the FF heterogeneity discourse can be better reconciled with the corporate governance literature beyond the inquiry of FFs. Specifically, many of the drivers of FF heterogeneity have been identified as important corporate governance constructs, but these literature streams tend to remain fragmented (Research opportunity 2).

> ***Research opportunity 2****: Investigate which dimensions of heterogeneity supersede the FF-level and how the distinction between FF-specific and FF-agnostic sources can help disentangle these effects*

One respective dimension of heterogeneity that may supersede the FF level is the difference between *public versus private FFs*. As per the review results, there tends to be a considerable disconnect between these two groups of firms. While the differences between public and private

FFs are intuitive, the understanding of the underlying mechanisms remains surprisingly limited. One reason for this observation is that many research designs gravitate between the two opposite groups and only seldomly achieve to bridge these two sampling contexts. On the one hand, there are archival, empirical-quantitative study designs that rely on commercial databases, focusing strongly on large publicly listed firms. On the other hand, scholars focus on small private FFs, either through survey-based quantitative studies or through qualitative designs, mostly with a limited regional scope and smaller sample sizes. Yet researchers rarely incorporate more diverse groups of firms in a joint research design due to data availability problems, which represents a methodological bottleneck to advance the understanding of heterogeneity (see Research opportunity 3).

> ***Research opportunity 3****: Investigate in which ways private and public FFs differ in terms of their FAT policies, as well as more generally, how heterogeneity can be captured better by employing larger or more diverse datasets that blend heterogeneous groups of FFs*

5.2. Board gender diversity, family ownership and corporate climate efforts

Addressing the second research objective, Article 2 has empirically explored the joint and individual effects of BGD and FO for symbolic and substantive climate efforts (climate talk and walk) in the European capital market. The results provide timely new evidence in light of the increasing relevance of female representation on the boards of FFs (Duran et al. 2025) as well as the first compliance periods of the EU BGD Directive in the coming years (see Section 3.3.2). Based on several random-effects panel regressions as well as a battery of robustness tests, the results of the second article suggest that firms with higher BGD engage more strongly in climate talk but not in climate walk. These findings extend prior results indicating that BGD is more strongly associated with symbolic climate efforts, which do not always translate into substantive improvements (Haque 2017; Cordova et al. 2021; Taglialatela et al. 2024). From a legitimacy perspective, the results suggest that more gender-diverse boards tend to seek

legitimacy through symbolic climate efforts, which does not necessarily correspond to fundamental improvements in climate-related performance.

Meanwhile, the findings concerning the climate consequences of FO entail several nuanced observations. Overall, FO tends to exhibit a negative association with climate actions, although the effect depends on the ownership concentration threshold and varies with family management. On aggregate, the results support negative effects of FO*,* which are mainly attributable to climate walk and to a lesser extent to climate talk*,* in line with the negative view of family involvement for carbon outcomes. The results did not support a negative moderating role of FO in the relationship between BGD and climate talk or walk. However, when disaggregating the interaction results in more detail, the findings provide evidence suggesting a mitigating effect of female directors for the negative direct effect of FO, applicable to both climate talk and climate walk and across different thresholds of female directorships. This suggests that FFs may benefit from appointing relatively more female board members in terms of their climate strategies.

On a higher level, the results also contribute to the ongoing debate concerning the role of board mechanisms and their effectiveness in aligning firm objectives with climate-related stakeholder needs. The findings substantiate prior evidence indicating that BGD and FO may be regarded as competing corporate governance mechanisms in terms of their influence on corporate climate strategies (Maggi et al. 2023). By separating symbolic from substantive efforts, the results shed light on the more nuanced dynamics that encompass corporate climate efforts that are facing persistent greenwashing allegations. Namely, the results suggest that although BGD is associated with positive consequences, firms focusing merely on BGD as a measure of demographic board diversity may not be sufficiently equipped to catalyze substantive climate efforts. Furthermore, regarding the role of FO, the results suggest that family-owned firms are reluctant to engage in substantive climate efforts. These effects tend to be more pronounced for

higher levels of family control and are not evident for family-managed firms. This evidence suggests that family owners with higher stakes, who are relatively more exposed to climate risks affecting their assets, are counterintuitively more reluctant to transform their business through substantive climate strategies.

Building on these findings, there is significant potential for further research. Due to limitations in terms of data availability, the interaction between BGD and FO was analyzed on an aggregate level. There are promising opportunities for further refinement by diving deeper into the interaction of BGD and FO at the level of each individual board member. Considering the explicit family affiliation (family or non-family members) and gender for each board member may provide additional insights into the unique synergies and role conflicts that female directors are confronted with in FFs (Research opportunity 1). These considerations have already informed prior research in the CSR literature but have not been explored in-depth for the climate/carbon literature (Masi et al. 2022; Gavana et al. 2023; Cambrea et al. 2024).

> ***Research opportunity 1****: Analyze the role of BGD and FO for climate talk and walk at the level of individual board members (disaggregating family affiliation and gender on the level of each individual director)*

Besides a closer inquiry into the individual-level implications of BGD and FO, further opportunities for future research lie in more comprehensive considerations of heterogeneity among FFs. Both the results of the first article as well as preliminary evidence from green innovation research indicate that heterogeneity is an important contingency, also in the FF-sustainability literature (Francesco et al. 2024). Although the second article has employed different FO thresholds, tested for differential effects of family involvement in management as well as controlled for firm age as a proxy for the family firm generation, further considerations of FF heterogeneity could not be implemented with the available data. Therefore, in combination with the research findings of the first article of the dissertation, a deeper analysis

regarding the climate consequences of FF heterogeneity represents a promising opportunity for further research (Research opportunity 2). Some important differences from a heterogeneity perspective that deserve further research attention include regional differences, public versus private FFs, as well as family-owned versus family-managed FFs. These have been raised in the second article as important contingencies to explain conflicting evidence and should receive further attention (Dyck et al. 2024; Lorenzen et al. 2024; Gómez-Mejía et al. 2025).

> ***Research opportunity 2****: Incorporate additional elements of FF heterogeneity (e.g., regional differences, public versus private, family ownership versus family management) within the analysis of climate strategies among FFs*

Another promising avenue for future research is associated with measuring the (climate) consequences of the various recent regulatory interventions on a European level (Ottenstein et al. 2022; Benlemlih and Yavaş 2024). While our observation period falls into the pre-CSRD time period, the growing uptake of mandatory sustainability reporting duties in line with CSRD/ESRS provides new opportunities for researchers to analyze the respective regulatory effects on a European level (e.g., CSRD, EU Taxonomy, CSDDD, EU BGD Directive). These policies provide fertile ground for scientifically robust research designs, offering interesting methodological angles to capture and isolate regulatory effects and their impact on climate reporting and performance outcomes. On the one hand, this relates to the mandatory nature of the underlying reporting duties, circumventing selection issues affecting voluntary reporting schemes (Döring et al. 2023). On the other hand, this also provides additional opportunities for (quasi-) experimental methods, as for instance the different application periods and size thresholds considered in the regulations provide useful opportunities to study the differences between treated (regulated) firms and their (non-regulated) control groups (Velte 2024c).

Research opportunity 3*: Study the regulatory effects of recent European sustainability regulations with regards to climate outcomes as the mandatory nature and the underlying regulatory intervention (e.g., treated vs. non-treated firms) allow for robust empirical research designs*

5.3. Financial consequences of corporate decarbonization

Complementing and building upon the results of the second article, the third article subsequently raised questions concerning the financial consequences of corporate decarbonization efforts. Addressing the third partial research objective of the dissertation, the results suggest that the adherence to emission reduction targets is positively related to (accounting-based) FP. The results concerning market-value-based FP (Tobin's Q) yield no significant results. The results in terms of accounting-based FP tend to align with prior evidence in favor of the 'business case for sustainability' (Busch and Lewandowski 2018; Velte et al. 2020). Re-affirming previous research, the results of the third article indicate a dominant role of SBTs in the carbon-FP relationship. However, going beyond prior contributions, the results provide novel insights into potential mechanisms explaining the particular role of SBTs for superior FP. Specifically, the results suggest a "double-positive" effect in which firms with SBTs set themselves more ambitious targets, which they also tend to achieve at a higher rate. Based on this "double-positive" effect, the results also show that the positive consequences of adherence for FP mainly unfold through more ambitious SBTs.

Furthermore, the findings of the third article show that the relationship between adherence and FP is moderated negatively by FO. These findings provide timely new evidence as the ability of FFs to benefit financially from their climate efforts has been gaining increasing research attention recently (Gangi et al. 2025; Gómez-Mejía et al. 2025). In light of the lively discourse on the dual/polar nature of family involvement in climate matters (Miller and Le Breton-Miller 2021; Hsueh et al. 2023; Li et al. 2023), the findings lend support to the negative view of FO

in terms of its moderating role for the adherence-FP relationship among publicly listed family firms in Europe. As these results deviate from some previous studies, the third article discusses important contingencies that may explain diverging results (e.g., regional samples, private vs. public FFs, different measures being used). As the family business literature faces a persistent divide between conflicting research findings, there are significant opportunities for further research. Building up on the findings of the third article, there are additional research opportunities to help in reconciling diverging evidence in the prior literature. Specifically, these include the additional consideration of other dimensions of heterogeneity as outlined by the first article of this dissertation as well as recent studies in the literature (Francesco et al. 2024). Most importantly, future research should account for a potential disconnect between private and public FFs that has been associated with differences in climate behavior, but may also affect the ability of FFs to benefit financially from their climate efforts. Within the third article, only public firms have been taken into account, leaving this as a potential area for future research.

> ***Research opportunity 1****: Investigate how additional considerations of FF heterogeneity can help reconcile conflicting evidence in the adherence-FP relationship (e.g., also consider private FFs beyond the sample of publicly listed firms)*

Besides these opportunities for further research to better understand diverging findings among FFs, future research may benefit from additional methodological improvements beyond the scope of the third article. Although the study has been designed to alleviate endogeneity concerns, especially from reverse causality in the CP-FP relationship (Gómez-Mejía et al. 2025), some potential issues remain. Therefore, future research could benefit from further methodological advances. For instance, scholars may circumvent selection issues associated with the voluntary nature of the CDP survey by incorporating additional mandatory carbon reporting duties under EU CSRD/ESRS. Furthermore, advanced methods such as quasi-

experimental approaches, namely the difference-in-differences approach, may strengthen causal inference in future studies (see for instance Dyck et al. 2023 or Borsuk et al. 2024).

> ***Research opportunity 2****: Consider additional methodological advancements by alleviating potential selection issues associated with the voluntary CDP reporting by utilizing mandatory carbon reporting duties in line with EU CSRD/ESRS as well as employ additional advanced methods such as difference-in-differences research designs*

Furthermore, the third article considered sustainable bond issuance as a potential channel for financial advantage from corporate decarbonization in its additional analysis. The results indicate that firms that adhere to their emission reduction targets are more likely to engage in sustainable finance markets by issuing GBs or SLBs. On the one hand, this confirms the underlying conceptual reasoning that sustainable bond issuance may represent a particular source of financial advantage from corporate decarbonization. On the other hand, these results indicate that firms with a positive track record in managing their carbon emissions also more frequently access sustainable finance markets, which adds to the credibility of this market segment. In contrast, FFs have been found to issue sustainable bonds less often. In the context of all the findings of the third article collectively, there are promising avenues for further research. On aggregate, the results indicate that firms with successful approaches towards managing their carbon emissions may extract multiple benefits across the organization. Namely, firms adhering to their emission targets benefit financially, especially when these targets are aligned with climate-science. Similarly, they also tend to have better access to sustainable finance markets. This implies that a holistic corporate carbon strategy may imply synergistic benefits across the organization that extend beyond immediate financial benefits. Therefore, future research could dive deeper into these potentially re-inforcing mechanisms across the organization that can be leveraged through comprehensive climate strategies. For instance, setting up the necessary carbon reporting infrastructure, formalizing the firm's climate

ambition and subsequently delivering on these claims may facilitate several positive outcomes across product-, labor- and financial markets.

> ***Research opportunity 3****: Analyze how holistic climate strategies can synergistically benefit firms in different areas of the organization (e.g., product-market, labor-market or financial-market related benefits)*

5.4. Implications for regulators and practitioners

Besides these implications for academia, the results of this dissertation also entail several important managerial and regulatory implications. By chronological order of the individual studies, the first article provides practical insights relevant to different family business stakeholder groups. Although the discourse concerning family business heterogeneity has been mostly focused on academic audiences, the implications of heterogeneity are directly relevant to practice as they document the large spectrum of variation among FFs. The findings indicate in concrete terms that FFs are a diverse group of firms, observable across their financing practices, the quality of their financial reporting, and their tax behaviors. Although FFs are frequently seen as rather homogenous group, the results indicate the clear need to evaluate FFs on a case-by-case-basis rather than considering them as a uniform aggregate of organizations. The results of the first article thus provide a basis to appreciate the specific peculiarities of FFs, catering to a wide practitioner audience, including business families themselves, external non-family managers, their providers of capital, auditors, as well as tax authorities.

Similarly, the results of the second article have important managerial and regulatory implications, specifying the joint and individual effects of BGD and FO for corporate climate strategies. Firms are subject to increasingly tight regulation and mounting expectations to reduce their carbon emissions. Therefore, they must set up their governance systems in accordance with the climate expectations of their stakeholders. In this regard, the results

indicate the positive yet limited effect of BGD for corporate climate efforts. This is of particular relevance as prior research emphasizes the interrelationship between legislation concerning gender equality in corporate governance and climate outcomes (Velte 2024c). In this regard, regulators at the national and European level may gain additional insights into the opportunities and limits of regulatory initiatives such as the European board gender diversity directive (with the first compliance periods approaching in 2026/2027) to promote substantive climate efforts within the European capital market.

Meanwhile, the results of the second article also shed light on the negative consequences of family involvement for corporate climate efforts. As a substantial part of European publicly listed firms are led by influential owning families, these results are directly relevant to the viability of European climate objectives. In light of the negative consequences of family involvement for corporate climate efforts documented in our empirical analyses, different interest groups including industry associations, regulatory bodies as well as society at large may find these results useful. Addressing the environmental concerns associated with FO therefore represents an important lever in favor of a climate-friendly transition of the European economy. Besides the high practical relevance of achieving global decarbonization targets, the results contribute to the ongoing discourse on greenwashing by providing quantifiable evidence on the extent to which firms follow up on their decarbonization commitments.

Furthermore, the results of the third article provide encouraging evidence relevant to both practitioners and regulators alike. First, the results document that corporate decarbonization, as measured by the adherence to emission reduction targets, entails financial benefits. Accordingly, firms that adhere to their decarbonization targets exhibit higher (accounting-based) FP, indicating that emission reduction does not contradict economic success. Furthermore, the results have shown that the positive financial effect is mainly associated with firms who set themselves SBTs. Overall, these results provide an optimistic account of the

potential financial benefits among firms with robust climate ambitions, which can inform managers in their quest to decarbonize their business operations. Meanwhile, the results also suggest that strong and credible commitments (e.g., setting SBTs) coincide with increased financial benefits, which may serve as an affirmation for corporate practitioners as well as the wider climate community, adding new insights concerning the role of externally validated climate objectives. This is further reinforced by the findings from the additional analysis of Article 3, suggesting that sustainable finance markets attract high quality issuers with a good decarbonization track record. Overall, the results add to the credibility of the sustainable bond markets, which is frequently met with some doubts concerning greenwashing. In this regard, the findings provide a more encouraging account of this market segment, indicating that the sustainable bond markets attract issuers with better sustainability profiles, as measured by their ability to set and adhere to emission reduction targets. More generally, the results of the second and third article also include insights that may inform ongoing regulatory discussions on a European level, aiming at a comprehensive revision of the current regulatory landscape (see Omnibus discussion in Section 3.3). In this regard, the results shed light on the historic merit of corporate climate efforts prior to the CSRD implementation period. These insights are of high importance as the CSRD/ESRS requirements are being reviewed at the time of writing.

6. Conclusion

Over the course of this dissertation, different partial research objectives have been addressed. The first article has emphasized dissimilarities among FFs (family business heterogeneity), investigating their particular role for finance, accounting and tax policies. The results suggest that FFs differ across several dimensions, especially with regards to the firm's corporate governance system. Although different dimensions of heterogeneity represent important determinants of finance, accounting and tax policies in FFs, reflecting these adequately remains challenging in research practice. Empirically, scholars face considerable limitations in terms of

data availability. Within the literature, heterogeneity has been widely used as an umbrella term, capturing a broad set of underlying phenomena (Daspit et al. 2021). Therefore, the first article provided additional conceptual recommendations to improve future heterogeneity studies by offering a refined approach to define family business heterogeneity, focusing more strongly on family-specific sources of variation. On a high-level, the results suggest that scholars should be mindful of heterogeneity in their empirical designs, considering FFs as a diverse group of entities whose finance, accounting and tax behaviors can vary significantly (Michiels and Molly 2017; Brune et al. 2019; Bauweraerts et al. 2020).

The subsequent empirical articles have then explored a different domain, namely corporate climate efforts. Both the general extent of climate efforts (Article 2), as well as their respective financial consequences (Article 3) have been analyzed as part of this dissertation. The third article also included sustainable finance instruments, representing a linking element between the separate studies concerning finance (Article 1) and corporate climate efforts (Article 2), in line with the growing relevance of research at the intersection of finance and sustainability. In more detail, the second article has analyzed climate strategies of European publicly listed FFs and non-FFs. Given persistent concerns over differences in symbolic and substantive climate efforts (Coen et al. 2022; Morrison et al. 2024), the second article has analyzed the role of BGD and FO for different climate actions from reporting, to setting emission reduction targets, as well as finally meeting these commitments. While there has been extensive research on the role of female directors for carbon reporting and performance outcomes (Nuber and Velte 2021; Konadu et al. 2022; Caby et al. 2024), prior studies have raised questions about their capacity to influence substantive climate strategies (Haque 2017; Taglialatela et al. 2024). Meanwhile, the role of BGD has been gaining increasing relevance within the family business literature, too (Maggi et al. 2023; Oussii and Jeriji 2024; Duran et al. 2025). Overall, the results of the second article shed light on the complex interplay of symbolic and substantive climate efforts. Based

on target-level data of firms' emission reduction objectives, the second article provides novel insights into how firms translate their climate ambitions into actionable targets and how they subsequently deliver on those targets. Specifically, the results have shown that BGD is associated with positive consequences for symbolic climate efforts yet has no significant effect on substantive climate efforts. Meanwhile, FO tends to exhibit a negative relationship with climate efforts, although the effect depends on the ownership concentration threshold and varies with family management. The results further suggest that female directors mitigate the negative direct consequences of FO for climate actions. Thereby, the study provided new insights into the particular role of different corporate governance mechanisms for attaining international climate objectives among European public firms.

The third article then concluded the dissertation, linking the first and second articles conceptually by exploring the financial consequences of corporate decarbonization. Specifically, the third article analyzed the FP effects of the adherence to emission reduction targets. The results indicate that the adherence to emission targets is associated with higher (accounting-based) FP, consistent with the business case for sustainability perspective (Busch and Lewandowski 2018; Schaltegger et al. 2019; Velte 2024b). The positive effect of adherence toward FP mainly unfolds through SBTs, indicating that firms with ambitious climate objectives tend to benefit more financially. The adherence-FP relationship is moderated negatively by FO, adding to the negative view concerning the dual role of family involvement in climate performance (Miller and Le Breton-Miller 2021; Miroshnychenko et al. 2024). Meanwhile, the results also indicate that adherence to targets is positively linked to sustainable bond issuance, re-affirming the conceptual notion of sustainable bond issuance as a potential channel for financial advantage from corporate decarbonization (Khan and Vismara 2025). In turn, FFs are less likely to issue sustainable bonds, adding novel insights into family business

financing preferences, e.g., in terms of their aversion toward control-diluting sources of capital (González et al. 2013; Keasey et al. 2015).

Besides the overall results and their implications for future research, the findings have several managerial and regulatory implications (see Section 5.4. for a detailed discussion). Especially from a European regulatory perspective, the results are subject to the ongoing controversial policy discussions (see 'Omnibus' discourse in Section 3.3). Notably, the observation periods of the empirical articles fall into the pre-CSRD time and are thus not directly affected. Yet, the future course of the European sustainability legislation may change swiftly. Potential disruptions amongst others include changes in the scope of companies affected by prevailing legislations, as well as changes concerning the implied timing and extent of reporting and due diligence duties (Velte et al. 2025). Considering the dynamic and volatile nature of the Omnibus discussions, key developments have been reflected briefly. Yet, projections concerning the further course of European sustainability legislation are subject to considerable uncertainty at the time of finalizing this dissertation. Therefore, the focus has been on outlining the regulatory status quo, without engaging in further speculation. It remains to be seen whether the anticipated backlash will have a lasting negative impact, potentially threatening the viability of the EU Green Deal's climate neutrality objective altogether.

References

Achleitner A-K, Günther N, Kaserer C, Siciliano G (2014) Real Earnings Management and Accrual-based Earnings Management in Family Firms. European Accounting Review 23:431–461. https://doi.org/10.1080/09638180.2014.895620

Aldy JE, Bolton P, Kacperczyk M, Halem ZM (2023) Behind schedule: The corporate effort to fulfill climate obligations. J Applied Corp Finance 35:26–34. https://doi.org/10.1111/jacf.12560

Ali A, Chen T-Y, Radhakrishnan S (2007) Corporate disclosures by family firms. Journal of Accounting and Economics 44:238–286. https://doi.org/10.1016/j.jacceco.2007.01.006

Altunbas Y, Gambacorta L, Reghezza A, Velliscig G (2022) Does gender diversity in the workplace mitigate climate change? Journal of Corporate Finance 77:102303. https://doi.org/10.1016/j.jcorpfin.2022.102303

Ambec S, Lanoie P (2008) Does It Pay to Be Green? A Systematic Overview. AMP 22:45–62. https://doi.org/10.5465/AMP.2008.35590353

Amore MD, Minichilli A, Corbetta G (2011) How do managerial successions shape corporate financial policies in family firms? Journal of Corporate Finance 17:1016–1027. https://doi.org/10.1016/j.jcorpfin.2011.05.002

Anderson R, Reeb D (2003) Founding-Family Ownership and Firm Performance: Evidence from the S&P 500. Journal of Finance 58:1301–1328

Anderson A-M, Kish R (2024) Rewarding performance through sustainability-linked bonds. Economic Affairs 44:294–319. https://doi.org/10.1111/ecaf.12636

Anglin AH, Reid SW, Short JC, Zachary MA, Rutherford MW (2017) An Archival Approach to Measuring Family Influence. Family Business Review 30:19–36. https://doi.org/10.1177/0894486516669254

Ardito L, Capolupo P, Massis A de, Messeni Petruzzelli A, Miroshnychenko I (2024) Unveiling environmental, social, and governance dynamics in family firms. Journal of Family Business Strategy 15:100608. https://doi.org/10.1016/j.jfbs.2024.100608

Arndt P, Wrohlich K (2019) Gender Quotas in a European Comparison: Tough Sanctions Most Effective. https://doi.org/10.18723/DIW_DWR:2019-38-1

Aswani J, Raghunandan A, Rajgopal S (2024) Are Carbon Emissions Associated with Stock Returns? Review of Finance 28:75–106. https://doi.org/10.1093/rof/rfad013

Audretsch DB, Hülsbeck M, Lehmann EE (2013) Families as active monitors of firm performance. Journal of Family Business Strategy 4:118–130. https://doi.org/10.1016/j.jfbs.2013.02.002

Azuma K, Higashida A (2024) Climate change disclosure and evolving institutional investor salience: Roles of the Principles for Responsible Investment. Bus Strat Env 33:3669–3686. https://doi.org/10.1002/bse.3649

Bammens Y, Hünermund P (2020) Nonfinancial Considerations in Eco-Innovation Decisions: The Role of Family Ownership and Reputation Concerns. J Prod Innov Manag 37:431–453. https://doi.org/10.1111/jpim.12550

Bannò M, D'Allura GM, Dawson A, Torchia M, Audretsch D (2024) Advancing diversity research in family business. Journal of Family Business Strategy:100607. https://doi.org/10.1016/j.jfbs.2024.100607

Baumann-Pauly D, Wickert C, Spence LJ, Scherer AG (2013) Organizing Corporate Social Responsibility in Small and Large Firms: Size Matters. J Bus Ethics 115:693–705. https://doi.org/10.1007/s10551-013-1827-7

Bauweraerts J, Vandernoot J, Buchet A (2020) Family Firm Heterogeneity and Tax Aggressiveness: A Mixed Gamble Approach. Can J Adm Sci 37:149–163. https://doi.org/10.1002/cjas.1528

Bauweraerts J, Cirillo A, Sciascia S (2024) Socioemotional Wealth and Tax Aggressiveness in Private Family Firms: The Role of the CEO's Characteristics. Family Business Review 37:370–395. https://doi.org/10.1177/08944865231223562

Ben-Amar W, Comyns B, Martinez I (2024) Firm commitments on climate change: Effects of science-based targets on financial outcomes during the COVID-19 crisis. Bus Strat Env. https://doi.org/10.1002/bse.3890

Bendig D, Wagner A, Lau K (2023) Does it pay to be science-based green? The impact of science-based emission-reduction targets on corporate financial performance. J of Industrial Ecology 27:125–140. https://doi.org/10.1111/jiec.13341

Benlemlih M, Yavaş ÇV (2024) Economic Policy Uncertainty and Climate Change: Evidence from CO2 Emission. J Bus Ethics 191:415–441. https://doi.org/10.1007/s10551-023-05389-x

Berrada T, Engelhardt L, Gibson R, Krueger P (2024) The Economics of Sustainability-Linked Bonds. ECGI Working Paper Series in Finance

Berrone P, Cruz C, Gomez-Mejia LR, Larraza-Kintana M (2010) Socioemotional Wealth and Corporate Responses to Institutional Pressures: Do Family-Controlled Firms Pollute Less? Administrative Science Quarterly 55:82–113

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

Bhutta US, Tariq A, Farrukh M, Raza A, Iqbal MK (2022) Green bonds for sustainable development: Review of literature on development and impact of green bonds. Technological Forecasting and Social Change 175:121378. https://doi.org/10.1016/j.techfore.2021.121378

Bingler JA, Kraus M, Leippold M, Webersinke N (2024) How cheap talk in climate disclosures relates to climate initiatives, corporate emissions, and reputation risk. Journal of Banking & Finance 164:107191. https://doi.org/10.1016/j.jbankfin.2024.107191

Bjørn A, Tilsted JP, Addas A, Lloyd SM (2022) Can Science-Based Targets Make the Private Sector Paris-Aligned? A Review of the Emerging Evidence. Curr Clim Change Rep 8:53–69. https://doi.org/10.1007/s40641-022-00182-w

Bjuggren P-O, Duggal R, Giang DT (2012) Ownership Dispersion and Capital Structures in Family Firms: A Study of Closed Medium-sized Enterprises. Journal of Small Business & Entrepreneurship 25:185–200. https://doi.org/10.1080/08276331.2012.10593568

Blackwell M, Iacus S, King G, Porro G (2009) Cem: Coarsened Exact Matching in Stata. The Stata Journal 9:524–546. https://doi.org/10.1177/1536867X0900900402

Blanco-Mazagatos V, Quevedo-Puente E de, Castrillo LA (2007) The Trade-Off Between Financial Resources and Agency Costs in the Family Business: An Exploratory Study. Family Business Review 20:199–213. https://doi.org/10.1111/j.1741-6248.2007.00095.x

Block JH, Sharma P, Benz L (2023) Stakeholder Pressures and Decarbonization Strategies in Mittelstand Firms. J Bus Ethics. https://doi.org/10.1007/s10551-023-05576-w
Borsuk M, Eugster N, Klein P-O, Kowalewski O (2024) Family firms and carbon emissions. Journal of Corporate Finance 89:102672. https://doi.org/10.1016/j.jcorpfin.2024.102672
Botero IC, Cruz C, Massis A de, Nordqvist M (2015) Family business research in the European context. EJIM 9:139. https://doi.org/10.1504/EJIM.2015.067858
Brabec J, Macháč J (2025) Impacts of the EU Taxonomy implementation: a systematic literature review. Climate Policy:1–13. https://doi.org/10.1080/14693062.2025.2526683
Brigham KH, Payne GT (2019) Socioemotional Wealth (SEW): Questions on Construct Validity. Family Business Review 32:326–329. https://doi.org/10.1177/0894486519889402
Brückbauer, Frank, Cézanne, Thibault, Kirschenmann, Karolin, Schröder, Michael (2023) Does the European Union need another green bond standard?: ZEW policy brief, No. 10/2023, ZEW - Leibniz-Zentrum für Europäische Wirtschaftsforschung, Mannheim
Brune A, Thomsen M, Watrin C (2019) Family Firm Heterogeneity and Tax Avoidance: The Role of the Founder. Family Business Review 32:296–317. https://doi.org/10.1177/0894486519831467
Brune A, Thomsen M, Watrin C (2021) Family Firms in Business Research - A Literature Review on Financial Strategy, Tax Planning, and Earnings Management. BFuP:134–160
Brunelli S, Sciascia S, Baù M (2023) Nonfinancial reporting in family firms: A systematic review and agenda for future research. Bus Strat Env. https://doi.org/10.1002/bse.3484
Burgstaller J, Wagner E (2015) How do family ownership and founder management affect capital structure decisions and adjustment of SMEs? The Journal of Risk Finance 16:73–101. https://doi.org/10.1108/JRF-06-2014-0091
Busch T, Lewandowski S (2018) Corporate Carbon and Financial Performance: A Meta-analysis. J of Industrial Ecology 22:745–759. https://doi.org/10.1111/jiec.12591
Busch T, Johnson M, Pioch T (2022) Corporate carbon performance data: Quo vadis? J of Industrial Ecology 26:350–363. https://doi.org/10.1111/jiec.13008
Caby J, Coron C, Ziane Y (2024) How does gender diversity in top management teams affect carbon disclosure and its quality: Evidence from the technological industry. Technological Forecasting and Social Change 199:123077. https://doi.org/10.1016/j.techfore.2023.123077
Caccialanza A (2025) Sustainability performance disclosure and family businesses: a perspective article. JFBM 15:48–56. https://doi.org/10.1108/JFBM-10-2023-0250
Callery PJ, Kim E-H (2024) Set & Done? Trade-offs between Stakeholder Expectation and Attainment Pressures in Corporate Carbon Target Management. Journal of Management Studies. https://doi.org/10.1111/joms.13140
Cambrea DR, Tenuta P, Naciti V (2024) Family and nonfamily female directors' effect on CSR strategy. Corp Soc Responsibility Env 31:6387–6400. https://doi.org/10.1002/csr.2930
Carbone E, Manzi MA, Cirillo A, Sciascia S (2025) Tax Avoidance in Family Firms: A Multi-Level Literature Review. Entrepreneurship Research Journal. https://doi.org/10.1515/erj-2024-0157

Carney M, van Essen M, Gedajlovic ER, Heugens PPMAR (2015) What do we know about Private Family Firms? A Meta–Analytical Review. Entrepreneurship Theory and Practice 39:513–544. https://doi.org/10.1111/etap.12054

Chen J, Chen N-Y, He L, Patel C (2021) The Effect of Ownership Structure on Disclosure Quality and Credit Ratings in Family Firms: The Moderating Role of Auditor Choice. Family Business Review:089448652110578. https://doi.org/10.1177/08944865211057854

Chrisman JJ, Chua JH, Litz RA (2004) Comparing the Agency Costs of Family and Non–Family Firms: Conceptual Issues and Exploratory Evidence. Entrepreneurship Theory and Practice 28:335–354. https://doi.org/10.1111/j.1540-6520.2004.00049.x

Chrisman JJ, Chua JH, Pearson AW, Barnett T (2012) Family Involvement, Family Influence, and Family–Centered Non–Economic Goals in Small Firms. Entrepreneurship Theory and Practice 36:267–293. https://doi.org/10.1111/j.1540-6520.2010.00407.x

Chua JH, Chrisman JJ, Sharma P (1999) Defining the Family Business by Behavior. Entrepreneurship Theory and Practice 23:19–39

Chua JH, Chrisman JJ, Steier LP, Rau SB (2012) Sources of Heterogeneity in Family Firms: An Introduction. Entrepreneurship Theory and Practice 36:1103–1113. https://doi.org/10.1111/j.1540-6520.2012.00540.x

Cirillo A, Romano M, Ardovino O (2015) Does family involvement foster IPO value? Empirical analysis on Italian stock market. Management Decision 53:1125–1154. https://doi.org/10.1108/MD-11-2014-0639

Cirillo A, Manzi MA, Bauweraerts J, Sciascia S (2025) Tax Avoidance in Family Business: The Ethical Perspective of CEO Transgenerational Responsibility. J Bus Ethics 198:841–864. https://doi.org/10.1007/s10551-025-05941-x

Coen D, Herman K, Pegram T (2022) Are corporate climate efforts genuine? An empirical analysis of the climate 'talk–walk' hypothesis. Bus Strat Env 31:3040–3059. https://doi.org/10.1002/bse.3063

Combs JG, Jaskiewicz P, Ravi R, Walls JL (2023) More Bang for Their Buck: Why (and When) Family Firms Better Leverage Corporate Social Responsibility. Journal of Management 49:575–605. https://doi.org/10.1177/01492063211066057

Comino-Jurado M, Sánchez-Andújar S, Parrado-Martínez P (2021) Reassessing debt-financing decisions in family firms: Family involvement on the board of directors and generational stage. Journal of Business Research 135:426–435. https://doi.org/10.1016/j.jbusres.2021.06.060

Cordova C, Zorio-Grima A, Merello P (2021) Contextual and corporate governance effects on carbon accounting and carbon performance in emerging economies. CG 21:536–550. https://doi.org/10.1108/CG-10-2020-0473

Córdova Román C, Zorio-Grima A, Merello P (2021) Economic development and CSR assurance: Important drivers for carbon reporting… yet inefficient drivers for carbon management? Technological Forecasting and Social Change 163:120424. https://doi.org/10.1016/j.techfore.2020.120424

Croci E, Doukas JA, Gonenc H (2011) Family Control and Financing Decisions. European Financial Management 17:860–897. https://doi.org/10.1111/j.1468-036X.2011.00631.x

Dahlmann F (2024) Corporate Carbon Targets: The Role of Goal Setting in Driving Organisational Change for Climate Action. In: MacKie D (ed) The handbook of climate change leadership in organisations: Developing leadership for the age of sustainability. Routledge Taylor & Francis Group, New York, London

Dahlmann F, Branicki L, Brammer S (2019) Managing Carbon Aspirations: The Influence of Corporate Climate Change Targets on Environmental Performance. J Bus Ethics 158:1–24. https://doi.org/10.1007/s10551-017-3731-z

Daspit JJ, Chrisman JJ, Sharma P, Pearson AW, Mahto RV (2018) Governance as a Source of Family Firm Heterogeneity. Journal of Business Research 84:293–300. https://doi.org/10.1016/j.jbusres.2017.12.041

Daspit JJ, Chrisman JJ, Ashton T, Evangelopoulos N (2021) Family Firm Heterogeneity: A Definition, Common Themes, Scholarly Progress, and Directions Forward. Family Business Review 34:296–322. https://doi.org/10.1177/08944865211008350

Debicki BJ, Kellermanns FW, Chrisman JJ, Pearson AW, Spencer BA (2016) Development of a socioemotional wealth importance (SEWi) scale for family firm research. Journal of Family Business Strategy 7:47–57. https://doi.org/10.1016/j.jfbs.2016.01.002

Deegan C (2002) Introduction: The legitimising effect of social and environmental disclosures - a theoretical foundation. Accounting, Auditing & Accountability Journal 15:282–311. https://doi.org/10.1108/09513570210435852

Demski J, Dong Y, McGuire P, Mojon B (2025) Growth of the green bond market and greenhouse gas emissions. BIS Quarterly Review

Dibrell C, Memili E (2019) A Brief History and a Look to the Future of Family Business Heterogeneity: An Introduction. In: Memili E, Dibrell C (eds) The Palgrave Handbook of Heterogeneity among Family Firms. Springer International Publishing, Cham, pp 1–15. https://doi.org/10.1007/978-3-319-77676-7_1

Dorfleitner G, Utz S, Zhang R (2022) The pricing of green bonds: external reviews and the shades of green. Rev Manag Sci 16:797–834. https://doi.org/10.1007/s11846-021-00458-9

Döring S, Drobetz W, El Ghoul S, Guedhami O, Schröder H (2023) Foreign Institutional Investors, Legal Origin, and Corporate Greenhouse Gas Emissions Disclosure. J Bus Ethics 182:903–932. https://doi.org/10.1007/s10551-022-05289-6

Dou J, Su E, Wang S (2019) When Does Family Ownership Promote Proactive Environmental Strategy? The Role of the Firm's Long-Term Orientation. J Bus Ethics 158:81–95. https://doi.org/10.1007/s10551-017-3642-z

Dowling J, Pfeffer J (1975) Organizational Legitimacy: Social Values and Organizational Behavior. The Pacific Sociological Review 18:122–136. https://doi.org/10.2307/1388226

Duran P, Turturea R, Heugens PPMAR, Arregle J-L, van Essen M (2025) Leave the Token, Take the Gavel: How National Quotas and Corporate Ownership Shape Gender Diversity on Major Board Committees. J Management Studies. https://doi.org/10.1111/joms.13241

Dyck A, Lins KV, Roth L, Towner M, Wagner HF (2023) Renewable Governance: Good for the Environment? J of Accounting Research 61:279–327. https://doi.org/10.1111/1475-679X.12462

Dyck A, Lins K, Towner M, Wagner HF (2024) Family-Controlled Firms and Environmental Sustainability: All Bite and No Bark. SSRN Journal. https://doi.org/10.2139/ssrn.4829162

Ebihara T, Kubota K, Takehara H, Yokota E (2014) Market liquidity, private information, and the cost of capital: Market microstructure studies on family firms in Japan. Japan and the World Economy 32:1–13. https://doi.org/10.1016/j.japwor.2014.07.001

Elsayih J, Datt R, Tang Q (2021) Corporate governance and carbon emissions performance: empirical evidence from Australia. Australasian Journal of Environmental Management 28:433–459. https://doi.org/10.1080/14486563.2021.1989066

Endrikat J, Guenther E, Hoppe H (2014) Making sense of conflicting empirical findings: A meta-analytic review of the relationship between corporate environmental and financial performance. European Management Journal 32:735–751. https://doi.org/10.1016/j.emj.2013.12.004

European Comission (2019) The European Green Deal: COM(2019) 640 final. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52019DC0640

Fehre K, Weber F (2019) Why some are more equal: Family firm heterogeneity and the effect on management's attention to CSR. Business Ethics: A Eur Rev 28:321–334. https://doi.org/10.1111/beer.12225

Feldhütter P, Halskov K, Krebbers A (2024) Pricing of sustainability-linked bonds. Journal of Financial Economics 162:103944. https://doi.org/10.1016/j.jfineco.2024.103944

Flammer C (2021) Corporate green bonds. Journal of Financial Economics 142:499–516. https://doi.org/10.1016/j.jfineco.2021.01.010

Forés B, Fernández-Yáñez JM, Puig-Denia A, Boronat-Navarro M (2022) Unveiling the Direct Effects of Family Firm Heterogeneity on Environmental Performance. Sustainability 14:10442. https://doi.org/10.3390/su141610442

Francesco A, Pupo V, Mannarino L (2024) Green Innovation and Firm Heterogeneity. Beyond Dichotomies between Family and Non-Family Firms. https://doi.org/10.2139/ssrn.4869397

Fullerton AS (2009) A Conceptual Framework for Ordered Logistic Regression Models. Sociological Methods & Research 38:306–347. https://doi.org/10.1177/0049124109346162

Furtuna O, Sönmez H (2024) Critical masses and voluntary climate change disclosures: evidence from Türkiye. SRJ 20:956–974. https://doi.org/10.1108/SRJ-06-2023-0334

Gangi F, Varrone N, Daniele LM, D'Angelo E, Coscia M (2025) Does It Pay for Family Firms to Go Green? The Moderating Role of Familiness. Corp Soc Responsibility Env. https://doi.org/10.1002/csr.3248

García Martín CJ, Herrero B (2020) Do board characteristics affect environmental performance? A study of EU firms. Corp Soc Responsibility Env 27:74–94. https://doi.org/10.1002/csr.1775

García-Sánchez I-M, Núñez-Torrado M, Aibar-Guzmán C, Aibar-Guzmán B (2025) Beyond Climate Targets: Exploring When and How Female Directors Influence Corporate Decarbonization Transparency. Bus Strat Env. https://doi.org/10.1002/bse.4183

Garcia-Torea N, Luque-Vílchez M, Rodríguez-Gutiérrez P (2024) The EU Taxonomy, sustainability reporting and financial institutions: understanding the elements driving regulatory uncertainty. Accounting Forum 48:427–454. https://doi.org/10.1080/01559982.2024.2364953

Gavana G, Gottardo P, Moisello AM (2023) Board diversity and corporate social performance in family firms. The moderating effect of the institutional and business environment. Corp Soc Responsibility Env 30:2194–2218. https://doi.org/10.1002/csr.2478
Gavana G, Gottardo P, Moisello AM (2024) The effect of board diversity and tenure on environmental performance. Evidence from family and non-family firms. Journal of Family Business Management 14:534–561. https://doi.org/10.1108/JFBM-06-2023-0088
Ghitti M, Gianfrate G, Palma L (2024) The agency of greenwashing. J Manag Gov 28:905–941. https://doi.org/10.1007/s10997-023-09683-8
Giesekam J, Norman J, Garvey A, Betts-Davies S (2021) Science-Based Targets: On Target? Sustainability 13:1657. https://doi.org/10.3390/su13041657
Gillan SL (2006) Recent Developments in Corporate Governance: An Overview. Journal of Corporate Finance 12:381–402. https://doi.org/10.1016/j.jcorpfin.2005.11.002
Glass C, Cook A, Ingersoll AR (2016) Do Women Leaders Promote Sustainability? Analyzing the Effect of Corporate Governance Composition on Environmental Performance. Bus Strat Env 25:495–511. https://doi.org/10.1002/bse.1879
Goel S, Mazzola P, Phan PH, Pieper TM, Zachary RK (2012) Strategy, ownership, governance, and socio-psychological perspectives on family businesses from around the world. Journal of Family Business Strategy 3:54–65. https://doi.org/10.1016/j.jfbs.2012.03.005
Gomez-Mejia LR, Cruz C, Berrone P, Castro J de (2011) The Bind that Ties: Socioemotional Wealth Preservation in Family Firms. The Academy of Management Annals 5:653–707. https://doi.org/10.1080/19416520.2011.593320
Gómez-Mejía LR, Herrero I (2022) Back to square one: The measurement of Socioemotional Wealth (SEW). Journal of Family Business Strategy 13:100480. https://doi.org/10.1016/j.jfbs.2021.100480
Gómez-Mejía LR, Haynes KT, Núñez-Nickel M, Jacobson KJL, Moyano-Fuentes J (2007) Socioemotional Wealth and Business Risks in Family-controlled Firms: Evidence from Spanish Olive Oil Mills. Administrative Science Quarterly 52:106–137. https://doi.org/10.2189/asqu.52.1.106
Gómez-Mejía LR, Muñoz-Bullón F, Requejo I, Sanchez-Bueno MJ (2025) Ethical Correlates of Family Control: Socioemotional Wealth, Environmental Performance, and Financial Returns. J Bus Ethics. https://doi.org/10.1007/s10551-025-05943-9
González M, Guzmán A, Pombo C, Trujillo M-A (2013) Family firms and debt: Risk aversion versus risk of losing control. Journal of Business Research 66:2308–2320. https://doi.org/10.1016/j.jbusres.2012.03.014
Gregorič A, Rapp MS, Requejo I (2022) Listed family firms in Europe: Relevance, characteristics and performance. Stiftung Familienunternehmen, Munich
Gull AA, Hussain N, Khan SA, Mushtaq R, Orij R (2023) The power of the CEO and environmental decoupling. Bus Strat Env 32:3951–3964. https://doi.org/10.1002/bse.3347
Hachenberg B, Schiereck D (2018) Are green bonds priced differently from conventional bonds? J Asset Manag 19:371–383. https://doi.org/10.1057/s41260-018-0088-5
Hahn R, Reimsbach D, Schiemann F (2015) Organizations, Climate Change, and Transparency. Organization & Environment 28:80–102. https://doi.org/10.1177/1086026615575542

Hansen C, Block J (2021) Public family firms and capital structure: A meta-analysis. Corp Govern Int Rev 29:297–319. https://doi.org/10.1111/corg.12354
Haque F (2017) The effects of board characteristics and sustainable compensation policy on carbon performance of UK firms. The British Accounting Review 49:347–364. https://doi.org/10.1016/j.bar.2017.01.001
Herman KS, Schiavoni C, Guastella G (2024) Walking, Talking, or Standing Still? Climate Commitment and Performance in Publicly Listed Firms in Five Major Economies. Business & Society. https://doi.org/10.1177/00076503241255954
Herrero I, López C, Ruiz-Benítez R (2024) So … are family firms more sustainable? On the economic, social and environmental sustainability of family SMEs. Bus Strat Env 33:4252–4270. https://doi.org/10.1002/bse.3699
Hiebl M (2021) Sample Selection in Systematic Literature Reviews of Management Research. Organizational Research Methods:109442812098685. https://doi.org/10.1177/1094428120986851
Hoffmann VH, Busch T (2008) Corporate Carbon Performance Indicators. J of Industrial Ecology 12:505–520. https://doi.org/10.1111/j.1530-9290.2008.00066.x
Houqe MN, Khan HZ (2023) What determines the quality of carbon reporting? A system-oriented theories and corporate governance perspective. Bus Strat Env 32:3197–3216. https://doi.org/10.1002/bse.3295
Hsueh, Josh Wei-Jun, Massis A de, Gomez-Mejia LR (2023) Examining Heterogeneous Configurations of Socioemotional Wealth in Family Firms Through the Formalization of Corporate Social Responsibility Strategy 36:172–198
Hummel K, Jobst D (2024) An Overview of Corporate Sustainability Reporting Legislation in the European Union. Accounting in Europe 21:320–355. https://doi.org/10.1080/17449480.2024.2312145
ICMA (2021) Green Bond Principles: Voluntary Process Guidelines for Issuing Green Bonds
ICMA (2024) Sustainability-Linked Bond Principles: Voluntary Process Guidelines
Ioannou I, Li SX, Serafeim G (2016) The Effect of Target Difficulty on Target Completion: The Case of Reducing Carbon Emissions. The Accounting Review 91:1467–1492
Issa A, In'airat M (2024) From words to action: unpacking the real impact of sustainability initiatives on carbon emissions reduction. SRJ 20:585–604. https://doi.org/10.1108/SRJ-06-2023-0320
Jain BA, Shao Y (2015) Family Firm Governance and Financial Policy Choices in Newly Public Firms. Corporate Governance 23:452–468. https://doi.org/10.1111/corg.12113
Jensen MC, Meckling WH (1976) Theory of the Firm: Managerial Behavior, Agency Costs and Owernship Structure. Journal of Financial Economics:305–360
Jizi M (2017) The Influence of Board Composition on Sustainable Development Disclosure. Bus Strat Env 26:640–655. https://doi.org/10.1002/bse.1943
Kavadis N, Thomsen S (2023) Sustainable corporate governance: A review of research on long-term corporate ownership and sustainability. Corporate Governance 31:198–226. https://doi.org/10.1111/corg.12486
Keasey K, Martinez B, Pindado J (2015) Young family firms: Financing decisions and the willingness to dilute control. Journal of Corporate Finance 34:47–63. https://doi.org/10.1016/j.jcorpfin.2015.07.014

Khan MA, Vismara S (2025) Green bond issuance and corporate environmental and financial performance: A meta-analysis. International Review of Economics & Finance 102:104313. https://doi.org/10.1016/j.iref.2025.104313
Khatri I (2024) Boardroom Diversity and Carbon Emissions: Evidence from the UK Firms. J Bus Ethics 195:899–920. https://doi.org/10.1007/s10551-024-05675-2
Kim J, Fairclough S, Dibrell C (2017) Attention, Action, and Greenwash in Family-Influenced Firms? Evidence From Polluting Industries. Organization & Environment 30:304–323. https://doi.org/10.1177/1086026616673410
Kim S-J, Bae J, Kang S (2024) The cross-cutting pursuit of family values: When and how do family firms engage in corporate environmental responsibility. Corp Soc Responsibility Env 31:2749–2769. https://doi.org/10.1002/csr.2714
King MR, Santor E (2008) Family values: Ownership structure, performance and capital structure of Canadian firms. Journal of Banking & Finance 32:2423–2432. https://doi.org/10.1016/j.jbankfin.2008.02.002
Konadu R, Ahinful GS, Boakye DJ, Elbardan H (2022) Board gender diversity, environmental innovation and corporate carbon emissions. Technological Forecasting and Social Change 174:121279. https://doi.org/10.1016/j.techfore.2021.121279
Kordsachia O, Focke M, Velte P (2022) Do sustainable institutional investors contribute to firms' environmental performance? Empirical evidence from Europe. Rev Manag Sci 16:1409–1436. https://doi.org/10.1007/s11846-021-00484-7
Kordsachia O, Bassen A, Fieberg C, Wolters K (2023) Market perceptions on the role of female leadership in adapting to climate change. JRF 24:424–448. https://doi.org/10.1108/JRF-08-2022-0217
Kovermann J, Wendt M (2019) Tax avoidance in family firms: Evidence from large private firms. Journal of Contemporary Accounting & Economics 15:145–157. https://doi.org/10.1016/j.jcae.2019.04.003
Kreuzer C, Priberny C (2022) To green or not to green: The influence of board characteristics on carbon emissions. Finance Research Letters 49:103077. https://doi.org/10.1016/j.frl.2022.103077
Kyaw K, Treepongkaruna S, Jiraporn P (2022) Board gender diversity and environmental emissions. Bus Strat Env 31:2871–2881. https://doi.org/10.1002/bse.3052
Larcker DF, Watts EM (2020) Where's the greenium? Journal of Accounting and Economics 69:101312. https://doi.org/10.1016/j.jacceco.2020.101312
Le Luo, Tang Q (2014) Does voluntary carbon disclosure reflect underlying carbon performance? Journal of Contemporary Accounting & Economics 10:191–205. https://doi.org/10.1016/j.jcae.2014.08.003
Leitterstorf MP, Rau SB (2014) Socioemotional wealth and IPO underpricing of family firms. Strat. Mgmt. J. 35:751–760. https://doi.org/10.1002/smj.2236
Li J, Wang Y, Yao N, Cui X (2023) Exploring the effects of socioemotional wealth on environmental strategies of family firms in China: An integrative perspective. Bus Strat Env 32:5368–5381. https://doi.org/10.1002/bse.3425
Li J, Peng X, Zhang H (2025) The role of science-based targets on carbon mitigation: Addressing the tension between net zero anxiety and economic growth. The British Accounting Review 57:101491. https://doi.org/10.1016/j.bar.2024.101491

Liu C (2018) Are women greener? Corporate gender diversity and environmental violations. Journal of Corporate Finance 52:118–142. https://doi.org/10.1016/j.jcorpfin.2018.08.004
Liu X, Tang X, Xiong Y, Chen Y, Wu Y (2023) The effect of carbon emission policy on financial performance of target companies in China. Journal of Cleaner Production 412:137437. https://doi.org/10.1016/j.jclepro.2023.137437
Löffler KU, Petreski A, Stephan A (2021) Drivers of green bond issuance and new evidence on the "greenium". Eurasian Econ Rev 11:1–24. https://doi.org/10.1007/s40822-020-00165-y
Lorenzen S, Gerken M, Steinmetz H, Block J, Hülsbeck M, Lux FS (2024) Environmental Sustainability of Family Firms: A Meta-Analysis of Handprint and Footprint. Entrepreneurship Theory and Practice 48:1266–1284. https://doi.org/10.1177/10422587231221799
Lozano MB, Durán RF (2017) Family control and adjustment to the optimal level of cash holding. The European Journal of Finance 23:266–295. https://doi.org/10.1080/1351847X.2016.1168748
Lu J, Wang J (2021) Corporate governance, law, culture, environmental performance and CSR disclosure: A global perspective. Journal of International Financial Markets, Institutions and Money 70:101264. https://doi.org/10.1016/j.intfin.2020.101264
Ma L (2023) Corporate social responsibility reporting in family firms: Evidence from China. Journal of Behavioral and Experimental Finance 37:100730. https://doi.org/10.1016/j.jbef.2022.100730
MacAskill S, Roca E, Liu B, Stewart RA, Sahin O (2021) Is there a green premium in the green bond market? Systematic literature review revealing premium determinants. Journal of Cleaner Production 280:124491. https://doi.org/10.1016/j.jclepro.2020.124491
Maggi B, Gjergji R, Vena L, Sciascia S, Cortesi A (2023) Family firm status and environmental disclosure: The moderating effect of board gender diversity. Business Ethics Env & Resp 32:1334–1351. https://doi.org/10.1111/beer.12578
Magrelli V, Rovelli P, Benedetti C, Überbacher R, Massis A de (2022) Generations in Family Business: A Multifield Review and Future Research Agenda. Family Business Review 35:089448652110697. https://doi.org/10.1177/08944865211069781
Malen J (2022) Moving the Goalposts: Aspiration Reoperationalization in Response to Failure to Achieve Environmental Performance Targets. AMD 8:357–383. https://doi.org/10.5465/amd.2020.0245
Marchini PL, Tibiletti V, Mazza T, Gabrielli G (2022) Gender quotas and the environment: Environmental performance and enforcement. Corp Soc Responsibility Env 29:256–272. https://doi.org/10.1002/csr.2200
Masi S de, Słomka-Gołębiowska A, Paci A (2022) Women on boards and corporate environmental performance in Italian companies: The importance of nomination background. Business Ethics Env & Resp 31:981–998. https://doi.org/10.1111/beer.12467
Mateo-Márquez AJ, González-González JM, Zamora-Ramírez C (2025) Absolute emissions targets and voluntary carbon disclosure: an international empirical survey. SAMPJ 16:583–616. https://doi.org/10.1108/SAMPJ-09-2023-0634
Maughan R (2023) Adopting and adapting sustainability accounting: fit and faith in a family business. AAAJ 36:1–31. https://doi.org/10.1108/AAAJ-02-2020-4410

Memili E, Dibrell C (eds) (2019) The Palgrave Handbook of Heterogeneity among Family Firms. Springer International Publishing, Cham. https://doi.org/10.1007/978-3-319-77676-7

Memili E, Fang H"C", Koç B, Yildirim-Öktem Ö, Sonmez S (2018) Sustainability practices of family firms: the interplay between family ownership and long-term orientation. Journal of Sustainable Tourism 26:9–28. https://doi.org/10.1080/09669582.2017.1308371

Michelon G, Parbonetti A (2012) The effect of corporate governance on sustainability disclosure. J Manag Gov 16:477–509. https://doi.org/10.1007/s10997-010-9160-3

Michiels A, Molly V (2017) Financing Decisions in Family Businesses: A Review and Suggestions for Developing the Field. Family Business Review 30:369–399. https://doi.org/10.1177/0894486517736958

Miller D, Le Breton-Miller I (2006) Family Governance and Firm Performance: Agency, Stewardship, and Capabilities. Family Business Review 14:73–88

Miller D, Le Breton-Miller I (2021) Family Firms: A Breed of Extremes? Entrepreneurship Theory and Practice 45:663–681

Miller D, Le Breton–Miller I (2014) Deconstructing Socioemotional Wealth. Entrepreneurship Theory and Practice 38:713–720. https://doi.org/10.1111/etap.12111

Miroshnychenko I, Massis A de, Barontini R, Testa F (2022) Family Firms and Environmental Performance: A Meta-Analytic Review. Family Business Review 35:68–90. https://doi.org/10.1177/08944865211064409

Miroshnychenko I, Miller D, Massis A de, Le Breton-Miller I (2024) Are family firms green? Small Bus Econ. https://doi.org/10.1007/s11187-024-00907-1

Mishra CS, McConaughy DL (1999) Founding Family Control and Capital Structure: The Risk of Loss of Control and the Aversion to Debt. Entrepreneurship Theory and Practice 23:53–64. https://doi.org/10.1177/104225879902300404

Molly V, Michiels A (2021) Dividend decisions in family businesses: A systematic review and research agenda. Journal of Economic Surveys. https://doi.org/10.1111/joes.12460

Molly V, Laveren E, Jorissen A (2012) Intergenerational Differences in Family Firms: Impact on Capital Structure and Growth Behavior. Entrepreneurship Theory and Practice 36:703–725. https://doi.org/10.1111/j.1540-6520.2010.00429.x

Morck R, Shleifer A, Vishny RW (1988) Management ownership and market valuation. Journal of Financial Economics 20:293–315. https://doi.org/10.1016/0304-405X(88)90048-7

Morck R, Wolfenzon D, Yeung B (2005) Corporate Governance, Economic Entrenchment, and Growth. Journal of Economic Literature 43:655–720. https://doi.org/10.1257/002205105774431252

Morrison LJ, Jia J, Arora MP (2024) Decoupling the climate walk from the climate talk: Evidence from Australia. Bus Strat Env 33:7368–7382. https://doi.org/10.1002/bse.3856

Muktadir-Al-Mukit D, Bhaiyat FH (2024) Impact of corporate governance diversity on carbon emission under environmental policy via the mandatory nonfinancial reporting regulation. Bus Strat Env 33:1397–1417. https://doi.org/10.1002/bse.3555

Nadeem M, Gyapong E, Ahmed A (2020) Board gender diversity and environmental, social, and economic value creation: Does family ownership matter? Bus Strat Env 29:1268–1284

Narsa Goud N (2022) Corporate governance: Does it matter management of carbon emission performance? An empirical analyses of Indian companies. Journal of Cleaner Production 379:134485. https://doi.org/10.1016/j.jclepro.2022.134485

Neubaum DO (2018) Family Business Research: Roads Travelled and the Search for Unworn Paths. Family Business Review 31:259–270. https://doi.org/10.1177/0894486518792948

Neubaum DO, Kammerlander N, Brigham KH (2019) Capturing Family Firm Heterogeneity: How Taxonomies and Typologies Can Help the Field Move Forward. Family Business Review 32:106–130. https://doi.org/10.1177/0894486519848512

Nicolo G, Zampone G, Sannino G, Polcini PT (2025) Ready for Change After the Omnibus Package? Early Compliance With the European Sustainability Reporting Standards and Its Key Determinants in the New Regulatory Era. Bus Strat Env. https://doi.org/10.1002/bse.70054

Nimer K, Abdelqader M, Kuzey C, Uyar A (2024) Emission targeting and carbon emissions: The moderating effect of female directors. Bus Strat Env 33:3480–3504. https://doi.org/10.1002/bse.3669

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

Nuber C, Velte P (2021) Board gender diversity and carbon emissions: European evidence on curvilinear relationships and critical mass. Bus Strat Env 30:1958–1992. https://doi.org/10.1002/bse.2727

Nuber C, Velte P, Hörisch J (2020) The curvilinear and time-lagging impact of sustainability performance on financial performance: Evidence from Germany. Corp Soc Responsibility Env 27:232–243. https://doi.org/10.1002/csr.1795

Ottenstein P, Erben S, Jost S, Weuster CW, Zülch H (2022) From voluntarism to regulation: effects of Directive 2014/95/EU on sustainability reporting in the EU. JAAR 23:55–98. https://doi.org/10.1108/JAAR-03-2021-0075

Oussii AA, Jeriji M (2024) Female directors' representation and firm carbon emissions performance: does family control matter? JFBM. https://doi.org/10.1108/JFBM-06-2024-0121

Oyewo B (2023) Corporate governance and carbon emissions performance: International evidence on curvilinear relationships. J Environ Manage 334:117474. https://doi.org/10.1016/j.jenvman.2023.117474

Panwar R, Paul K, Nybakk E, Hansen E, Thompson D (2014) The Legitimacy of CSR Actions of Publicly Traded Companies Versus Family-Owned Companies. J Bus Ethics 125:481–496. https://doi.org/10.1007/s10551-013-1933-6

Park J, Lee J, Shin J (2023) Corporate governance, compensation mechanisms, and voluntary disclosure of carbon emissions: Evidence from Korea. Journal of Contemporary Accounting & Economics 19:100361. https://doi.org/10.1016/j.jcae.2023.100361

Payne GT (2018) Reflections on Family Business Research: Considering Domains and Theory. Family Business Review 31:167–175. https://doi.org/10.1177/0894486518776550

Pearson AW, Carr JC, Shaw JC (2008) Toward a Theory of Familiness: A Social Capital Perspective. Entrepreneurship Theory and Practice 32:949–969. https://doi.org/10.1111/j.1540-6520.2008.00265.x

Petrovic T (2025) Extraterritoriality Effect of the CSDDD on Non-EU Companies. SSRN Journal. https://doi.org/10.2139/ssrn.5107625

Pichlmayer K, Lehner OM (2024) Green, Greener, Not Green Enough?: Institutional Forces Driving the European Green Bond Market. In: Lehner OM, Harrer T, Silvola H, Weber O (eds) The Routledge handbook of green finance. Routledge Taylor & Francis Group, London, New York, pp 391–415. https://doi.org/10.4324/9781003345497-27

Pindado J, Requejo I, La Torre C de (2015) Does Family Control Shape Corporate Capital Structure? An Empirical Analysis of Eurozone Firms. Journal of Business Finance & Accounting 42:965–1006. https://doi.org/10.1111/jbfa.12124

Pizzi S, Coronella L (2024) Are listed SMEs ready for the corporate sustainability reporting directive? Evidence from Italy. Business Ethics Env & Resp. https://doi.org/10.1111/beer.12736

Prencipe A, Bar-Yosef S, Dekker HC (2014) Accounting Research in Family Firms: Theoretical and Empirical Challenges. European Accounting Review 23:361–385. https://doi.org/10.1080/09638180.2014.895621

Prigge S, Thiele FK (2019) Corporate Governance Codes: How to Deal with the Bright and Dark Sides of Family Influence. In: Memili E, Dibrell C (eds) The Palgrave Handbook of Heterogeneity among Family Firms. Springer International Publishing, Cham, pp 297–331. https://doi.org/10.1007/978-3-319-77676-7_12

Privato C, Johnson MP, Busch T (2024) Raising the bar: What determines the ambition level of corporate climate targets? Climatic Change 177. https://doi.org/10.1007/s10584-024-03783-6

Pyka M (2023) The EU Green Bond Standard: A Plausible Response to the Deficiencies of the EU Green Bond Market? Eur Bus Org Law Rev 24:623–643. https://doi.org/10.1007/s40804-023-00278-2

Qian W, Schaltegger S (2017) Revisiting carbon disclosure and performance: Legitimacy and management views. The British Accounting Review 49:365–379. https://doi.org/10.1016/j.bar.2017.05.005

Qosasi A, Susanto H, Rusmin R, Astami EW, Brown A (2022) An alignment effect of concentrated and family ownership on carbon emission performance: The case of Indonesia. Cogent Economics & Finance 10. https://doi.org/10.1080/23322039.2022.2140906

Rau SB, Astrachan JH, Smyrnios KX (2018) The F-PEC Revisited: From the Family Business Definition Dilemma to Foundation of Theory. Family Business Review 31:200–213. https://doi.org/10.1177/0894486518778172

Richards M, Zellweger T, Gond J-P (2017) Maintaining Moral Legitimacy through Worlds and Words: An Explanation of Firms' Investment in Sustainability Certification. Journal of Management Studies 54:676–710. https://doi.org/10.1111/joms.12249

Rivera-Franco P, Requejo I, Suárez-González I (2024) Internal versus external CSR practices: The trade-off in family firms. European Management Review. https://doi.org/10.1111/emre.12662

Rjiba H, Thavaharan T (2022) Female representation on boards and carbon emissions: International evidence. Finance Research Letters 49:103079. https://doi.org/10.1016/j.frl.2022.103079
Ross SA (1973) The Economic Theory of Agency: The Principal's Problem. The American Economic Review 62:134–139
Rutherford MW, Kuratko DF, Holt DT (2008) Examining the Link Between "Familiness" and Performance: Can the F-PEC Untangle the Family Business Theory Jungle? Entrepreneurship Theory and Practice 32:1089–1109
Sageder M, Mitter C, Feldbauer-Durstmüller B (2018) Image and reputation of family firms: a systematic literature review of the state of research. Rev Manag Sci 12:335–377. https://doi.org/10.1007/s11846-016-0216-x
Santos MS, Moreira AC, Vieira ES (2014) Ownership concentration, contestability, family firms, and capital structure. Journal of Management & Governance 18:1063–1107. https://doi.org/10.1007/s10997-013-9272-7
Sardo F, Vieira ES, Serrasqueiro Z (2022) The role of gender and succession on the debt adjustments of family firm capital structure. Eurasian Bus Rev 12:349–372. https://doi.org/10.1007/s40821-021-00186-w
Schaltegger S, Hörisch J, Freeman RE (2019) Business Cases for Sustainability: A Stakeholder Theory Perspective. Organization & Environment 32:191–212. https://doi.org/10.1177/1086026617722882
Schmid T (2013) Control considerations, creditor monitoring, and the capital structure of family firms. Journal of Banking & Finance 37:257–272. https://doi.org/10.1016/j.jbankfin.2012.08.026
Schulze WS, Lubatkin MH, Dino RN (2003) Exploring the Agency Consequences of Ownership Dispersion among the Directors of Private Family Firms. AMJ 46:179–194. https://doi.org/10.2307/30040613
Sharma P (2004) An Overview of the Field of Family Business Studies: Current Status and Directions for the Future. Family Business Review 17:1–36
Shocker AD, Sethi SP (1973) An Approach to Incorporating Societal Preferences in Developing Corporate Action Strategies. California Management Review 15:97–105. https://doi.org/10.2307/41164466
Shyu Y-W, Lee CI (2009) Excess Control Rights and Debt Maturity Structure in Family-Controlled Firms. Corporate Governance: An International Review 17:611–628. https://doi.org/10.1111/j.1467-8683.2009.00755.x
Siebels J-F, Knyphausen-Aufseß D zu (2012) A Review of Theory in Family Business Research: The Implications for Corporate Governance. Int J Management Reviews 14:280–304. https://doi.org/10.1111/j.1468-2370.2011.00317.x
Singhania M, Chadha G, Prasad R (2024) Sustainable finance research: Review and agenda. Int. J Fin Econ 29:4010–4045. https://doi.org/10.1002/ijfe.2854
Stanley L, Kellermanns FW, Zellweger TM (2017) Latent Profile Analysis. Family Business Review 30:84–102. https://doi.org/10.1177/0894486516677426
Suchman MC (1995) Managing Legitimacy: Strategic and Institutional Approaches. The Academy of Management Review 20:571. https://doi.org/10.2307/258788

Taglialatela J, Miroshnychenko I, Barontini R, Testa F (2024) Talk or walk? The board of directors and firm environmental strategies. Bus Strat Env 33:2890–2910. https://doi.org/10.1002/bse.3628

Tang DY, Zhang Y (2020) Do shareholders benefit from green bonds? Journal of Corporate Finance 61:101427. https://doi.org/10.1016/j.jcorpfin.2018.12.001

Temouri Y, Nardella G, Jones C, Brammer S (2021) Haven-Sent? Tax Havens, Corporate Social Irresponsibility and the Dark Side of Family Firm Internationalization. Brit J Manage. https://doi.org/10.1111/1467-8551.12559

Terlaak A, Kim S, Roh T (2018) Not Good, Not Bad: The Effect of Family Control on Environmental Performance Disclosure by Business Group Firms. J Bus Ethics 153:977–996. https://doi.org/10.1007/s10551-018-3911-5

Thiele FK, Wendt M (2017) Family firm identity and capital structure decisions. JFBM 7:221–239. https://doi.org/10.1108/JFBM-05-2017-0012

Tingbani I, Chithambo L, Tauringana V, Papanikolaou N (2020) Board gender diversity, environmental committee and greenhouse gas voluntary disclosures. Bus Strat Env:2194–2210

Torchia M, Calabrò A, Huse M (2011) Women Directors on Corporate Boards: From Tokenism to Critical Mass. J Bus Ethics 102:299–317. https://doi.org/10.1007/s10551-011-0815-z

Toukabri M, Jilani F (2023) The power of critical mass to make a difference: how gender diversity in board affect US corporate carbon performance. SBR 18:592–617. https://doi.org/10.1108/SBR-11-2021-0224

Umans I, Corten M (2022) Ownership succession intentions affecting earnings management in private family firms. Small Bus Econ. https://doi.org/10.1007/s11187-022-00696-5

Valls Martínez MdC, Santos-Jaén JM, Soriano Román R, Martín-Cervantes PA (2022) Are gender and cultural diversities on board related to corporate CO2 emissions? Journal of Cleaner Production 363:132638. https://doi.org/10.1016/j.jclepro.2022.132638

Vastola V, Campopiano G, Debellis F, Cambrea DR (2025) "If you like it Green, put a ring on it": Married women directors and environmental performance in family and non-family businesses. J Bus Ethics. https://doi.org/10.1007/s10551-025-05981-3

Vekemans L, Michiels A, Steijvers T, Molly V (2025) What drives bank financing in family firms? A systematic review and research agenda. Journal of Family Business Strategy 16:100669. https://doi.org/10.1016/j.jfbs.2025.100669

Velte P (2024a) A literature review concerning the non-carbon-related environmental goals of the EU Taxonomy Regulation and the European Sustainability Reporting Standards (ESRS). JGR. https://doi.org/10.1108/JGR-02-2024-0032

Velte P (2024b) Archival research on carbon reporting quality. A review of determinants and consequences for firm value. ZfU:110–148

Velte P (2024c) Wirkt sich geschlechtliche Vielfalt im Verwaltungsrat auf die Klimaberichterstattung aus? Ergebnisse internationaler Studien. IRZ:259–265

Velte P (2025) Sustainable corporate governance and corporate carbon outputs. Status quo of empirical research and further improvements. JFRA. https://doi.org/10.1108/JFRA-10-2024-0743

Velte P, Weber S (2021) Sustainable corporate purpose and sustainable corporate governance: Integrative theoretical framework and reform recommendations. ZfU 44:287–323
Velte P, Stawinoga M, Lueg R (2020) Carbon performance and disclosure: A systematic review of governance-related determinants and financial consequences. Journal of Cleaner Production 254:120063. https://doi.org/10.1016/j.jclepro.2020.120063
Velte P, Wulf I, Weber S, Fischer A (2025) Der Vorschlag der EU-Kommission für ein EU-Omnibus-Paket zur Änderung von CSRD, CSDDD und Taxonomie-Verordnung. Der Betrieb:813–823
Venturelli A, Fasan M, Pizzi S (2022) Guest editorial Rethinking non-financial reporting in Europe: challenges and opportunities in revising Directive 2014/95/EU. JAAR 23:1–7. https://doi.org/10.1108/JAAR-02-2022-265
Villalonga B, Amit R (2006) How do family ownership, control and management affect firm value? Journal of Financial Economics 80:385–417. https://doi.org/10.1016/j.jfineco.2004.12.005
Villalonga B, Amit R, Trujillo M-A, Guzmán A (2015) Governance of Family Firms. Annu. Rev. Financ. Econ. 7:635–654. https://doi.org/10.1146/annurev-financial-110613-034357
Villiers C de, Naiker V, van Staden CJ (2011) The Effect of Board Characteristics on Firm Environmental Performance. Journal of Management 37:1636–1663. https://doi.org/10.1177/0149206311411506
Vulturius G, Maltais A, Forsbacka K (2024) Sustainability-linked bonds – their potential to promote issuers' transition to net-zero emissions and future research directions. Journal of Sustainable Finance & Investment 14:116–127. https://doi.org/10.1080/20430795.2022.2040943
Walenta J (2020) Climate risk assessments and science-based targets: A review of emerging private sector climate action tools. WIREs Climate Change 11. https://doi.org/10.1002/wcc.628
Wintoki MB, Linck JS, Netter JM (2012) Endogeneity and the dynamics of internal corporate governance. Journal of Financial Economics 105:581–606. https://doi.org/10.1016/j.jfineco.2012.03.005
Wiseman RM, Gomez-Mejia LR (1998) A Behavioral Agency Model of Managerial Risk Taking. The Academy of Management Review:133–153
Wu Z, Chua JH, Chrisman JJ (2007) Effects of family ownership and management on small business equity financing. Journal of Business Venturing 22:875–895. https://doi.org/10.1016/j.jbusvent.2006.07.002
Yen J-F, Lin C-Y, Chen Y-S, Huang Y-C (2015) Founding Family Firms and Bank Loan Contracts. J Financ Serv Res 48:53–82. https://doi.org/10.1007/s10693-014-0199-1
Yoshikawa T, Rasheed AA (2010) Family Control and Ownership Monitoring in Family-Controlled Firms in Japan. Journal of Management Studies 47:274–295. https://doi.org/10.1111/j.1467-6486.2009.00891.x
Zellweger T, Kammerlander N (2015) Family, Wealth, and Governance: An Agency Account. Entrepreneurship Theory and Practice 39:1281–1303. https://doi.org/10.1111/etap.12182
Zellweger T, Eddleston KA, Kellermanns FW (2010) Exploring the concept of familiness: Introducing family firm identity. Journal of Family Business Strategy 1:54–63. https://doi.org/10.1016/j.jfbs.2009.12.003

Zhu C, Villar AS, Ge B (2025) Environmental, Social, and Governance in Family Firms: A Bibliometric Review and Agenda for Future Research. Business Ethics Env & Resp. https://doi.org/10.1111/beer.12805

Journal of Business Economics (2024) 94:311–378
https://doi.org/10.1007/s11573-023-01164-6

ORIGINAL PAPER

Heterogeneity in family firm finance, accounting and tax policies: dimensions, effects and implications for future research

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Abstract

Family firms, as a unique organizational form, are associated with distinct finance, accounting, and tax behaviors. Prior research indicates that heterogeneity among family firms is linked to significant variation concerning these outcomes. However, the scope of dissimilarities, their empirical operationalization, and the corresponding effects of heterogeneity remain largely unexplored. Therefore, this study maps the dimensions of family firm heterogeneity addressed in extant research based on a systematic review of 91 articles published between 1999 and 2021. Focusing on heterogeneity in corporate governance and wider firm characteristics, the most relevant effects of heterogeneity for family firm finance, accounting, and tax policies are discussed in depth. The results across the 24 identified dimensions of heterogeneity show that heterogeneity is a key factor to be considered by family business scholars. Previous heterogeneity research has specifically focused on heterogeneity rooted in differences concerning the firms' management, ownership structure, board composition, and transgenerational issues. However, this study also finds that additional conceptual and practical challenges emerge at the heterogeneity level of analysis. Several recommendations for advancing the understanding of family firm heterogeneity have been derived. In particular, the results indicate a need to distinguish more clearly between sources of heterogeneity that are strictly specific to family firms and those that extend beyond the family firm level, thereby proposing a refined, more restricted approach toward family business heterogeneity.

Keywords Family firms · Heterogeneity · Finance · Accounting · Tax

JEL Classification G32 · G35 · M41 · M42 · H26

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1 Introduction

The field of family business research has primarily evolved around the perspective of family firms as a unique type of organization, as well as the implied consequences of family involvement for a wide array of firm outcomes (Fang et al. 2019; Gedajlovic et al. 2012; Sharma 2004). Recently, studies on the differences between family firms have become increasingly relevant (Dibrell and Memili 2019; Neubaum et al. 2019). For about a decade, the theme of *family business heterogeneity* has been eliciting continuous research interest and has been widely discussed (Chua et al. 2012; Nordqvist et al. 2014; Rau et al. 2019). Notably, family firms are subject to various sources of heterogeneity, including variations in their ownership structure (Cascino et al. 2010; Chen et al. 2014; Chen et al. 2021; Huang et al. 2012) or management composition (Burgstaller and Wagner 2015; Sciascia et al. 2013; Wu et al. 2007). Other family business-specific sources of variation such as the extent of non-family involvement and its role in family firm conflicts (Rosecká and Machek 2022) or the role of family businesses' transgenerational intention, have also been studied (Suess-Reyes 2017). These differences have been found to affect family firm financing behavior (Schmid 2013; Thiele and Wendt 2017), the way family firms manage and report their earnings (Umans and Corten 2022), and the extent to which family firms engage in tax avoidance (Temouri et al. 2021).

Family firm heterogeneity can be defined as "the range of categorical and/or variational difference(s) between or among family firms at a given time or across time" (Daspit et al. 2021). In addition to the perspective of how family firms stand out vis-á-vis their non-family counterparts, questions about potential dissimilarities among family firms that may explain distinct behaviors or dynamics within specific sub-groups of family firms are being raised. Recent reviews have found that family firm heterogeneity constitutes an important yet under-studied phenomenon in the fields of finance, accounting, and tax (FAT) research (Brune et al. 2021; Michiels and Molly 2017). However, given the broad consensus that the heterogeneity of family firms represents an important phenomenon, several important questions remain unanswered. Heterogeneity is frequently used as an umbrella term for a wide array of differences among family firms. However, the single dimensions, which are collectively referred to as heterogeneity, are rarely explored in further detail, resulting in a lack of understanding concerning the scope and consequences of heterogeneity (Daspit et al. 2021; Dibrell and Memili 2019).

In contrast to prior reviews regarding family firm FAT research (Brune et al. 2021; Michiels and Molly 2017; Molly and Michiels 2021; Prencipe et al. 2014; Salvato and Moores 2010), this study takes a different perspective. While extant reviews have focused on a set of dependent variables, our analysis integrates research findings from a broader range of domains and variables. This study aims to understand the role of heterogeneity across different streams of financial research on family firms rather than review, for instance, family firm capital structure decisions or financial reporting quality per se. Therefore, our review does not compete with prior works thematically but builds on their findings and directly addresses their calls for research (Brune et al. 2021; Michiels and Molly 2017; Molly and Michiels 2021).

The different literature streams on family firm FAT research provide a fertile ground for an inclusive research design to investigate the role of heterogeneity comprehensively. As will be elaborated further, all literature streams are closely interconnected, for instance, with regard to underlying commercial processes and the managerial personnel involved within the family firms (Hiebl 2012). Moreover, our analysis shows that these fields rely on a similar set of methodologies with a strong dominance of empirical quantitative designs, allowing for a systematic review of the effects of heterogeneity across these domains.

This study aims to answer the following three main research questions:

RQ1 Which dimensions of heterogeneity have been studied in family business finance, accounting, and tax research thus far? This question resembles the future research directions proposed by Daspit et al. (2021).

RQ2 Which effects on finance, accounting and tax outcomes are associated with different aspects of family firm heterogeneity within the literature?

RQ3 Which implications can be drawn for further research in this area in terms of existing gaps and promising further avenues for research?

As a first contribution to the ongoing discourse on family firm heterogeneity, this review derives 24 dimensions of family firm heterogeneity from the literature that have been employed in empirical studies to distinguish family firms. The analysis facilitates further research progress by providing scholars with an overview of the scope of dissimilarities among family firms observable in FAT research. As a second contribution, this review particularly emphasizes sources of variations that strongly influence family firm outcomes and provides a synthesis of the empirical literature on heterogeneity across different dimensions of heterogeneity, integrating partially dispersed literature streams.

The article is structured as follows. Section 2 introduces the research framework and discusses in which ways family firm heterogeneity may alter agency conflicts within family firms, and thereby, affect their FAT policies. In addition, the sample selection process is described, and the dimensions of heterogeneity in the literature are introduced. Their respective effects are reviewed in detail in Sect. 3. In Sect. 4, the results are being discussed, leading to a proposed model of heterogeneity applicable to FAT in family firms. Furthermore, recommendations for further research as well as limitations are discussed before the work is concluded in Sect. 5.

2 Research framework and methodology

2.1 Agency theory and the role of family firm heterogeneity in finance, accounting, and tax policies

Before elaborating their specific relationships, we briefly define finance, accounting and tax (FAT). First, in line with Michiels and Molly (2017), *finance* encompasses all matters associated with the provision of financial resources needed to ensure the

viability of the business, including but not limited to debt capital, public/private equity and retained earnings as a source of funding (or contrary, the distribution of funds via dividends).

Second, following Moores (2009), *accounting* is defined as the "body of phenomena associated with the economic performance of individuals or groups responsible for the utilization of economic resources", thereby addressing subject matters such as financial accounting and auditing. Within accounting research among family businesses, especially financial reporting quality is studied frequently and is of central importance for the analysis (Prencipe et al. 2014). Simultaneously, we also consider audit quality as a constituent of financial reporting quality. As such, financial reporting quality is widely regarded as a function of audit quality, since higher quality audits provide greater assurance of high financial reporting quality, indicating an interrelated or even recursive relationship (DeFond and Zhang 2014; Gaynor et al. 2016).

Third, *tax* entails all matters related to corporate taxation, e.g., the active management of tax liabilities in a business environment. Within the family business domain, this predominantly includes research on corporate tax avoidance, tax aggressiveness or tax evasion, rather than, e.g., normative tax issues (Brune et al. 2019a; Chen et al. 2010; Steijvers and Niskanen 2014). These represent distinct yet similar constructs at decreasing levels of legality within the conceptual umbrella of corporate tax planning (Lietz 2013). Given that these terms are often used interchangeably in empirical research, we employ an inclusive definition and refer to a uniform'tax avoidance' term, unless specified otherwise.

Collectively, all three domains of FAT are directly interconnected within the management of a firm's financial resources. Among family firms, this may prove particularly true since these are regularly addressed by a select group of managers, and depending on the firm size, these roles may be closely related or even converge in smaller firms (Hiebl 2012). Furthermore, this interaction is particularly relevant within family firms, given the firms' unique composition of providers of capital, managers, and ultimately, beneficiaries of these corporate policies within and beyond the owning family (Brune et al. 2021).

2.1.1 Heterogeneity as a determinant of agency problems in family firms

Within the literature on FAT, agency theory has been identified as the dominant theoretical perspective (Michiels and Molly 2017; Molly and Michiels 2021; Prencipe et al. 2014). While it is clearly acknowledged that multi-theoretical perspectives are needed to account for both the idiosyncratic behavior of all corporate actors as well as reflect ongoing regulatory changes related to corporate purpose and corporate governance (Velte and Weber 2021), agency theory to date provides the most comprehensive theoretical fundament which is equally applicable to finance, accounting and tax research. More importantly though, agency theory reveals promising angles towards family firm heterogeneity, which warrants further analysis.

Following the framework of Villalonga et al. (2015), several family specific agency conflicts can be distinguished. Generally, the agency theory considers the firm as a bundle of contracts, emphasizing potential conflicts arising from

asymmetric information between utility-maximizing agents who act on behalf of a principal (Jensen and Meckling 1976; Ross 1973). For the specific case of family firms, Villalonga et al. (2015) describe them as "host to a multi-tier, concatenated agency structure in which managers (both family and nonfamily) act as agents for shareholders, including the controlling family shareholders who appoint them". Additionally, the authors establish the family at large as the 'superprincipal' of the controlling family shareholders, thus, on aggregate leading to four distinct agency problems: conflicts of interest between owners and managers (AP I), controlling family shareholders and minority shareholders (AP II), shareholders and creditors (AP III) and between family shareholders and the family at large (AP IV).

The classical agency conflict between owners and managers (AP I) is frequently alleviated in family firms (Chrisman et al. 2004; Prigge and Thiele 2019). The separation between owners and managers is often less clearly delineated, up to the point of identity between family owners and managers (Goel et al. 2012). Even where ownership is separated from management, family owners regularly possess both the ability and incentive to monitor managers efficiently because of significant shareholdings (Anderson and Reeb 2003; Audretsch et al. 2013; Morck et al. 1988). Whether or not these agency advantages materialize may depend on various factors, including firm size and ownership dispersion (Miller et al. 2013).

In turn, this gives rise to principal-principal conflicts between majority and minority shareholders (AP II), in which minority owners are more exposed towards potential opportunistic behavior of powerful majority owners (Morck et al. 2005; Villalonga and Amit 2006). Regarding conflicts of interest between shareholders and creditors (AP III) and the corresponding agency problem of debt, competing arguments exist which indicate either higher or lower use of debt financing (Burgstaller and Wagner 2015; Hansen and Block 2021). Collectively, prior evidence tends to suggest that the incentives of family shareholders are better aligned with those of creditors than for other types of shareholders, giving them better and cheaper access to credit (Villalonga et al. 2015). Finally, conflicts of interest can also arise between family shareholders and the family at large (AP IV), in which the family at large as the superprincipal takes important decisions as part of the firm's governance systems through various types of contracts such as family constitutions, prenuptial agreements or wills (Villalonga et al. 2015).

Overall, the group of family firms is thus collectively associated with similar agency dynamics (Miller and Le Breton-Miller 2006). At the same time, prior research has indicated that family firms differ significantly from one another in terms of their FAT behaviors, proven largely by studies which rely on agency theoretical research designs (Brune et al. 2021; Michiels and Molly 2017).

From an agency theoretical point of view, we therefore consider family business heterogeneity as a constituent that alters the family firms' distinct agency conflicts, ultimately being associated with variation among FAT policies. This reasoning follows prior research which has documented that family firms should be viewed as a heterogeneous group, rooted in firm-level differences in the severity of agency conflicts (Ali et al. 2007; Chen et al. 2021). Similarly, Yoshikawa and Rasheed (2010) elaborate that the agency setting in family firms is more nuanced than the assertion that agency problems disappear in the presence of concentrated ownership or

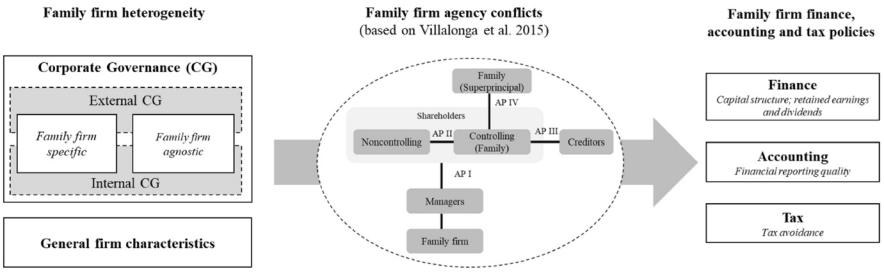

Fig. 1 Research framework

that family owners would naturally be inclined to appropriate the wealth of minority shareholders. Thus, they suggest theorizing based on the understanding of the "*players […] and the context of the interaction*" which essentially describes the idea of heterogeneity.

Based on this notion, Fig. 1 introduces the research framework which guides the further analysis. As main building blocks it considers heterogeneity that originates from differences in corporate governance and other firm characteristics as determinants of the family businesses' agency conflicts, leading to varying outcomes among its FAT policies.

Heterogeneity based on differences in corporate governance is considered among the dominant drivers of family firm heterogeneity overall (Carney 2005; Nordqvist et al. 2014) and many of the heterogeneity variables covered in the literature turn out to be governance variables which are traditionally studied as means to alleviate agency conflicts (Villalonga et al. 2015). There exist several non-homogeneous approaches to define corporate governance (Tricker 2015), including the seminal work of Shleifer and Vishny (1997) who define corporate governance as means for suppliers of finance to assure their return on invest, widely considered as too narrow as of today. Slightly more inclusive, Becht et al. (2003) define corporate governance as "the reconciliation of conflicts of interest between various corporate claimholders". Irrespective of the definition used, researchers often view corporate governance mechanisms as falling into one of two groups: those internal to firms and those external to firms (Gillan 2006). Following Gillan, in Fig. 1 we distinguish between *external* governance mechanisms (e.g., ownership structure and capital markets) as well as *internal* corporate governance mechanisms (e.g., board and management). Based on a more practice-oriented approach towards governance, the OECD (2015) further regards corporate governance as providing "the structure through which the objectives of the company are set, and means of attaining those objectives". We consider this as a particularly important aspect for the case of family firms who are frequently discussed as having a more diverse set of objectives such as financial and nonfinancial goals (Gomez-Mejia et al. 2011; Holt et al. 2017; Zellweger et al. 2013). Throughout the analysis, we will address these aspects as family-specific determinants of corporate purpose and thus, as a component of the firm's governance system. Within the literature, also family firm goals and resources are considered as important sources of heterogeneity (Chua et al. 2012; Michiels and Molly

2017). Yet, they are less prevalent in the literature streams relevant to the review and are therefore not emphasized specifically (see Fig. 1).

Conceptually, we further distinguish between governance heterogeneity which is strictly family firm specific, or which is agnostic of family firms, i.e., which supersedes the family firm level (see Fig. 1). For instance, the CEO being a family member or not, the distribution of shares among family members or the extent of supervision through family board members represent family specific matters of the governance system. At the same time, differences in governance may be equally applicable to non-family firms, e.g., the general effect of dispersed ownership or the existence of other minority blockholders. Overall, these elements of heterogeneity directly affect the existence and magnitude of agency conflicts in family firms (Ali et al. 2007; Chen et al. 2021; Yoshikawa and Rasheed 2010).

2.1.2 Instances of heterogeneity, their agency consequences, and effects for FAT policies

Based on the conceptual framework in Fig. 1, the specific relationships are being elaborated below, indicating how instances of heterogeneity affect agency conflicts and ultimately, materialize as changes in FAT policies. When it comes to *finance*, debt capital is widely considered as a mechanism to prevent managerial misbehavior, e.g., due to the disciplining effect of regular interest payments (Jensen 1986). From a heterogeneity perspective, variation in the governance system of the family firm, such as different board structures, have direct consequences for the agency problems linked to debt capital. Consistent with agency theory, González et al. (2013) find that higher family presence in the board implies superior direct monitoring and results in reduced agency costs (AP I) and thereby, lower demand for debt as a means to prevent managerial misbehavior. Regarding the general role of board independence, Hülsbeck et al. (2019) show that the distinction between dependent and independent boards must even be extended to account for different functions performed by the board (value protection and value creation). Generally, prior research concerning boards of directors emphasizes several important pitfalls linked to boards as an endogenously determined institution, which need to be considered within our analysis (Hermalin and Weisbach 2003). Beyond family firms' boards, another source of heterogeneity can be associated with the firm's CEO, who is either a family member or a hired non-family CEO. Amore et al. (2011) document that non-family CEOs are associated with higher owner-manager agency costs (AP I) and in turn, more debt financing is used as a governance mechanism to discipline external managers. But also the differences in the relationship between active and passive family members can exert influence on agency costs in family firms (Michiels et al. 2015). As such, inactive family members may try to mitigate managerial opportunism, leading to a higher demand for debt (Molly et al. 2010), especially in later generations where agency costs tend to increase (Blanco-Mazagatos et al. 2007). Depending on whether all respective family members are involved as owners or not, this setting can be framed either as AP I (owner-manager) or as AP IV (family as superprincipal).

In terms of *accounting* in family firms, other agency problems become relevant which are equally dependent on elements of family firm heterogeneity. Generally,

managerial opportunism can be linked to discretion in accounting choices. For instance, different forms of earnings management give rise to agency costs regarding the potential expropriation of minority shareholders by dominant family owners who may exploit private benefits of control (Salvato and Moores 2010; Thesing and Velte 2021; Umans and Corten 2022). Within the family firm accounting literature, two competing views are widely discussed which have a direct effect for financial reporting quality: the role of an improved alignment of interest between owners and managers (AP I) and the entrenchment of family owners versus minority owners (AP II) (Ali et al. 2007; Chau and Gray 2010; Wang 2006; Yang 2010). In line with the wider governance literature, family firms tend to benefit from the independence of their board and the board chair in particular (Bansal 2021; Prencipe et al. 2011; Prencipe and Bar-Yosef 2011), being associated with higher quality financial reporting. Heterogeneity-wise, beyond board independence especially firms managed by family members exhibit higher financial reporting quality, rooted in lower agency conflicts between owners and managers (Ali et al. 2007; Prencipe et al. 2011; Yang 2010). As another factor contributing to the firm's financial reporting quality, also auditors are subject to the agency implications of family firm heterogeneity. Prior research shows that auditors react to these agency consequences in their assessment of audit risk and effort based on heterogeneity such as ownership characteristics, family relationships and general family firm attributes (Hope et al. 2012; Schierstedt and Corten 2021).

Finally, *tax* issues in family firms are subject to agency problems which depend upon heterogeneity. Generally, avoiding taxes and, thus, increasing the distributable post-tax income, can be regarded as in the best interest of the owners (Chen et al. 2010; Kovermann and Velte 2019). However, excessive tax avoidance (e.g., to boost managerial rewards) entails significant reputational or even litigation risks at the expense of the principal (Kovermann and Wendt 2019). The general notion that agency problems tend to increase across generations (Villalonga and Amit 2006) is observable in tax research specifically. For various research designs and proxies, there is substantial evidence that proximity to the founder as an individual, but also the family firm generation in general, directly affect the firm's tax policies. Family-founder firms tend to avoid taxes to a lesser extent (Bauweraerts et al. 2020; Brune et al. 2019a; Clemente-Almendros et al. 2021). Yet, also other aspects of heterogeneity are found to alter the firm's agency conflicts and materialize in diverging tax strategies, such as higher CEO ownership shares that catalyze tax aggressiveness (Steijvers and Niskanen 2014) or excessively entrenched family owners that are associated with higher tax avoidance (Mafrolla and D'Amico 2016).

After establishing the theoretical framework, several examples of heterogeneity have been introduced from an agency theoretical point of view, exhibiting direct consequences for FAT policies in family firms. In the next section, we discuss the employed method and sample selection process.

2.2 Method and sample selection

We conduct a systematic literature review that represents a well-established method to map, assess, and further develop a body of literature (Tranfield et al. 2003).

Systematic literature reviews rely on a systematic, transparent, and reproducible process for identifying academic literature to answer a clearly defined research question (Fisch and Block 2018). The literature sample selection follows the recent methodologic guidance of Hiebl (2021) as a benchmark for conducting rigorous systematic reviews, which emphasizes structure, comprehensiveness, and transparency as key requirements. A database-driven search approach is employed using the Web of Science and Scopus multipublisher databases. To ensure the comprehensiveness of the literature sample, the keyword search is complemented with additional consideration of all references of widely cited reviews regarding family business FAT research (Brune et al. 2021; Michiels and Molly 2017; Prencipe et al. 2014; Salvato and Moores 2010). Building up on their queries, the employed search terms take the following form[1]:

(*Finance entity* OR *Accounting entity* OR *Tax entity*)
AND *Family firm entity* AND *Heterogeneity entity*.

The full sample selection process is documented in Table 1. Accordingly, a total of 1818 articles have been retrieved from the Web of Science and Scopus databases. The search results of both databases are comprehensive. While the second database (Scopus) has contributed 340 search results, excluding duplicates (207) and applying all further retention criteria described below, only one additional sample-relevant article remained, indicating a saturation in the search results. In addition, 199 potentially relevant articles have been derived from the literature samples of Michiels and Molly (2017), Salvato and Moores (2010), and Prencipe et al. (2014), leading to a search result of 2017 articles in total.

This scope can be substantially reduced by excluding duplicates (451), articles outside the subject area such as medical publications (1016), non-empirical articles (44), articles that are not English peer-reviewed publications (36), or those not related to family business and/or finance, accounting and tax phenomena (195).

Furthermore, additional content-related retention criteria have been applied. Since the analysis focuses on the internal perspective of how heterogeneity affects FAT policies within the respective firms, articles dedicated to performance outcomes (68) are excluded from the review, similar to the approach of Salvato and Moores (2010). In the context of our review, performance outcomes are regarded as a second-order function of internal corporate policies and are beyond the scope of the analysis. Furthermore, given the significant focus on corporate governance variables as drivers of heterogeneity, we further exclude research designs that consider governance as a dependent variable (20) to avoid ambiguity. This step excludes dependent variables, such as executive remuneration, employee stock programs, or ownership structure. Finally, articles associated with the broad literature on risk-taking, investment, and divestment decisions, as well as transaction-related studies that address mergers and acquisitions (M&A) cases are omitted (35). These articles have been excluded from the review because they exhibit both a pronounced focus on

[1] A full overview of the search terms is presented in the Appendix.

Table 1 Sample selection process

		Step	# of articles
Initial search	1	Total results of keyword search in Scopus and Web of Science databases	1818
	2	Additional items based on defined review articles	199
		Total search results	**2017**
Data cleaning	3	Excluding duplicates	(451)
	4	Excluding unrelated articles (e.g., medical research)	(1016)
	5	Excluding articles which are not English peer-reviewed articles	(36)
	6	Excluding articles which do not address family firm finance, accounting or tax phenomena	(195)
		Sub-Total search results after data cleaning	**319**
	7	Excluding non-empirical studies	(44)
Content-related	8	Excluding performance as dependent variable	(68)
	9	Excluding governance as dependent variable	(20)
	10	Excluding investment, risk taking and transaction related research (MBO/MBI, M&A etc.)	(35)
Quality-related	11	Excluding articles which are not ranked VHB JOURQUAL > D or ABDC > C	(7)
		Preliminary sample	**145**
	12	Excluding articles which lack family business heterogeneity data	(54)
		Final sample	**91**

single cases and simultaneously focus on an outside perspective toward family firms (e.g., deal valuations *of* family firms or family firms as portfolio companies), and thus, do not relate to the review purpose that focuses on heterogeneity effects toward internal corporate policies. As a quality-related retention criterion, all articles must be ranked in the VHB JOURQUAL 3 or the ABDC 2019 lists, which represents a relatively inclusive search approach.

To generate the final literature sample, the remaining 145 articles are fully analyzed individually to validate the representation of heterogeneity within the papers. Taking into account the definition of Daspit et al. (2021), categorical and variational differences among family firms at a given time or across time are relevant to our review. Studies that do not consider data regarding such intra-group differentiation of family firms are excluded from the sample after reviewing each paper carefully (54). Therefore, the final sample consists of 91 relevant peer-reviewed journal articles that empirically address heterogeneity within family business FAT research. Table 2 provides an overview of the distribution of sample articles across years of publication (Panel A), journals (Panel B), data sources (Panel C), research sample composition (Panels D and E), country (Panel F), and theories used (Panel G).

Heterogeneity-related research has been growing over time, with a preliminary peak in publications between 2014 and 2015, which is reasonable given the preceding seminal work of Chua et al. (2012) that opened up the topic. Publications increased substantially in 2021, indicating growing research interest. The studies are equally dispersed across accounting and finance journals, business and management journals, and family-firm-specific outlets. While most of the research relies on archival data, the prevailing sample composition among the articles is striking. An equal number of studies address public and private family firms; however, hardly any of the reviewed literature addresses both at once. Similar observations can be made regarding geographical coverage, which mostly relies on single-country designs. In terms of theory, agency theoretical perspectives are predominant, which are complemented by less frequent socioemotional wealth (SEW) considerations.

Three main clusters of research topics have been identified in the search: "T1 Finance", "T2 Accounting (esp. financial reporting quality)", and "T3 Tax (esp. tax avoidance)" as shown in Table 3. These clusters will guide the further analysis process regarding the drivers of heterogeneity within the literature sample.

2.3 Dimensions of heterogeneity

An iterative approach has been employed to answer the first research question (RQ1). First, all variables from the primary studies that met the introduced definition of family firm heterogeneity (i.e., "variational or categorical differences between or among family firms at a given time or across time") have been compiled. These variables have been considered in various ways within the primary studies, either by explicitly incorporating them as explanatory variables in various forms of regression models, by analyzing their effects as moderators or mediators, or based on analyses of distinct subsamples to compare the behaviors of two or more slices of data. Based on a large set of all items, clusters of variables have been identified in

Table 2 Count of cited published papers

Panel A: by publication year		
Total: 91	• 1999	1
	• 2000	2
	• 2001	1
	• 2003	1
	• 2006	2
	• 2007	4
	• 2008	1
	• 2009	4
	• 2010	7
	• 2011	7
	• 2012	6
	• 2013	7
	• 2014	8
	• 2015	9
	• 2016	2
	• 2017	4
	• 2018	3
	• 2019	4
	• 2020	3
	• 2021	15
Panel B: by journal		
Total: 91	**Accounting and Finance Journals**	39
	• Accounting and Business Research	1
	• Accounting Forum	1
	• Accounting Horizons	1
	• Accounting Organizations and Society	1
	• Auditing—A Journal of Practice & Theory	1
	• Corporate Governance—An International Review	5
	• European Accounting Review	3
	• European Journal of Finance	1
	• Family Business Review	1
	• International Journal of Accounting	1
	• International Review of Financial Analysis	1
	• Journal of Accounting & Economics	1
	• Journal of Accounting and Public Policy	1
	• Journal of Accounting Research	1
	• Journal of Accounting, Auditing & Finance	1
	• Journal of Banking & Finance	3
	• Journal of Business Finance & Accounting	2
	• Journal of Contemporary Accounting & Economics	2
	• Journal of Corporate Finance	2

Table 2 (Continued)

	• Journal of Financial Reporting and Accounting	1
	• Journal of Financial Services Research	1
	• Journal of International Accounting, Auditing and Taxation	3
	• Journal of Risk Finance	1
	• Managerial Auditing Journal	1
	• Spanish Accounting Review	1
	• The International Journal of Accounting	1
	Business and Management Journals	**22**
	• Academy of Management Journal	1
	• Asia Pacific Journal of Management	2
	• British Journal of Management	1
	• Canadian Journal of Administrative Sciences	1
	• Economics Letters	1
	• Eurasian Business Review	1
	• International Entrepreneurship and Management Journal	1
	• Japan and the World Economy	
	• Journal of Asia Business Studies	1
	• Journal of Business Research	3
	• Journal of Management & Governance	1
	• Journal of Management Studies	1
	• Management Decision	2
	• Managerial and Decision Economics	1
	• Review of Managerial Science	1
	• Strategic Management Journal	1
	• Sustainability	2
	Family business, SME and Entrepreneurship Journals	**30**
	• Entrepreneurship Theory And Practice	2
	• Family Business Review	12
	• Journal of Business Venturing	3
	• Journal of Family Business Management	1
	• Journal of Family Business Strategy	6
	• Journal of Small Business and Entrepreneurship	1
	• Journal of Small Business Management	2
	• Journal of Small Business Strategy	1
	• Small Business Economics	2
Panel C: by data source		
Total: 91	• Public or commercial databases, annual reports and other publicly available data:	59
	• Direct survey data:	32

Table 2 (Continued)

Panel D: by sample composition (publicly-listed and private firms)		
Total: 91	• Publicly-listed firms:	41
	• Private, non-listed firms:	37
	• Both public and private firms:	6
	• Transition from private to public (IPO):	4
	• Not specified:	3
Panel E: by sample composition (family and non-family firms)		
Total: 91	• Samples only consisting of family firms:	33
	• Samples consisting of both family and non-family firms:	58
Panel F: by country		
Total: 91	• International/cross-country	8
	• Australia	2
	• Austria	1
	• Belgium	7
	• Canada	2
	• China	7
	• Colombia	2
	• Finland	2
	• France	1
	• Germany	10
	• India	3
	• Italy	11
	• Japan	2
	• Malaysia	1
	• Norway	1
	• Portugal	1
	• Spain	10
	• Sweden	1
	• Taiwan	6
	• USA	13
Panel G: by theory		
Total: 91 (count exceeds 91, due to multiple theories used per paper)	• Agency theory	56
	• Legitimacy theory	2
	• Lifecycle theory	2
	• Pecking order theory	6
	• RBV	2
	• SEW	23
	• Stewardship theory	4
	• Theory of planned behavior	2
	• Trade-off theory	2
	• Others	8
	• None	5

Table 3 Clusters of research topics and dependent variables represented in literature sample

Topic	Dependent variables
T1 Finance	
Capital structure, debt and equity	• Debt (level of debt, maturity structure, speed of adjustment to target ratio) • Cost of capital (cost of debt, loan spread, required and actual equity returns) • Behavioral intention to use debt; intention to use debt for succession financing • General use of equity financing • New venture debt financing (relationship with lenders, guarantees, amount of debt financing) • Financing constraints (access to capital) • Financial intermingling (mixing family and business assets) • Use of sophisticated financial products and financial management techniques • IPO (value, underpricing, post-IPO financing behavior)
Retained earnings and dividends	• Dividends (Likelihood, amount and stability over time)
T2 Accounting (esp. financial reporting quality)	• Earnings quality (discretionary accruals, earnings informativeness, persistence of transitory loss components in earnings, predictability of cash flows, earnings persistence, earnings response coefficient, abnormal working capital accruals, real earnings management, income smoothing, conservatism) • Financial report readability (FOG index) • Disclosure quality (based on Taiwanese rating system) • Voluntary disclosure (importance-adjusted relative disclosure index (RDI), early adoption of new disclosure requirements, voluntary KPI disclosure) • External audit (voluntary demand, demand for audit quality, audit fees/effort, auditor resignations)
T3 Tax (esp. tax avoidance)	• Tax avoidance (effective tax rate, cash effective tax rate, reaction in leverage ratio subsequent to legislative changes which reduced tax benefit of debt) • Tax evasion (underreported revenues)

the first iteration. In subsequent iterations, these granular sets of variables have been consolidated toward higher-order clusters until a comprehensive level of aggregation is achieved. In the final iteration, each article's variables have been coded using these clusters to ensure alignment across all sample articles (Hiebl 2021).

The results of this process are presented in Table 4. It is a standard practice to distinguish drivers of heterogeneity by differences in governance, goals, and resources (Chua et al. 2012; Michiels and Molly 2017). The review of the specific sample of articles from the fields of FAT has shown that differences in the corporate governance of family firms take precedence over other sources of variations. Therefore, as a modification of Michiels and Molly (2017), Table 4 introduces all dimensions of heterogeneity identified in the literature, broken down by corporate governance and general firm characteristics. Furthermore, corporate governance is disaggregated in line with the research framework based on internal vs. external corporate governance parameters according to Gillan (2006), while also considering family-specific

Table 4 Dimensions of heterogeneity

Clusters of heterogeneity	ID	Source of heterogeneity	Scope of variables
Corporate Governance			
Ownership (External CG)	HD1	Ownership structure[a]	% Ownership by family members (direct/indirect), strong vs. weak ownership position, which family members as owners (founder vs. descendant), Ownership stake of non-CEO family members, Owner characteristics (e.g., Billionaire owners, gender of owner), Process of obtaining ownership (acquired vs. non-acquired), involvement of non-family ownership, # of shareholders, Non-family shareholders (Institutional ownership, bank ownership, foreign ownership, family foundations, PE and business angels as owners)
	HD2	Ownership concentration (dispersion) and other blockholders[1]	Ownership concentration (e.g., % Ownership of dominant shareholder) ownership dispersion (balance of voting power), presence of other blockholders (e.g., 5/10%), % ownership of blockholders (individual, cumulative), affiliates of other blockholders in board, type of blockholder (other family, non-family)
	HD3	Control enhancing mechanisms and excess control rights	Control-ownership wedge, excess control rights (ratio, total sum, dummy), access to control enhancing mechanisms (dummy), deviation of voting from cash flow rights, use of control enhancing mechanisms (pyramid structure, dual class shares)
	HD4	Affiliation with business groups	Affiliation with business groups, i.e., crossholdings of equity or similar arrangements
	HD5	Public vs. private	Public (stock-listed) family firms vs. private family firms
	HD6	Corporate opacity	Corporate opacity (measured based on trading characteristics of equity shares)
Board and Management (Internal CG)	HD7	Family vs. non-family management	Family involvement in management (various operationalizations, incl. CEO position, % family managers), involvement of non-family managers (dummy, %), Active vs. passive family members, existence of intra-family agency conflicts, involvement of family members on employee level

Table 4 (continued)

Clusters of heterogeneity	ID	Source of heterogeneity	Scope of variables
	HD8	Board	Family presence in board (any representation, multiple family members, % family members), family dominated board, chair of the board (independent), outside board members, board size, board independence, founder on board, affiliates of blockholder on board, # of affiliates main blockholder on board, shares held by board members, family board member ownership to total family ownership, outside director ownership, % board members of CEO's family, frequency of board meetings, existence of board, 'disproportionate' board representation, existence of (voluntary) audit committee, board gender diversity
	HD9	CEO and founder	Family vs. non-family CEO, CEO duality, interaction between descendant/hired CEO and founder (via ownership or board seat), CEO interaction effect with family dominated board, financial knowledge of owner manager, % CEO shareholding, founder vs. descendant management (focus: CEO role), presence of founder (regardless of position), blockholder position of founder (> 25%) without management responsibility, board presence of founder, CEO gender
	HD10	CFO, financial managers and accountants	Family CFO vs. External CFO, presence of external CFO (dummy), non-family manager responsible for finance and accounting
	HD11	Generation and succession	Generation, founder vs. later-generation (dummy), generation as discrete variable, generation proxied via firm age, involvement of multiple generations in management, transgenerational succession intention, succession related personal factors (need for family control, succession planning), succession between 1st and second generation vs. successions in later generations
	HD12	Collective differences in family involvement, control and influence	All studies addressing various elements of family firm governance simultaneously at a higher level of aggregation, e.g., F-PEC scale (and sub-dimensions) and various collective differences in ownership/management/control

Table 4 (continued)

Clusters of heterogeneity	ID	Source of heterogeneity	Scope of variables
	HD13	Family governance practices (FGP)	Existence of family governance practices (family forum or family charter)
	HD14	Network ties, relational strength and political connections	Firm-level and individual-level political connections, relational strength in clusters, political connection of CEO or chair of the board
	HD15	Auditors, advisors and consultants	Auditor size, Big 4 auditor (or for earlier studies Big 5), Auditor size, lead manager in IPO (internationality, reputation)
Family-specific determinants of corporate purpose	HD16	Family goals and preferences	General personal factors (attitude towards debt, risk propensity), economic goal orientation, family goals
	HD17	Socio-emotional wealth (SEW)	SEW importance (SEWi scale), levels of SEW (high vs. low, based on sample median), SEW (proxied via generation, management and CEO), differences in SEW and construct subdimensions (FIBER scale)
	HD18	Family firm culture, values and ethics	Perceived family norms towards financing sources, owner-manager's attitude towards financing sources (behavioral control), perceived behavioral control, family values (identification, altruism, collectivism, commitment, perpetuation, obligation), family culture and ethics, imprints of founders and next generation, Family commitment (based on F-PEC culture dimension)
	HD19	Family firm identity	Family firm identity score, overlap between business and family name (family name as a brand)
General firm characteristics	HD20	Size	Size of family firm
	HD21	Industry	Industry characteristics (cyclicity, capital intensity), industry growth
	HD22	Age and firm lifecycle	Firm age (continuous, old vs. young), lifecycle stages (maturity, growth, revival)
	HD23	Current and historic financial situation	Prior experience with debt suppliers, current level of indebtedness, owner committing personal line of credit, business and household demographics, cash situation, available borrowing capacities

Table 4 (continued)

Clusters of heterogeneity	ID	Source of heterogeneity	Scope of variables
	HD24	Firm- and industry-level performance environment	Current financial performance, firm performance hazard (return on assets compared to industry median, indicating relative performance), perceived financial performance (high vs. low), overall economic environment (growth vs. crisis), firm performance (high vs. low)

[a]HD1 addresses all specificities of the family business ownership structure, e.g., who is involved as owner. In contrast, HD2 addresses more general aspects of ownership concentration as a standalone variable, thereby reflecting the overall balance of power among all owners

determinants of the corporate purpose which are not directly addressed in the classical governance literature. The concrete instances of variables represented in the literature are presented for each dimension of heterogeneity (abbreviated HD for heterogeneity dimension).

A total of 24 relevant dimensions (HD1 to HD24) have been retrieved from the review, which will be discussed in the next section. The presented items and clusters of heterogeneity are the result of the work-intensive manual process described above that extends beyond the final sample of articles. Publications without sufficient representation of heterogeneity effects have been omitted only after carefully reviewing each research design and confirming the absence of heterogeneity data (see Sect. 2.2). The results of this process allow for a detailed discussion of the manifold impacts of elements of heterogeneity on family firm FAT outcomes in the next section.

3 Analysis: effects of heterogeneity for FAT policies

To contextualize the effects of heterogeneity, key results at the family vs. non-family level are briefly introduced in each section below. The analysis then focuses on the differential effects of variation among family firms, particularly on connecting similar findings and highlighting conflicting evidence. The analysis follows the structure of Table 4 (especially internal vs. external corporate governance). Yet, dimensions of heterogeneity and their effects are not discussed in direct chronological order but based on their overall significance as well as according to mutual connections among variables. These are either based on directly connected sets of heterogeneity variables (e.g., family firm generation and age) or because they exhibit interactions within the reviewed primary studies (e.g., CEO/founder as individuals and wider considerations of family management).

3.1 Finance

3.1.1 Capital structure, debt, and equity

Family firm financing decisions have been widely discussed in the literature, especially in the context of family-specific objectives to retain family control and aversion toward risk, namely, avoiding the dilution of control rights via equity financing while also avoiding excessive risks implied in leveraged capital structures (Croci et al. 2011; Mishra and McConaughy 1999). Given this trade-off, Burgstaller and Wagner (2015) note that prior research has unsurprisingly yielded diverging results. In their comprehensive meta-analysis of 613 primary studies, Hansen and Block (2021) recently document a slightly negative significant relationship between family firm status and firm leverage, supporting the argument of risk-averse family firms.

Heterogeneity from internal corporate governance

Generation and succession (HD11). Our analysis of the drivers of heterogeneity in family firm capital structure decisions shows that family firm generation (and

correspondingly, firm age) as well as succession events are among the most studied heterogeneity perspectives. In terms of generations, our review has yielded conflicting evidence that later-generation family firms tend to use more debt financing (Blanco-Mazagatos et al. 2007; González et al. 2013; Hansen and Block 2021), less debt financing (Bjuggren et al. 2012; Comino-Jurado et al. 2021b) or that founder- and descendant-controlled firms do not differ in terms of their capital structure (Burgstaller and Wagner 2015). Several generational effects may explain these peculiarities. Molly et al. (2012) show that debt levels decrease after a company transfer from the first to the second generation, while debt levels increase for transfers among later generations. This finding is consistent with that of González et al. (2013), who document a non-linear relationship between firm age and debt levels (i.e., debt levels initially decrease with firm age but start to increase again over time). Furthermore, increases in debt subsequent to professional successions toward non-family CEOs are more common among young family firms (Amore et al. 2011). The impact of the main owner's stake on leverage is also stronger for young firms (Keasey et al. 2015).

However, controlling for interactions with firm growth, Molly et al. (2012) find that the family firm generation has no direct effect on debt financing but interacts only indirectly via firm growth, which may explain why findings on the basis of generations diverge. Further effects of family firm generations on capital structures include lower sensitivity of debt levels toward fluctuations in the cash flow in first-generation family firms (Pindado et al. 2015), and observations that later-generation family firms adjust faster to their target debt ratio (Sardo et al. 2022). This supports the notion that debt financing decisions may exhibit a certain inertia in early generations. A potential explanation for this result may be that young family firms are also found to manage cash levels more aggressively (Lozano and Durán 2017). In conjunction, these arguments suggest that more deliberate cash management policies in earlier generations lead to lower demand (and speed) to acquire debt capital.

CEO (HD9). Various differential effects related to the family firm CEO are discussed in the literature. Both family CEOs and founder-CEOs (as a subset of family CEOs) are associated with higher degrees of discretion in capital structure decisions, expressed through the ability to react faster toward deviations from their target debt ratio (Burgstaller and Wagner 2015) and their ability to extend debt maturity structures after going public (Jain and Shao 2015). Similar observations have been made regarding active family management, especially in early generations, as a precondition for flexibility and discretion in family firm funding decisions (Pindado et al. 2015; Schmid 2013). Regarding the *level of debt*, family CEOs are associated with lower leverage (González et al. 2013), while also CEO duality exhibits a negative relationship toward short-term debt (Shyu and Lee 2009). In line with these findings, the appointment of external (non-family) CEOs is associated with significant increases in debt levels and short-term maturities in particular (Amore et al. 2011). Furthermore, CEO generation and CEO gender are found to moderate the negative relationship between higher SEW importance and debt levels (Baixauli-Soler et al. 2021). Finally, the *cost of debt* is also affected by heterogeneity. Ebihara et al. (2014) find that family CEOs have a trust-enhancing effect, observable based on a significantly lower cost of debt. Likewise, Yen et al. (2015) document favorable loan

conditions among founding family firms, albeit the favor tends to decrease when family members act as the CEO, which is contrary to prior results.

Heterogeneity from external corporate governance

Ownership concentration and other blockholders (HD2). The second group of heterogeneity variables frequently addressed regarding capital structure decisions includes ownership concentration or dispersion and the specific role of blockholder owners. In their seminal article, Schulze et al. (2003) find that debt among private family firms has a curvilinear (u-shaped) relationship with the dispersion of ownership among voting members of the board; this has been confirmed by Bjuggren et al. (2012). This effect is more pronounced in periods of market expansion, indicating a moderating role of industry growth, similar to the interaction of firm growth with leverage decisions (Molly et al. 2012) discussed above. Our review finds support that more concentrated ownership is associated with higher leverage (Keasey et al. 2015; King and Santor 2008) to maintain a dominant equity position. This finding is also in line with results regarding the role of blockholder owners, which may contest respective controlling ownership positions. Accordingly, blockholding is associated with lower short-term debt (Shyu and Lee 2009) and lower overall debt ratios (Schmid 2013). It also leads to more pronounced pecking-order behavior (Pindado et al. 2015). However, leverage increases in the presence of multiple controlling shareholders with comparable voting rights (Santos et al. 2014).

Considerations of heterogeneity and their effect on *equity financing* are significantly underrepresented within the sample. Regarding the general preference to use equity financing, Wu et al. (2007) find that family ownership and management have little direct effect on equity financing individually. However, the interaction of family ownership with family management is associated with a stronger unwillingness for public equity financing. In terms of equity financing, the reviewed literature particularly emphasizes family firm initial public offerings (IPOs) and especially IPO underpricing. Cirillo et al. (2015) find that family firm IPO valuations increase with higher levels of family involvement in the management, board, and staff, while intergenerational control decreases this positive effect. Generally, higher IPO underpricing is observed for family firms (Keasey et al. 2015; Leitterstorf and Rau 2014). Board size and international lead managers, as strong quality signals, significantly affect IPO underpricing, while board independence and variation in family control have less effects. Based on the number of family members involved across generations, Leitterstorf and Rau (2014) further argue that IPO underpricing is consistent across all tested configurations; thus, family firm heterogeneity may be neglected. Furthermore, post-IPO financing behavior is influenced by the nature of family involvement, such that controlling ownership of families is associated with a stronger reluctance to raise capital after the IPO. However, despite observable variation, post-IPO capital-raising behavior is consistent across all the tested groups of family firms compared with non-family firms, indicating that heterogeneity does not impair the main relationship of family firms being more leveraged and less likely to raise external capital after the IPO (Jain and Shao 2015).

Across all reviewed studies concerning family firm capital structures, especially transgenerational differences have been emphasized. As such, several competing

effects regarding family firm generations and capital structure decisions have been discussed. Other important drivers of heterogeneity include the role of family CEOs, which are associated with higher financial discretion, lower debt levels, and a trust-enhancing perception among lenders. Moreover, variation in family firm ownership structures suggest that more concentrated ownership is linked with higher leverage, following a U-shaped trajectory once ownership becomes more dispersed.

3.1.2 Retained earnings and dividends

Aside from external financing via debt or equity, the pecking-order theory states that retained earnings as internal sources of capital represent the most favorable financing option that minimizes information asymmetries (Myers and Majluf 1984). Retaining financial resources within the firm is directly at odds with the distribution of dividends among shareholders. In our literature sample, evidence suggests that family firms are more inclined to distribute dividends compared with non-family firms (Pindado et al. 2015; Setia-Atmaja et al. 2009; Yoshikawa and Rasheed 2010). We refer to Molly and Michiels (2021) for a more detailed general discussion and hereafter focus on the relative determinants of variation in dividend behavior from a heterogeneity perspective.

Heterogeneity from internal corporate governance

CEO (HD9). Among heterogeneity that originates from the internal corporate governance system, differences in the staffing of the CEO position affect dividend behavior. Vandemaele and Vancauteren (2015) find that family CEOs and founder CEOs are associated with lower dividend payouts. Although González et al. (2014) do not find any significant relationship between family CEOs and dividends, this represents no contradiction. Testing for interaction effects between family CEOs and family board dominance, Vandemaele and Vancauteren (2015) specify that family CEOs only have a significant negative effect on dividend payouts in the presence of family board majorities. This effect is especially attributed to the interplay between CEOs and boards in later generations, where firm governance may become less reliant on the family firm CEO only.

Active vs. passive family members (HD7). Aside from family CEOs, the share of family members who actively engage in the firm vis-á-vis passive family shareholders poses risks of intra-family principal-principal conflicts. The presence of passive family shareholders is, therefore, associated with a higher propensity to pay dividends (Michiels et al. 2015). This relationship is further strengthened in families that employ family governance practices, indicating that family governance practices help alleviate principal-principal agency conflicts.

Board (HD8). Regarding the effect of board composition, González et al. (2014) find that disproportionately high family representation on the board is associated with both higher levels and likelihood of dividends. By contrast, Vandemaele and Vancauteren (2015) find that dividend payout is low in the presence of family-dominated boards.

Heterogeneity from external corporate governance

Ownership structure (HD1). Huang et al. (2012) find a non-monotonic relationship between the level of controlling families' cash flow rights and dividends. At low levels of cash flow rights, the risk of losing their weak majority position induces higher dividend claims from the controlling families, while the entrenchment effect becomes more prominent at moderate levels, leading to reduced dividends. At high levels of cash flow rights, excessive firm-specific risks increase the need for diversification, implying higher dividends. Among non-family owners, foreign ownership is found to interact with family control to reduce dividend payouts, while bank ownership is positively related to dividend levels (Yoshikawa and Rasheed 2010).

Other blockholders (HD2). Other non-family blockholders capable of monitoring the controlling owners more efficiently are associated with higher dividend payments. However, this holds true only if the second blockholder is not a family shareholder (Pindado et al. 2012).

Control enhancing mechanisms (HD3). Pyramid schemes, as a control-enhancing mechanism that may favor expropriation of minority shareholders, are found to reduce dividend payout (González et al. 2014). Simultaneously, Pindado et al. (2012) find that higher dividend payments are observable for family firms where voting and cash flow rights are aligned (i.e., control-enhancing mechanisms are absent).

Heterogeneity from family-specific determinants of corporate purpose

SEW (HD17). Although the agency theory represents the dominant theoretical paradigm within dividend research in family firms, socioemotional perspectives have also informed prior research concerning dividends. Based on the socioemotional wealth importance scale (Debicki et al. 2016; Belda-Ruiz et al. 2021) find that higher SEW preservation is negatively associated with the likelihood and amount of dividends paid. Moreover, this relationship is relatively stronger when a family CEO or family members are included in the top management, in early generational stages and when the firm faces greater performance hazards.

Across all reviewed studies concerning family firm dividend policies, from a heterogeneity perspective the most frequently studied determinants evolve around board composition, the use of control enhancing mechanisms, firm ownership structure, and family firm management. Although conflicting evidence has been documented regarding several nuances of heterogeneity, one consistent finding has been that agency prescriptions suggesting potential expropriation of minority owners (e.g., in the case of control-enhancing mechanisms or passive family owners) may not necessarily materialize in the analyzed firms.

3.2 Accounting (especially financial reporting quality)

After elaborating the effects of heterogeneity in finance research, this section focuses on effects of heterogeneity for family business accounting policies, with particular attention to financial reporting quality. The high-level results of this review support

that family firms provide financial reporting of better overall quality compared with non-family firms. Family firms are associated with higher earnings quality (Ali et al. 2007; Cascino et al. 2010; Wang 2006). In addition, family firms are more transparent in their reporting (Wan-Hussin 2009), manipulate accounting information to a lesser extent (Borralho et al. 2020), and pursue less income smoothing (Prencipe et al. 2011). Furthermore, family firms are less likely to engage in earnings management (Bansal 2021) and particularly less in real earnings management, albeit to a greater extent in accrual-based earnings management (Achleitner et al. 2014). Among the drivers of heterogeneity affecting these high-level results, family firm boards and their specific role as monitors are most frequently discussed.

Heterogeneity from internal corporate governance

Board, board chair and audit committee (HD8). Several articles have addressed the role of board independence and the extent of family representation on the board of directors. On aggregate, the results support that board independence is associated with higher financial reporting quality in family firms. Accordingly, higher board independence is associated with a reduced likelihood of income smoothing (Prencipe et al. 2011) and higher accrual quality (Cascino et al. 2010). Family firms with more independent boards also engage less in earnings management (Prencipe and Bar-Yosef 2011), whereas this relationship is weaker in first-generation family firms (Bansal 2021). Other studies have not found significant evidence that board independence is associated with better financial reporting (Ho and Wong 2001; Wan-Hussin 2009). In terms of heterogeneity, one noteworthy finding lies in a relationship potentially subject to reverse causality or even simultaneity. Although Bansal (2021) documents a positive moderating effect of independent directors on the relationship between family control and earnings management, Jaggi et al. (2009) find that family control moderates the negative relationship between board independence and earnings management.

The chair of the board is found to be of particular relevance. Prencipe et al. (2011) document that income smoothing is less likely to occur in firms whose board has a chair of the controlling family. By contrast, Chau and Gray (2010) find that firms with an independent board chair are associated with higher voluntary disclosure. More importantly, the role of the chair restricts the effect of other independent non-executive directors and the influence of family ownership on disclosure as a moderator. This finding constitutes an interesting observation in terms of heterogeneity in the sense that particularly exposed corporate protagonists, such as the board chair, may affect family firm behavior to be more alike or more heterogeneous. This finding is further reinforced when considering the presence of CEO duality, which is associated with a higher likelihood of earnings manipulation (Bansal 2021), less earnings management (Prencipe and Bar-Yosef 2011), and reduced overall quality of financial information (Borralho et al. 2020).

In line with these findings, the representation of family members (i.e., non-independent board members) yields largely negative effects on financial reporting quality. Increased family board representation is associated with reduced voluntary disclosure (Boujelben and Boujelben 2020; Ho and Wong 2001) and increased conservatism (Chen et al. 2014). More importantly, family-dominated boards negatively affect firm governance. Family board presence negatively affects the monitoring

effectiveness of the board (Jaggi et al. 2009) and reduces the effectiveness of audit committees (Jaggi and Leung 2007). On the contrary, the existence of (voluntary) audit committees is generally associated with higher financial reporting quality in family firms (Ho and Wong 2001; Jaggi and Leung 2007).

In relation to board composition, the demand for external auditing is positively correlated with the proportion of non-family directors (Carey et al. 2000). In terms of audit effort and corresponding fees, family supervisory board representation is associated with lower audit fees (Schierstedt and Corten 2021), and audit effort decreases in proportion to board members attributed to the largest family owner (Hope et al. 2012). Surprisingly, this relationship is reversed (i.e., audit effort increases) in the proportion of board members affiliated with the CEO.

Family vs. non-family management (HD7) and CEO and founder (HD9). Aside from the monitoring task performed by family firm boards, differences in management constellations are studied. Family firms are found to be more conservative when managed by family members (Raithatha and Shaw 2019), especially in founder CEO firms (Chen et al. 2014). Despite greater conservatism, results indicate that family management and family CEOs are associated with higher overall financial reporting quality. Firms with CEOs from controlling families engage less in income smoothing, exhibit relatively better disclosure practices, and manipulate earnings to a lesser extent (Ali et al. 2007; Prencipe et al. 2011; Yang 2010). However, other evidence suggests the absence of significant differences across family firm CEO configurations and their effect on earnings quality (Stockmans et al. 2010; Wang 2006).

Regarding audit demand, Carey et al. (2000) find that demand for external auditing is correlated with the level of non-family management, while demand for internal auditing is not affected. Higher family involvement in management correlates with lower audit fees (Schierstedt and Corten 2021). Despite using different proxies for family involvement in management, this finding is in conflict with Hope et al. (2012), who observe that auditors increase their effort when the CEO is a member of the owning family. Khalil et al. (2011) document variations in the likelihood and consequences of auditor resignations, depending on the family firm CEO and founder positions. While auditor resignations are less likely to occur in founder or hired CEO firms, they are more likely to occur in descendant CEO firms. Following resignations, family firms managed by a non-family CEO face less negative investor reactions, while the CEO's generation (founder or descendant) does not affect this relationship.

Generation (HD11). Although the impact of the family firm generation on financial reporting quality has been addressed in several studies, the results remain ambiguous. First-generation firms are more likely to engage in earnings management, especially when confronted with bad earnings performance (Ali et al. 2007; Bansal 2021; Stockmans et al. 2010). At the same time, family firms in later generations have been associated with reduced voluntary disclosure and reduced annual report readability (Boujelben and Boujelben 2020; Drago et al. 2018).

Collective differences in family influence (HD12). One particularly notable finding regarding family firm heterogeneity can be derived from two studies employing the F-PEC scale (Astrachan et al. 2002; Klein et al. 2005) in relation to financial reporting quality. Duréndez and Madrid-Guijarro (2018) find various impacts across the F-PEC dimensions, among which the F-PEC power dimension is associated with lower quality of financial reporting. By contrast, Drago et al. (2018) show that higher levels of family power, as per the F-PEC scale, are associated with better annual report readability. Acknowledging that both studies use different proxies, there is an abstract lesson for studying heterogeneity in family firm financial reporting. The use of direct survey information provides more granular heterogeneity data (e.g., F-PEC power dimension) but does not directly result in an improved understanding of the family dynamics at play, as observable for these two diverging findings.

Heterogeneity from external corporate governance

Ownership structure (HD1) and ownership concentration (HD2). Differences in family firm ownership are widely considered in the context of the alignment and entrenchment effects. Chau and Gray (2010) find that the extent of voluntary disclosure is relatively low for low levels of family ownership, which can be attributed to the dominance of the alignment effect. The entrenchment effect becomes more pronounced at high levels of family ownership, observable through a greater extent of voluntary disclosure. This finding is in line with Yang (2010), who associates higher insider ownership in family-controlled firms with an increase in discretionary accruals, supporting the entrenchment hypothesis. Moreover, Chen et al. (2014) find that conservatism increases with increasing equity holdings within the family.

Increasing family ownership is also associated with a decrease in the likelihood of Big 4 audits, indicating that higher dispersion of ownership is linked with an increased need for high-quality audits (Niskanen et al. 2010). Higher family ownership is also associated with higher audit fees (Schierstedt and Corten 2021). These findings are at odds with Hope et al. (2012), who find that greater ownership concentration in family firms leads to easier monitoring of managers, translating into lesser efforts by external auditors. Moreover, shares held by the CEO are associated with lower audit fees and a reduction in the likelihood of obtaining a Big 4 audit. Similar to CEO ownership, the presence of strong second blockholders has a significant negative effect on audit fees (Hope et al. 2012; Niskanen et al. 2010).

Pazzaglia et al. (2013) state that earnings quality among family firms is not only affected by the level of ownership but also the process by which ownership is obtained. They show that firms acquired through market transactions display lower earnings quality compared with firms owned by the founding families due to lower identification of the family owners with the firm. Arguably, this perspective offers interesting insights because the majority of research conceptualizes family firms as organizations arising from organic transgenerational growth rather than acquisitions. Regarding further ownership heterogeneity, relatively little is known about the role of institutional shareholders. The presence of institutional owners is associated with lower accrual quality (Cascino et al. 2010) but does not affect overall corporate transparency (Wan-Hussin 2009).

Affiliation with business groups (HD4). The affiliation with business groups is also found to affect financial reporting in family firms (Raithatha and Shaw 2019). Given that family firms form the core of many business groups, they are more reluctant to provide financial information to protect their complex cross-holdings and maintain control of the group. This finding resembles the results of Ali et al. (2007), showing that family firms report higher-quality earnings but make fewer disclosures about their corporate governance practices.

Overall, with regard to financial reporting quality as a whole, it can be concluded that the most important drivers of heterogeneity evolve around the management of the family firm and its board of directors. While the chair of the board is particularly exposed, board independence or the absence of independence (i.e., family board dominance) affects financial reporting quality. This suggests that family firms benefit from family management paired with independent boards, being associated with higher financial reporting quality and reduced earnings management. With regard to auditing, it can be concluded that auditors perceive family businesses as a diverse group of firms, and audit fees as a proxy for effort vary depending on a number of firm-level characteristics related to ownership and family structures. Thus, auditors are likely to react to the agency consequences of the underlying family firm characteristics, indicating a clear need to consider family firm heterogeneity in audit research (Schierstedt and Corten 2021).

3.3 Tax (especially tax avoidance)

The reviewed articles document partially inconclusive results in terms of tax behaviors. Family firms are found to be less tax aggressive compared with non-family firms (Kuo 2022; Lee and Bose 2021; Mafrolla and D'Amico 2016; Steijvers and Niskanen 2014) and less likely to use tax-haven locations (Temouri et al. 2021). Opposing evidence suggests that family firms avoid more taxes (Gaaya et al. 2017; Kovermann and Wendt 2019), or that family and non-family firms do not differ regarding tax avoidance altogether (Brune et al. 2019b). These diverging results lend support to the perspective that family firm heterogeneity may be an important driver of variation across research results.

Heterogeneity from internal corporate governance

Family vs. non-family management (HD7) and CFO (HD10). The involvement of non-family managers is found to affect family firm tax avoidance. Brune et al. (2019b) show that an increase in the number of non-family top management team members is associated with higher tax avoidance. Specifically, family firms with non-family CFOs tend to be more tax aggressive (Bauweraerts et al. 2020). Challenging this notion of family involvement being beneficial in terms of responsible tax behavior, Mafrolla and D'Amico (2016) find that excessive family involvement is associated with higher tax avoidance compared with non-family firms, depicting a moderating non-linear effect of family involvement on tax aggressiveness.

Founder (HD9), generation (HD11), and firm age (HD22). The reviewed literature suggests a broad consensus regarding the role of the founder and the implied generational stages for family firm tax avoidance. The presence of the founder is linked to lower tax aggressiveness, whereas tax aggressiveness tends to increase across generations (Bauweraerts et al. 2020; Brune et al. 2019a; Clemente-Almendros et al. 2021; Temouri et al. 2021). One notable exception lies in the higher prevalence of tax haven usage among early-generation family firms (Temouri et al. 2021). However, founder presence, even in this context, is linked to fewer tax haven locations. Clemente-Almendros et al. (2021) further specify that first- and second-generation firms follow similar conservative approaches to tax avoidance, which become more aggressive across third- and fourth-generation firms. The most relevant observation from a heterogeneity perspective is that founders may affect the level of tax avoidance not only through direct influence (e.g., serving as CEO) but also indirectly through substantial ownership or board positions (Brune et al. 2019a). This conclusion is based on the finding that founder-led family firms avoid less taxes than descendant or hired CEO family firms. However, this difference does not persist if the founder holds substantial shares or a board seat. Conceptually, this finding shows that there may be more covert factors that are not addressed by the standard set of variables currently used to capture family firm heterogeneity, even when accounting for differences in the demographic governance profile of family firms (e.g., founder vs. descendant CEO).

Heterogeneity from external corporate governance

Ownership structure (HD1). Bauweraerts et al. (2020) find that strong family ownership positions are associated with lower tax avoidance, whereas Kovermann and Wendt (2019) show that tax avoidance increases with the percentage of family ownership. Aside from the overall percentage of ownership, they find that tax is a function of the number of shareholders, arguing that larger numbers of family shareholders are associated with higher tax avoidance, which is rooted in an increasing demand for dividends. Further results indicate that family firms with lower CEO ownership are relatively more tax-aggressive (Steijvers and Niskanen 2014). This direct effect of CEO ownership on tax aggressiveness is moderated by the presence of outside directors, while board size and CEO duality do not affect the association between CEO ownership and tax aggressiveness (Steijvers and Niskanen 2014).

Public vs. private firms (HD5). In terms of publicly listed vs. private family firms, Brune et al. (2019b) find that private family firms avoid less taxes compared with public family firms. Moreover, they show that public non-family firms engage in tax avoidance to the largest extent, indicating that stock listing and the corresponding capital market pressures have more explanatory power for tax avoidance than the family firm status itself.

Heterogeneity from family-specific determinants of corporate purpose

Family firm identity (HD19). Based on a mixed gamble approach, Eddleston and Mulki (2021) study the effect of family firm identity as measured by five items for family members' identification with the business based on Berrone et al. (2012).

They find that a strong family identity is negatively associated with tax evasion when perceived performance is high. On the contrary, family firm identity is associated with increased tax evasion when perceived performance is low, indicating that family-specific rationale may motivate tax evasion for the sake of the family when facing financial pressures.

Overall, in terms of heterogeneity in family firm tax avoidance, especially variation in management composition leads to converging observations. Management through family members is associated with lower tax avoidance. This relationship especially holds in the case of direct or indirect founder involvement and in earlier generations. Conflicting findings prevail regarding family firm tax avoidance in terms of heterogeneity among ownership variables.

4 Discussion and recommendations for future research

4.1 Preliminary results

The preliminary results are briefly summarized before elaborating how the findings contribute toward an overall model of heterogeneity applicable to FAT research among family firms. Previously, the observable effects of different dimensions of heterogeneity have been discussed (RQ2). The results indicate that the most influential drivers of heterogeneity evolve around family firm management, variations in ownership structure and board composition, and transgenerational issues. Similar sets of heterogeneity variables have been utilized within the different literature streams. However, distinct focal points can be identified for each of these streams.

Transgenerational differences have been especially emphasized across the reviewed studies concerning family firm *capital structures*. As such, several competing effects regarding family firm generations and capital structure decisions have been discussed. Other important drivers of heterogeneity include the role of family CEOs, which are associated with higher financial discretion, lower debt levels, and a trust-enhancing perception among lenders. Variations in family firm ownership structures suggest that more concentrated ownership is linked with higher leverage, following a U-shaped trajectory once the ownership becomes more dispersed. The most frequently studied determinants of family firm *dividend policies* from a heterogeneity perspective have addressed board composition, the use of control-enhancing mechanisms, firm ownership structure, and family firm management. Although conflicting evidence has been documented regarding some of these dimensions of heterogeneity, one consistent finding has been that agency prescriptions suggesting the potential expropriation of minority owners (e.g., in the case of control-enhancing mechanisms or other passive family owners) may not necessarily materialize in the analyzed firms.

With regard to *financial reporting quality* in family firms, it can be concluded that the most important drivers of heterogeneity evolve around the management of the family firm and its board of directors. While the chair of the board is particularly exposed, especially board independence or the absence of independence (i.e., family board dominance) affect the financial reporting quality. This suggests that family

firms benefit from family management paired with independent boards, which is associated with higher financial reporting quality and reduced earnings management. With regard to auditing, it can be concluded that auditors perceive family businesses as a diverse group of firms, and audit fees as a proxy for effort vary depending on a number of firm-level characteristics related to ownership and family structures. Therefore, auditors are likely to react to the agency consequences of the underlying family firm characteristics, indicating a clear need to consider family firm heterogeneity in audit research. In terms of heterogeneity regarding family firm *tax avoidance*, especially variation in management composition leads to converging observations. The involvement of family managers is associated with reduced tax avoidance. This finding especially holds in the case of direct or indirect founder involvement and in earlier generations. In terms of heterogeneity among ownership variables, conflicting findings prevail regarding family firm tax avoidance.

Overall, it can be concluded that heterogeneity significantly affects research outcomes. This re-affirms existing calls to address heterogeneity within family firm research (Brune et al. 2021; Chua et al. 2012; Michiels and Molly 2017). However, going beyond prior analyses, the review systematically documents in which ways drivers of variation among family firms have been studied, indicating both the scope of dissimilarities and their consequences. The abundance of heterogeneity-related findings suggests that it is an important factor for family business researchers within the fields of FAT. This holds true across all reviewed domains, including the role of family firm heterogeneity for capital structure decisions (Comino-Jurado et al. 2021b; González et al. 2013; Jain and Shao 2015; Molly et al. 2012), family firm dividend policies (González et al. 2014; Michiels et al. 2015; Vandemaele and Vancauteren 2015), financial reporting quality (Borralho et al. 2020; Chen et al. 2021; Drago et al. 2018; Wan-Hussin 2009), and tax (Bauweraerts et al. 2020; Brune et al. 2019a; Clemente-Almendros et al. 2021).

Beyond the fact that the heterogeneity of family firms matters, the analysis results provide a basis to reflect on the prevailing understanding of heterogeneity. One finding is that heterogeneity per se collectively addresses a large variety of effects and should be regarded as multi-dimensional. As a consequence, the impact of heterogeneity is not directly reconcilable in a particular way but represents various groups of effects. It has further become evident that the term 'heterogeneity' is partially being used interchangeably for various underlying phenomena, causing certain challenges. For instance, researchers may address very different underlying variables but still generalize findings toward a broader heterogeneity umbrella term. A very concrete example of this observation can be derived from Cirillo et al. (2015) in comparison to Leitterstorf and Rau (2014), whose studies both address family firm IPOs. Based on a narrow definition of heterogeneity (multiple family members involved across generations), Leitterstorf and Rau (2014) find that heterogeneity does not matter for family firm IPO underpricing. Based on a more nuanced representation of heterogeneity (involvement of family members in the board, top management team, or on employee level and respective generation), Cirillo et al. (2015) point out various relevant heterogeneity effects, such as family involvement's value-enhancing role for IPOs or the diminishing value in case of transgenerational control.

Despite these challenges, considerations of heterogeneity have been found to contextualize or resolve inconsistent findings and, thus, reduce ambiguity. For instance, the relationship between family firm status and firm leverage has been frequently investigated, and different results prevail (Burgstaller and Wagner 2015). As one dimension of heterogeneity, this review has discussed the multifaceted impact of generational forces that affect the financing choices in family firms (Bjuggren et al. 2012; Blanco-Mazagatos et al. 2007; Burgstaller and Wagner 2015; Comino-Jurado et al. 2021b; González et al. 2013; Hansen and Block 2021; Molly et al. 2012).

Although heterogeneity helps describe family firm behavior in a more granular way, it does not resolve inconsistencies and ambiguity across research findings by default. Conflicting results also prevail at the heterogeneity level of analysis. This review has shown that several drivers of heterogeneity may affect FAT outcomes in a distinct, non-trivial fashion. Sticking to the previous example of how family firm generations affect indebtedness, several researchers have found significant direct effects of family firm generation toward debt. Meanwhile, Molly et al. (2012) document only an indirect effect in the interaction with firm growth.

Therefore, it must be noted that an increased emphasis towards heterogeneity also leads to a complex and multi-faceted grid of dissimilarities among family firms. On the one hand, the findings show that incorporating aspects of family firm heterogeneity in study designs is certainly needed and can explain ambiguous findings at the family vs. non-family firm level. On the other hand, differentiating family firms along several dimensions results in various hierarchically nested categories of family. This becomes clear in the results of Pazzaglia et al. (2013), who investigate the relative advantages of family- vs. non-family CEOs in terms of financial reporting quality, contingent on how ownership of a company has been obtained (acquired vs. non-acquired). This single example creates a grid of 8 (2^3) distinct categories based on family firm status, CEO identity, and the process of obtaining ownership.

The multi-layered fashion of how heterogeneity is being addressed in extant research leads to substantial challenges in comparing its outcomes. This is especially true given that categories of heterogeneity are seldomly constructed in a consistent fashion across research designs. Therefore, advancing heterogeneity research must also be understood as an effort to 'separate signal from noise'. Future research is required to navigate the trade-off between the robustness of findings and sufficient consideration of heterogeneity effects. This analysis has taken an initial step toward this objective by providing an overview of all dimensions along which family firms are observed to differ in FAT research (see Sect. 2.3) and how these differences affect their FAT policies (see Sect. 3). Given these identified challenges, in the section below we propose a model to incorporate heterogeneity in FAT research.

4.2 (Re)conceptualizing family business heterogeneity: family firm specific and agnostic sources of variation

Researchers increasingly emphasize the need for review-centric works to go beyond a mere review perspective by making a distinct contribution to theory (Hoon and Baluch 2020; Post et al. 2020). Thereby, attention is being drawn from reproducing

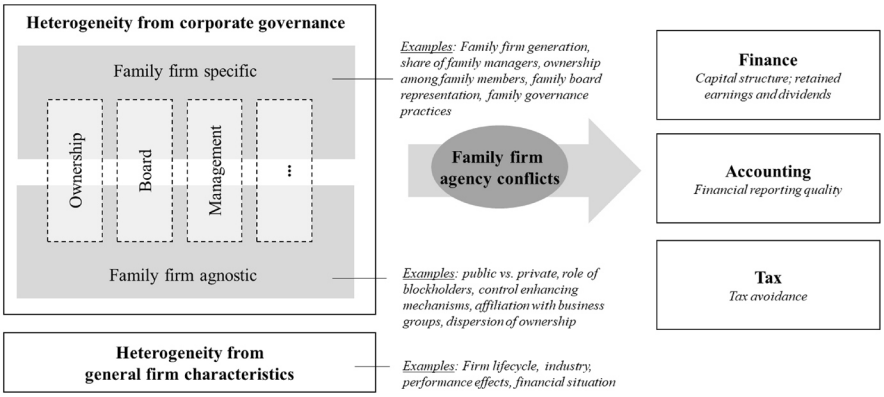

Fig. 2 Model: Family business heterogeneity and finance, accounting and tax policies

prior findings to deriving novel insights based on the reviewed body of literature. While these can take different forms, for the scope of our review especially the consolidative vs. disruptive elaboration of empirical evidence (Hoon and Baluch 2020) and contributing to an improved construct clarity (Post et al. 2020) have been relevant aspects throughout the analysis, informing the model introduced below.

The general notion underlying our review has been that heterogeneity alters family firm specific agency conflicts. Focusing specifically on heterogeneity among firm-level corporate governance variables, this has been associated with distinct FAT policies. Within the theoretical framework, a differentiation between family firm specific heterogeneity and family firm agnostic heterogeneity has been anticipated.

The review results strongly confirm this perspective. We therefore propose a model that considers family firm heterogeneity as the sum of family firm specific and family firm agnostic differences in corporate governance, complemented by heterogeneity among other general firm characteristics. The subsequent effects of heterogeneity, i.e., differences in FAT policies, should primarily be regarded as a function of these governance variations and their respective agency implications (see Fig. 2). Within the review, it has become evident that a corporate governance perspective towards family business heterogeneity is dominant within the literature on FAT. Other perspectives that focus for instance on differences among family firm goals or resources (Chua et al. 2012; Heider et al. 2022; Michiels and Molly 2017), which are more common in other literature streams such as entrepreneurship, have proven less prevalent and applicable to the FAT domains.

In line with the model presented in Fig. 2, in a first step heterogeneity from corporate governance is conceptually divided into differences specific to or agnostic of family firms. In a second step, it has been observed that clusters of heterogeneity variables (e.g., heterogeneity among ownership variables) can permeate or overlap both categories at once (i.e., specific and agnostic). In other words, referring the example of ownership heterogeneity, heterogeneity can be thought of as taking place along a continuum from family firm specific to family firm agnostic.

Establishing this additional layer and thereby, refining the prevailing heterogeneity umbrella term, catalyzes several important conceptual advancements that are needed to enhance research on family firm heterogeneity. First, it has become apparent that categories of heterogeneity initially thought to refine relationships at the family firm level may actually be associated with stronger effects than the family firm status itself. Therefore, isolating sources of heterogeneity not specific to family firms would allow these effects to rise above the family firm level. For instance, Brune et al. (2019b) show that the stock listing of family firms has more relative explanatory power for tax avoidance than the family firm status itself. This shows that categories of heterogeneity (private vs. public family firms) should not only be addressed at the level of family firms. Second, rather than simply 'slicing the cake' in a different way, separating family firm specific and agnostic differences allows family business scholars to reconcile the heterogeneity debate with the wider corporate governance literature. Many of the heterogeneity variables being studied in FAT research have turned out to be governance variables that are widely studied also outside the field of family businesses, albeit with a different connotation.

While on the one hand this facilitates better integration of both literature streams, we also believe that looking at heterogeneity through the lens of family firm specific or agnostic differences brings researchers closer to the *essence of family business heterogeneity*. In fact, we suggest that the core of family firm heterogeneity as an overall concept relates exclusively to family firm specific differences. Therefore, to get closer to this presumed core of family business heterogeneity, we deem it necessary to further narrow down the current broad understanding of heterogeneity. As a reflection of our findings, we propose a revision (amendment) of the definition of family business heterogeneity provided of Daspit et al. (2021) who establish heterogeneity as 'the range of categorical and/or variational difference(s) between or among family firms at a given time or across time'. While this definition has proven useful throughout the analysis, we consider it as too inclusive, leading to a unclear understanding of the concept that may cover virtually any variation among family firms. We therefore suggest to re-focus the definition to reflect only strictly family firm specific heterogeneity, thereby excluding other differences that exceed the family firm level per se.

In order to further demonstrate the merit of these conceptual thoughts accompanying our model, the application of this notion for the case of heterogeneity among ownership variables is elaborated below. According to the review, heterogeneity among ownership variables can take many different forms and has been operationalized in several different ways in empirical research. Disentangling these differences by separating strictly family specific variation from variation agnostic of the family firm allows scholars to appreciate more clearly the actual underlying drivers of family business heterogeneity. Among items that are directly *specific to the family firm*, examples include the cumulative/individual ownership of family members (Chau and Gray 2010; Chua et al. 2011; Mafrolla and D'Amico 2016; Schierstedt and Corten 2021), the specific family members who are involved as owners (Brune et al. 2019a; Shyu and Lee 2009; Yang 2010) or inactive family owners (Chen et al. 2014; Schmid 2013). At the intersection towards family firm agnostic items, the existence of other non-family shareholders and their respective stake (Di Giuli et al. 2011) or the existence of other family blockholders besides the controlling family (Pindado et al. 2012) have been identified. Finally, as ownership

heterogeneity *agnostic of the family firm*, the review has documented effects that originate from the general dispersion of ownership (Hope et al. 2012), the general existence of other blockholders (Pindado et al. 2015), the involvement of other shareholder types such as institutional or bank owners (Hearn 2011; Yen et al. 2015) or the process by which ownership has been obtained (Pazzaglia et al. 2013). While these indeed affect FAT policies, they are in principle not specific to the family business context and should thus not be incorporated in a more stringent definition of family business heterogeneity.

Even for this short example, it is obvious that heterogeneity among family firms represents the sum of a large variety of differences. We believe that thinking of heterogeneity along the introduced continuum from family firm specific to agnostic differences enables researchers to reflect critically on the true origin of heterogeneity. As a whole, this helps to expose those specific relationships that make family firms distinct from other types of organizations, yet unique among the group of their family firm peers.

Finally, some additional aspects need to be considered when applying our model toward the understanding of heterogeneity in FAT. While the idea of dissimilarity is at the very core of the heterogeneity literature in general, researchers may counterintuitively find persistent roots in the assumption of uniformity among family firms. In other words, while heterogeneity research directly emphasizes differences between family firms, many of the reviewed studies tend to implicitly assume that incorporating an additional layer of heterogeneity will inevitably result in a coherent grid of merely minor deviations among family firms, while still largely considering them as a joint group that is otherwise very much similar. Based on our review results, this implicit expectation may not materialize, and researchers should not fall victim to this belief in order for heterogeneity research to live up to its potential in advancing the understanding of family firms.

Furthermore, we have identified corporate governance variations as pivotal for family business heterogeneity, this review has also documented that heterogeneity extends beyond the overt demographic governance profile of the firm. It is a common practice in the literature to consider key heterogeneity variables, such as firm generation, family or non-family management, and the involvement of the founder as CEO. Brune et al. (2019a) show that the founder exerts an influence on tax behavior also indirectly through substantial ownership or a board position, even when not directly involved as the CEO. Currently, founder-related heterogeneity is largely operationalized as a dummy variable based on the founder also being the CEO (Achleitner et al. 2014; Chen et al. 2014; Ma et al. 2017). This shows that heterogeneity considerations in the literature may not yet capture the full extent of heterogeneity effects. Therefore, it is strongly encouraged to look beyond the overt demographic governance profile of the firm when addressing heterogeneity in practical research. Our review also shows that heterogeneity is predominantly studied based on the components of involvement perspective of family firms. The components of involvement approach captures the overall presence of the family in the firm but does not necessarily consider its distinct behaviors which lead to family-firm-specific organizational dynamics (Zellweger et al. 2010). For the reviewed sample, this result may be due to the fact that the components of involvement concept exhibits significant overlaps with firm-level governance variables, which are well-established in FAT research. Although this finding is intuitive in the sense that the components of involvement variables can be measured more efficiently, it leads to heterogeneity

being considered mostly as a stationary, demographic phenomenon and does not consider family firm behaviors from an essence perspective.

4.3 Recommendations for further research

Based on our review, several promising avenues for further research can be identified that concentrate on heterogeneity from corporate governance as the focal point of the review. Additionally, further conceptual recommendations are being derived which can advance the understanding of family firm heterogeneity in FAT research in the future. These are presented in Table 5 and will be elaborated further below.

RQ1. This review has shown that substantial heterogeneity originates from the *protagonists of the corporate governance systems*, especially the founder (Brune et al. 2019a; Chen et al. 2014; Temouri et al. 2021), the CEO (Amore et al. 2011; Borralho et al. 2020; Pazzaglia et al. 2013), and the board chair (Bansal 2021; Chau and Gray 2010; Prencipe et al. 2011). As such, e.g., the founder has been found to exert strong influence also through non-executive positions. Similarly, the board chair has been found to directly affect voluntary disclosure while restricting the role of other governance mechanisms, such as non-executive directors. Overall, the findings indicate that these roles are of particular relevance in understanding family firm heterogeneity because they may frequently dominate other effects, which warrants further inquiry, e.g., focusing specifically on sources of heterogeneity at the individual-level.

RQ2. The *family firm generation* stands out among the dimensions of heterogeneity most frequently addressed. In particular, the effect towards debt capital has been discussed extensively. However, despite the relevance attributed to this topic, the actual impact of the generational effect on family firm capital structures remains partially inconclusive (Hansen and Block 2021). This is especially true considering that several significant direct generational effects have been found (Blanco-Mazagatos et al. 2007; Comino-Jurado et al. 2021b; González et al. 2013), while Molly et al. (2012) reject a direct relationship between generation and capital structure, indicating that the effect is contingent on firm growth. Aside from the level of debt, generational effects have been found to influence the speed of adjustments of the debt ratio and its sensitivity toward adjustments in the cash flow (Pindado et al. 2015; Sardo et al. 2022). The general notion of inertia in earlier generations, or conservative behavior more generally, is also observable in accounting and tax policies. Early-generation family firms have been found to be less tax-aggressive as well as more conservative in their financial reporting, amongst others. Collectively, this may suggest inertia (conservatism) in early-generation family firms' FAT policies, which constitutes a promising avenue for further research. Future studies in this area may benefit from the timely reflections on the central role of generations for family firm research provided by Magrelli et al. (2022).

RQ3. One significant gap in the literature sample is the absence of analyses of the differential effects of *private vs. publicly listed* family firms. There are frequent analyses of samples of either private or public firms (Hansen and Block 2021; Kovermann and Wendt 2019; Steijvers and Niskanen 2014), as well as several studies that address the process of going public (Cirillo et al. 2015; Hearn 2011; Leitterstorf and Rau 2014) or family firm behavior subsequent to going public (Jain and Shao

Table 5 Recommendations for future research

Heterogeneity from corporate governance	
RQ1	In which way do corporate protagonists (e.g., founder, CEO, board chair) determine specifically whether family firms behave more alike or more heterogeneously?
RQ2	Do early-generation family firms systematically exhibit conservatism (or inertia) in their FAT policies?
RQ3	In which ways do private and public family firms differ, and how does this affect their FAT policies?
RQ4	How does the interaction of family ownership with other ownership variables (especially institutional and state ownership) affect their FAT policies? How does ownership via a (family) foundation affect FAT policies?
RQ5	Which dimensions of heterogeneity may supersede the family firm level? How can differentiating family-firm-specific and family-firm-agnostic sources of heterogeneity help disentangle these effects?
RQ6	Can significant differences be observed between the effects of 'classical' governance research findings among non-family firms and the respective family firm specific connotation of the same variables?
RQ7	How do performance effects interact with heterogeneity variables to cause family firms to be more alike or heterogeneous? Do performance effects supersede other heterogeneity effects (e.g., originating from governance variations) with regard to their explanatory power?
Additional conceptual aspects	
RQ8	How can heterogeneity be captured as a more global phenomenon by employing either larger or more diverse datasets that blend heterogeneous groups of family firms to a greater extent?
RQ9	How does heterogeneity materialize in family firms over time? Which new insights can be generated from looking at heterogeneity as a phenomenon changing over time?
RQ10	How can additional dimensions of heterogeneity be adequately incorporated, going beyond the prevailing components of involvement perspective?

2015). However, comparative evidence between private and public family firms is significantly lacking which is particularly striking given that the differences between private and public firms are substantial.

RQ4. In terms of *heterogeneity among ownership variables*, this review has shown that the strong focus on family owners is associated with infrequent considerations of the other shareholder constellations. In particular, the interaction of family ownership with other ownership variables, such as institutional ownership or state ownership, has not been widely explored. Acknowledging that the group of institutional owners includes very different investor types itself, only two studies within the sample have analyzed interactions between family ownership and other ownership variables, such as institutional ownership (Cascino et al. 2010) or bank and foreign ownership (Yoshikawa and Rasheed 2010). Secondly, regarding ownership configurations, the role of (family) foundations has not been addressed previously in terms of their effect on FAT policies. Foundations have significantly affected family firm decisions in other areas of research (Fehre and Weber 2019) and have a direct impact on the corporate structure as well as the management of financial resources within the business and beyond.

RQ5. Methodologically, the concept of heterogeneity implies a group of subjects, i.e., family firms, which are regarded as similar in the first place. Heterogeneity subsequently refers to variation within this set of similar subjects. However, this analysis has shown that some categories thought to describe or refine relationships at the family firm level may extend beyond it. For instance, Brune et al. (2019b) find that stock-listed family and non-family firms behave more alike in terms of tax avoidance, indicating that capital market pressure outweighs the family firm status. Therefore, from a heterogeneity point of view, it appears necessary to test which dimensions of heterogeneity supersede the family firm level. To achieve this objective, reconceptualizing heterogeneity as both family firm specific and family firm agnostic (see Sect. 4.2) constitutes a necessary intermediate step.

RQ6. The review has documented that family business heterogeneity is largely overlapping with variables from the classical corporate governance literature. At the same time, many relationships studied in family business heterogeneity research can be understood as a slight variation of the classical corporate governance variables. This raises the question to what extent prior research findings are transferrable across both fields. In other words, to what extent does, e.g., the family firm connotation of board independence (i.e., family board representation) coincide with the general findings regarding board independence in the wider governance literature? Or how do gender effects, including board gender diversity, CEO gender or similar characteristics compare to the respective findings outside the family firm research field, taking into account that these matters have different ramifications when the pool of family talent to draw from is much smaller.

RQ7. Heterogeneity from corporate governance has been frequently found to interact with performance and growth variables (Eddleston and Mulki 2021; Molly et al. 2012; Schulze et al. 2003; Stockmans et al. 2010), having direct consequences for the understanding of heterogeneity and its impact on FAT policies. Overall, this raises the question whether these indicators of performance may serve as more reliable predictors of heterogeneous behavior of family firms than differences in firm governance itself. In other words, considering the performance of family firms (e.g., high vs. low performance, specific crisis events etc.) not only as a consequence of doing business but also as a determinant of firm behavior in subsequent periods may allow for additional perspectives in explaining heterogeneity. At least though, the results indicate that growth and performance need to be controlled for in any analysis of heterogeneity effects.

RQ8. In terms of heterogeneity, study designs tend to gravitate toward two extremes: large publicly listed firms combined with archival sources or smaller private firms combined with survey-based research designs. The latter are predominantly addressed based on regional samples with strong local frames of reference, most frequently within single-country designs. While this is in line with the findings of prior studies (Michiels and Molly 2017), it has particular implications for capturing heterogeneity. It implies that certain pairs of attributes or categories of heterogeneity may not be sufficiently studied together (e.g., see the prior example showing that public vs. private firms are seldomly studied in combination). However, there is significant unexploited potential in overcoming this bias regarding sample composition, thereby addressing heterogeneity as a more global phenomenon.

RQ9. According to the heterogeneity definition of Daspit et al. (2021), *variation across time* is an important constituent of family firm heterogeneity. However, this

perspective of heterogeneity over time is not well explored within the reviewed literature. Rare examples include specific formative corporate events, such as IPOs (Jain and Shao 2015) or succession (Amore et al. 2011; Molly et al. 2010). While family firm IPOs are researched relatively well, the longitudinal effects before, at and after IPO have not been sufficiently explored. Therefore, existing studies that currently focus on the process and short-term effects of going public could extend their focus to utilize the optimal experimental setting of the IPO, directly comparing its behavior before and after IPO without the need to apply matching techniques between private and public firms. Generally, the various ways by which event studies may capture the heterogeneity of family firms over time are largely unexploited. For instance, events that induce changes in several governance variables, such as board composition or ownership structure (e.g., the entrance of new shareholders or shifts in the distribution of shares), allow for novel insights.

RQ10. A vast majority of research dedicated to heterogeneity in FAT studies originates from differences in family firm governance. As shown in this study, these governance variables mostly fall under the realm of the *components of involvement* perspective toward family firms. Therefore, further research on heterogeneity should extend this focus, for instance, by addressing family-specific behaviors more in-depth. This notion is further supported by the fact that research increasingly recognizes family firm heterogeneity as a phenomenon beyond the firm and family level, extending toward individuals (Fang et al. 2019). Methodologically, going beyond the components of involvement perspective also implies the use of a more diverse set of research methods to better understand family firm heterogeneity. For instance, no qualitative methods have been represented in the literature sample. Similarly, focusing to a larger extent on the behavior of family firms also requires exploiting data beyond archival sources. Specifically, survey-based research is encouraged to investigate nuances of heterogeneity.

Given the recommendations for further research introduced above, it should be noted that these are associated with several distinct challenges. Family firm research is widely plagued by problems of data availability (Michiels and Molly 2017; Neubaum 2018). When analyzing effects of family firm heterogeneity, these challenges are further aggravated because of more granular data requirements. Hence, heterogeneity research is inherently linked to challenges of feasibility. Therefore, researchers need to navigate the trade-off between the fundamental availability of data, the cost of collecting the data and the benefits of increased explanatory power by developing superior models that incorporate heterogeneity. Regarding this trade-off, two conclusions can be drawn. First, our results show that the added value of including heterogeneity in research designs is substantial. Second, considering the practical limitations regarding availability and cost of obtaining data, researchers need to establish priorities among heterogeneity variables of interest, as well as optimize the cost–benefit ratio of incorporating these variables in their studies. For both of the latter issues, i.e., prioritizing variables and optimizing research efficiency, the review provides useful guidelines. On the one hand, the research recommendations serve as indicators for promising avenues for future heterogeneity research, helping researchers prioritize. On the other hand, the review may serve as an inventory for heterogeneity-related findings but also more generally, practical approaches towards heterogeneity, which can inform future research and therefore, increase efficiency.

4.4 Limitations

Our study is subject to a number of limitations. First, the review has been designed to reflect on the prevailing understanding of heterogeneity, including its main drivers and operationalizations in empirical research. In this regard, the sample selection actively considers heterogeneity in the query search terms and in further retention criteria (heterogeneity-relevant dataset). As a consequence, the review is not able to answer questions about the general prevalence of heterogeneity considerations across the population of all articles regarding family firm FAT research. Given that this review is explicitly designed to discuss heterogeneity among family firms, it is likely that the articles that support the perspective of family firms being a heterogeneous group stand out. However, this risk is not rooted in the study design itself because the sample selection does not exclude heterogeneity-related non-findings. Rather, it must be considered that publication bias (Rothstein et al. 2005) may imply that heterogeneity-related non-findings are less probable to be reported. Methodologically, the systematic review approach is further related to limitations such as selection bias or the inadequate processing of statistical information (Owens 2021; Yuan and Hunt 2009). Considering the predominance of quantitative empirical studies within the reviewed literature, meta-analytic methods can further support the understanding of family firm heterogeneity beyond the scope of this review (Hansen and Block 2021; Hulland and Houston 2020).

As another limitation, a significant share of the reviewed analyses represents single-country studies with regional samples. As such, cross-country effects are frequently not addressed. Therefore, these factors can only be assessed to a limited extent, leading to a distinct focus on sources of heterogeneity originating from family firms' corporate governance systems. Finally, the dominance of the agency theory in the literature sample must be reflected critically. Based on the wide prevalence of agency theoretical arguments among the primary studies, our review also strongly relies on agency theoretical considerations. However, it is now widely accepted that agency theory as an economic theory alone is not able to entirely capture and explain family firm dynamics (Le Breton-Miller et al. 2011). Rather, a pluralistic approach towards theory is necessary (Prencipe et al. 2014; Velte and Weber 2021). Aside from the significant uptake of theories based on behavioral arguments such as the behavioral agency model and the SEW theory (Gomez-Mejia et al. 2011; Wiseman and Gomez-Mejia 1998), more recently scholars have suggested integrating family science perspectives into management research (Jaskiewicz et al. 2017; Michiels et al. 2022). However, these family science perspectives are not reflected in the reviewed primary studies to date.

5 Conclusion

Family firm policies in the area of FAT are closely interconnected (Brune et al. 2021). These can be regarded as of particular relevance in family firms due to their unique composition of providers of capital, managers and ultimately, beneficiaries of these corporate policies within and beyond the owning families. Prior research

has shown that family firms exhibit several differences in their FAT policies, pointing toward the heterogeneity of family firms to explain such variation (Bauweraerts et al. 2020; Michiels and Molly 2017; Molly and Michiels 2021).

Theoretically, heterogeneity has been discussed as altering the distinct family business agency conflicts, subsequently materializing as changes in the firms' FAT policies. The analysis of the empirical heterogeneity literature lends support to this perspective, indicating that variations in family firm agency conflicts can explain dissimilarities in family firm FAT policies and thus, family firm heterogeneity (Ali et al. 2007; Chen et al. 2021; Yoshikawa and Rasheed 2010).

To identify relevant drivers of heterogeneity, a systematic review of 91 peer-reviewed articles has been conducted. In total, 24 dimensions of family firm heterogeneity have been identified, predominantly associated with the firms' corporate governance and, to a lesser extent, wider firm characteristics. The corresponding heterogeneity effects across these dimensions have subsequently been discussed in depth. The results clearly support the perspective of family firms being a heterogeneous group, as hypothesized in prior research. On a high level, the results indicate that the most influential drivers of heterogeneity evolve around family firm management, variations in ownership structure and board composition as well as transgenerational issues.

Among the most prominent findings, transgenerational differences and their effect on family firm capital structures have been discussed. Several competing effects regarding family firm generations and capital structure decisions have been elaborated (González et al. 2013; Hansen and Block 2021; Molly et al. 2012). Aside from generational differences, especially the role of family CEOs has been found to affect family firm financing, observable through higher financial discretion, lower debt levels, and a trust-enhancing perception among lenders (Burgstaller and Wagner 2015; Jain and Shao 2015; Schmid 2013). Regarding family firm dividend policies, our review has shown that agency prescriptions suggesting the potential expropriation of minority owners (e.g., in the case of control-enhancing mechanisms or other passive family owners) do not necessarily materialize in the analyzed firms. In terms of financial reporting quality, especially heterogeneity regarding management and board composition is associated with converging outcomes. Our results suggest that family firms benefit from family management paired with independent boards, which is associated with higher financial reporting quality and reduced earnings management (Ali et al. 2007; Bansal 2021; Cascino et al. 2010; Prencipe et al. 2011). Finally, tax avoidance behavior has been particularly associated with heterogeneity in management composition. The involvement of family managers is associated with reduced tax avoidance, especially if the founder is involved directly or indirectly (Bauweraerts et al. 2020; Brune et al. 2019a, b; Temouri et al. 2021).

Consequently, heterogeneity has been found to capture different groups of effects. Although differentiating family firms along several dimensions of heterogeneity has resolved conflicting results at the level of family vs. non-family firms, inconsistencies also prevail at the heterogeneity level. From a practical perspective, it has been discussed how heterogeneity considerations establish multiple hierarchically nested categories of family firms, reducing the robustness and comparability of research results across studies.

Therefore, among other recommendations, the analysis results suggest distinguishing conceptually between heterogeneity that is family firm specific or family firm agnostic. This is expected to catalyze several conceptual advancements regarding the understanding of family business heterogeneity. Namely, it increases focus and consolidates heterogeneity as a meaningful concept with a more defined scope. Furthermore, it allows for more consistent research designs in which drivers of variation that are not specific to family firms rise above the family firm level. Following this thinking, we propose a more focused approach to family business heterogeneity. This will help develop a clearer picture of family firm heterogeneity as a complex phenomenon while increasing the permeability toward non-family-firm-related research, especially from the realm of corporate governance research.

Overall, this review contributes to the ongoing scholarly debate regarding family firm heterogeneity. In particular, the analysis integrates findings from separate literature streams dispersed across finance and accounting journals and outlets dedicated to family firm research. Therefore, providing a comprehensive overview of the ways in which family firms are found to differ offers valuable insights for researchers at the intersection of these domains. Aside from adding to the ongoing academic discourse, the documented heterogeneity of family firms has direct implications for practitioners alike. The heterogeneous behaviors of family firms, observable in their financing practices, the quality of their financial reporting, and their tax behaviors, provide a basis for family firm (financial) managers to reflect on the environments they are exposed to. More importantly, external stakeholders, including providers of capital, auditors, recipients of the firms' financial reporting, and tax authorities, are encouraged to consider family firms, not as one uniform aggregate of organizations, but appreciate the specific peculiarities of these firms as documented in this review.

Appendices

Appendix A: List of abbreviations (sorted alphabetically)

Abbreviation	Definition
AP (I-IV)	Agency problem (I-IV)
ETR	Effective Tax Rate
FAT	Finance, Accounting and Tax
IPO	Initial Public Offering
PE	Private Equity
RBV	Resource-Based View
SEW	Socioemotional Wealth
SMEs	Small and Medium-Sized Enterprises

Appendix B: Search terms and sample selection process

(*Finance entity* OR *Accounting entity* OR *Tax entity*) AND *Family firm entity* AND *Heterogeneity entity.*

Finance entity

((financ*) OR (debt) OR (equity) OR (stock) OR (capital) OR (leverag*) OR (IPO) OR (bank*) OR (investor*) OR (dividend*) OR (borrow*) OR (lend*) OR (loan*) OR (credit) OR (collateral)

Accounting entity

(accounting OR accrual* OR audit* OR disclosure OR earnings OR "financial reporting" OR reporting OR "management control")

Tax entity

(tax* OR "tax avoidance" OR "tax aggressiveness" OR "tax evasion")

Family firm entity

(("family firm*") OR ("family business*") OR ("family enterprise*") OR ("family influenc*") OR ("family control*") OR ("family owner*") OR ("family manag*") OR (family govern*) OR ("founding family"))

Heterogeneity entity

heterogen*

The keywords used to describe the heterogeneity entity have been limited to the term heterogen* in order to cover 'heterogeneity' as well as 'heterogeneous'. Other synonyms such as 'differen*', 'variation' or 'divers*' have been found to inflate the search results substantially without adding value and have thus been omitted. This observation can be attributed to the fact that the term heterogeneity is well-established as the dominant terminology in the family business research space.

Appendix C: Overview of literature sample

Overview of short code definitions for dimensions of heterogeneity

HD1 Ownership structure; HD2 Ownership concentration (dispersion) and other blockholders; HD3 Control enhancing mechanisms and excess control rights; HD4 Affiliation with business groups; HD5 Public vs. private; HD6 Corporate opacity; HD7 Family vs. non-family management; HD8 Board; HD9 CEO and founder; HD10 CFO, financial managers and accountants; HD11 Generation and succession; HD12 Collective differences in family involvement, control and influence; HD13 Family governance practices (FGP); HD14 Network ties, relational strength and political connections; HD15 Auditors, advisors and consultants; HD16 Family goals and preferences; HD17 Socio-emotional wealth (SEW); HD18 Family firm culture, values and ethics; HD19 Family firm identity; HD20 Size; HD21 Industry; HD22

Age and firm lifecycle; HD23 Current and historic financial situation; HD24 Firm- and industry-level performance environment

Year	Author(s)	Journal	Regime Time frame Sample size Model	Theoretical fundament	Heterogeneity dimensions (HD)	Dependent variable	Effect of heterogeneity variables towards dependent variable (+/−/o)[a]
Panel A: Capital structure, debt and equity (n = 40)							
2011	Amore et al.	Journal of Corporate Finance	Italy 2000–2009 2484 firms; 186 succession events Difference-in-difference	Agency theory	HD8: Family dominated board HD9: Family/non-family CEO HD22: Firm age HD23: Cash and spare borrowing capacities	Debt (level, maturity structure)	HD8: + HD9: + HD22: + HD23: +
2021	Baixauli-Soler et al.	Journal of Business Research	Spain 2016 420 firms OLS	SEW	HD9: Family/non-family CEO, CEO gender HD11: Generation HD17: SEW importance (SEWi)	Debt level	HD9: +/+ HD11: + HD17: –
2012	Bjuggren et al.	Journal of Small Business and Entrepreneurship	Sweden 2008 177 firms OLS	Agency theory	HD2: Ownership dispersion HD22: Firm age	Debt level	HD2: + (non-linear) HD22: –
2007	Blanco-Mazagatos et al.	Family Business Review	Spain 2000 654 firms Binomial logit regression	RBV Agency theory	HD11: Generation	Debt level	HD11: +
2015	Burgstaller and Wagner	Journal of Risk Finance	Austria 2005–2010 470 firms Dynamic panel data model	Agency theory Pecking order theory	HD9: Founder/descendant CEO HD11: Generation	Capital structure (leverage, speed of adjustment to target debt ratio)	HD9: + HD11: o
2012	Chan et al.	Economics Letters	China 2005–2007 1347 firms OLS; fixed effects; IV	None	HD14: Politically connected CEO or board chair	Financing constraints (access to capital)	HD14: –

Year	Author(s)	Journal	Regime Time frame Sample size Model	Theoretical fundament	Heterogeneity dimensions (HD)	Dependent variable	Effect of heterogeneity variables towards dependent variable (+/−/o)[a]
2011	Chua et al.	Journal of Business Venturing	USA 2002 1267 firms OLS; Logit; Heckman-two-stage procedure	Agency theory Social capital	HD1: Family ownership HD7: Family management HD8: Family board members HD11: Transgenerational succession intention	New venture debt financing (relationship with lenders, guarantees, amount of debt financing)	HD1: +/o HD7: o HD8: + HD7*HD8: +/o HD11: +/o
2015	Cirillo et al.	Management Decision	Italy 2000–2011 113 firms and IPOs OLS	Stewardship theory	HD11: Generation HD12: Collective differences in family involvement	IPO value (premium over book value)	HD11: o HD12: + HD11*HD12: –
2021a	Comino-Jurado et al.	Journal of Business Research	Spain 2015–2017 81574 PLS-SEM	SEW	HD8: Family members in board HD11: Generation	Debt level (debt-to-total asset ratio)	HD8: + HD11: –
2021b	Comino-Jurado et al.	Management Decision	Spain, 2015–2017 9266 firms PLS-SEM	Agency theory SEW	HD8: Family members in board HD12: Collective differences in family involvement	Debt level	HD8: + HD12: +
2011	Di Giuli et al.	Journal of Banking & Finance	Italy 2000–2003 187 firms OLS, tobit	None	HD1: Existence of non-family shareholder HD10: Non-family CFO HD11: Generation HD20: Firm size	Financial sophistication (use of sophisticated financial products)	HD1: + HD10: + HD11: + HD20: +
2014	Ebihara et al.	Japan and The World Economy	Japan 2007–2009 2664 firm-years Cross-sectional regression	Agency theory	HD9: Family/non-family CEO	Cost of capital	HD9:– (debt); o (equity)

Year	Author(s)	Journal	Regime Time frame Sample size Model	Theoretical fundament	Heterogeneity dimensions (HD)	Dependent variable	Effect of heterogeneity variables towards dependent variable (+/−/o)[a]
2000	Filbeck and Lee	Family Business Review	USA 2000 61 firms OLS	None	HD11: Generation HD8: Non-family board members HD10: Non-family CFO HD20: Firm size	Use of financial management techniques (capital budgeting, risk adjustment, working capital management)	HD11: o HD8: + HD10: + HD20: +
2013	González et al.	Journal of Business Research	Colombia 1996–2006 523 firms Random-effects panel; IV; lagged variables	Agency theory	HD1: Family ownership HD8: Family managers in board HD9: Family/non-family CEO HD11: Generation HD22: Firm age	Debt level	HD1*HD9: + HD8: – HD9: – HD11: + HD22: u-shaped
2021	Hansen and Block	Corporate Governance—An International Review	International n/a, depending on primary studies 436,886 from 613 primary studies HOMA, MRA	Agency theory SEW	HD11: Generation	Leverage ratio	HD11: +/o
1999	Haynes et al.	Family Business Review	USA 1997 673 business-owning households Logit	None	HD20: Firm size HD22: Firm age HD23: Household net worth, borrower status	Intermingling	HD20: o HD22: o HD23: o/+
2011	Hearn	International Review of Financial Analysis	North Africa 2000–2009 63 firms and IPOs OLS; logit	Agency theory	HD1: Private equity and business angel investors HD8: Board size, board independence, board member ownership HD15: Foreign IPO lead manager	IPO underpricing	HD1: + HD8: +/o/o HD15: +

Year	Author(s)	Journal	Regime Time frame Sample size Model	Theoretical fundament	Heterogeneity dimensions (HD)	Dependent variable	Effect of heterogeneity variables towards dependent variable (+/−/o)[a]
2015	Jain and Shao	Corporate Governance—An International Review	USA 1997–2008 1,782 firms and IPOs Two-stage regression; propensity matching	Agency theory SEW	HD3: Excess control HD9: Family/non-family CEO HD11: Multiple generations involved	Post IPO financing behavior (debt level and maturity structure)	HD3: − HD9: + HD11: −
2015	Keasey et al.	Journal of Corporate Finance	Europe 2000–2009 1050 firms Panel regression; system GMM; IV	Pecking order theory, signaling theory, life-cycle theory	HD2: Main owner's shareholdings HD22: Firm age/life-cycle	Debt level	HD2: + HD22: +
2008	King and Santor	Journal of Banking & Finance	Canada 1998–2005 613 firms Random-effects panel regression	Pecking order theory	HD2: Ownership concentration HD3: Excess control (dual class, pyramid, size of wedge)	Capital structure (debt to total assets)	HD2: + HD3:− (dual class, pyramid); o (size of wedge)
2013	King and Peng	Journal of Family Business Strategy	USA 1950–1965 211 firms Logit and hazard models	Pecking order theory	HD11: Generation HD21: Industry characteristics	Capital structure	HD11: + HD21: +
2013a	Koropp et al.	Small Business Economics	Germany 2008 187 firms Binary logit regression	Pecking order theory	HD9: CEO financial knowledge HD16: Desire for family control, owner-manager risk propensity, Attitude towards debt HD23: Prior experience with debt suppliers; prior succession experience	Intention to use debt (for succession financing)	HD9: + HD16: o/o/+ HD23: o/+

Year	Author(s)	Journal	Regime Time frame Sample size Model	Theoretical fundament	Heterogeneity dimensions (HD)	Dependent variable	Effect of heterogeneity variables towards dependent variable (+/−/o)[a]
2013b	Koropp et al.	Journal of Small Business Management	Germany 2007 280 OLS; 2SLS; logistic regression	Theory of planned behavior	HD9: CEO financial knowledge HD16: Economic goal orientation HD18: Family commitment (F-PEC culture subscale) HD23: Prior experience with debt suppliers	Owner-manager's attitude toward debt financing	HD9: + HD16: – HD18: o HD23*HD18: +
2014	Koropp et al.	Family Business Review	Germany 2008–2009 118 firms SEM	Theory of planned behavior	HD18: Perceived family norms, Owner-manager attitude towards debt, perceived behavioral control, intention to use debt	Capital structure (behavioral intention to use debt/equity and actual decision to use debt/equity)	HD18: +/+/o/+
2014	Leitterstorf and Rau	Strategic Management Journal	Germany 2004–2011 153 firms and IPOs Hierarchical regressions	SEW	HD11: Generation HD12: Collective differences in family involvement	IPO underpricing	HD11: o HD12: o
2017	Lozano and Durán	European Journal of Finance	Europe 2000–2009 1,569 firms Panel regression, GMM	Trade-off theory	HD22: Firm age HD24: Financial constraints	Level and adjustment of cash holdings	HD22: + HD24: +
2017	Ma et al.	European Accounting Review	China 2004–2010 705 firms OLS, firm-fixed effects, IV	Agency theory	HD3: Control-ownership wedge HD6: Corporate opacity HD9: Founder-CEO HD14: Political connection	Cost of debt	HD6: + HD6*HD9: + HD6*HD3: + HD6*HD14: +

Year	Author(s)	Journal	Regime Time frame Sample size Model	Theoretical fundament	Heterogeneity dimensions (HD)	Dependent variable	Effect of heterogeneity variables towards dependent variable (+/−/o)[a]
2012	Molly et al.	Entrepreneurship Theory and Practice	Belgium 2001–2005 425 firms 2SLS regression	Pecking order theory	HD11: Generation HD24: Firm growth	Capital structure (debt to total assets)	HD11: o HD11*HD24: +
2010	Molly et al.	Family Business Review	Belgium 1991–2006 152 firms Fixed-effects panel regression	Agency theory	HD11: Generation	Debt	HD11: + (non-linear)
2015	Pindado et al.	Journal of Business Finance & Accounting	Europe 1996–2006 645 firms Panel regression, system GMM	Agency theory	HD2: Existence of second blockholder HD3: Control-enhancing mechanisms HD7: Active family management HD11: Generation	Capital structure and speed of adjustment to target debt ratio	HD2: + HD3: – HD7: – HD11: –
2018	Rojo Ramírez and Martínez Romero	Review of Managerial Science	Spain 2002–2013 719 firms Hierarchical regressions	SEW	HD12: Collective differences in family involvement HD24: Economic environment (upturn/downturn)	Required and actual equity returns	HD12: + HD24: +/o
2014	Santos et al.	Journal of Management & Governance	Europe 2002–2006 694 firms OLS	Agency theory	HD2: Ownership concentration, existence of other blockholders (and balanced voting rights among them)	Debt level	HD2: +/+
2021	Sardo et al.	Eurasian Business Review	Portugal 2010–2017 7135 firms System GMM	Trade-off theory	HD1: Gender of owner HD11: Generation	Debt (speed of adjustment to target debt level)	HD1: – HD11: + HD11*HD1: stronger effects

Year	Author(s)	Journal	Regime Time frame Sample size Model	Theoretical fundament	Heterogeneity dimensions (HD)	Dependent variable	Effect of heterogeneity variables towards dependent variable (+/−/o)[a]
2013	Schmid	Journal of Banking & Finance	Germany/International 1995–2009/1996–2003 5638 firm-years/26,516 firm-years Pooled OLS	Agency theory	HD2: Outside blockholders HD7: Active management role of family	Capital structure (leverage ratio)	HD2: − HD7: +
2003	Schulze et al.	Academy of Management Journal	USA 1995 1464 firms Moderated hierarchical polynomial regression	Agency theory Behavioral agency theory	HD2: Ownership dispersion HD21: Industry growth	Debt level	HD2: u-shaped HD21: +
2009	Shyu and Lee	Corporate Governance—An International Review	Taiwan 2002–2006 611 firms Panel regression; system GMM	Agency theory	HD1: CEO shareholding HD2: Ownership concentration HD3: Excess control rights HD8: Family/non-family board membership HD9: CEO duality	Debt (maturity structure)	HD1: − HD1*HD9: + HD2: − HD9: − HD8: + HD3: −
2013	Song and Wang	Asia Pacific Journal of Management	China not specified 132 firms Seemingly unrelated regression (SUR) model	Information asymmetry and embeddedness theory	HD14: Relational strength	Financing performance	HD14: +
2007	Wu et al.	Journal of Business Venturing	Canada 1998–2000 2116 firms OLS; Heckman-two-stage procedure	Agency theory	HD12: Collective differences in family involvement (family ownership and management)	Use of equity financing	HD12: −

Year	Author(s)	Journal	Regime Time frame Sample size Model	Theoretical fundament	Heterogeneity dimensions (HD)	Dependent variable	Effect of heterogeneity variables towards dependent variable (+/−/o)[a]
2015	Yen et al.	Journal of Financial Services Research	Taiwan 2000–2010 66,019 individual bank loan contracts 2SLS regression	Agency theory	HD3: Voting rights exceed cash-flow rights HD9: Founder/descendant CEO, Family/non-family CEO	Bank loan contracts (costs, loan spread)	HD3: − HD9: +/−
2006	Yilmazer and Schrank	Journal of Business Venturing	USA 1989–2001 4146 households managing small businesses Probit regression	None	HD23: Household net worth	Financial intermingling	HD23: +
Panel B: Retained earnings and dividends (n = 8)							
2021	Belda-Ruiz et al.	International Entrepreneurship and Management Journal	Spain 2013–2015 482 firms Logit/tobit	SEW	HD7: Family/non-family management HD9: Family/non-family CEO HD11: Generation HD17: SEW preservation HD24: Performance hazard	Dividends (Likelihood and amount)	HD7: −/o HD9: − HD11: − HD17: − HD24: −
2014	González et al.	Family Business Review	Colombia 1996–2006 458 firms Tobit/probit	Agency theory	HD1: Family ownership (largest shareholding) HD3: Pyramid schemes HD8: Disproportionate board representation HD9: Family/non-family CEO	Dividends (amount and likelihood)	HD1: – HD3: – HD9: o HD8: +

Year	Author(s)	Journal	Regime Time frame Sample size Model	Theoretical fundament	Heterogeneity dimensions (HD)	Dependent variable	Effect of heterogeneity variables towards dependent variable (+/−/o)[a]
2012	Huang et al.	Asia Pacific Journal of Management	Taiwan 1996–2008 2781 firm-years Piecewise OLS/tobit	Agency theory Lifecycle theory of dividends	HD1: Family ownership (low, moderate, high) HD22: Firm lifecycle (early, mature)	Dividends	HD1: +/−/+ (non-monotonic) HD22: +
2015	Michiels et al.	Small Business Economics	Belgium 2002–2003 244 firms Binary logit regression	Agency theory	HD7: Active/passive family shareholders HD13: Existence of family governance practices (FGP)	Dividends (likelihood)	HD7: + HD13: +
2012	Pindado et al.	Corporate Governance—An International Review	Europe 1996–2006 645 firms Panel regression; system GMM	Agency theory	HD2: Other blockholders (non-family, family blockholders) HD3: Deviation cash-flow from voting rights	Dividends (amount, stability of dividends)	HD2: +/− HD3: −
2009	Setia-Atmaja et al.	Journal of Business Finance & Accounting	Australia 2000–2005 316 firms 3SLS regression	Agency theory	HD2: Presence of other blockholders	Dividends (ratio), debt level	HD2: o
2015	Vandemaele and Vancauteren	Journal of Small Business Management	Belgium 1999–2003 501 firms Maximum likelihood regression	SEW	HD8: Family board dominance HD9: Family/non-family CEO HD11: Generation	Dividends (amount)	HD8: − HD9: − HD9*HD8: − HD11: −
2010	Yoshikawa and Rasheed	Journal of Management Studies	Japan 1998–2002 210 firms Cross-sectional time series feasible generalized least squares (FGLS) regression model	Agency theory	HD1: Family members in board HD8: Foreign ownership, bank ownership	Dividends (ratio, dividends to net profit)	HD1*HD8: −/+

Panel C: Financial reporting quality (n = 31)

Year	Author(s)	Journal	Regime Time frame Sample size Model	Theoretical fundament	Heterogeneity dimensions (HD)	Dependent variable	Effect of heterogeneity variables towards dependent variable (+/−/o)[a]
2014	Achleitner et al.	European Accounting Review	Germany 1998–2008 838 firms OLS	SEW	HD9: Founder/descendant/external CEO	Earnings management (accrual-based, real)	HD9: +
2007	Ali et al.	Journal of Accounting & Economics	USA 1998–2002 500 firms OLS	Agency theory	HD3: Dual class shares HD9: Founder/descendant CEO	Earnings quality (discretionary accruals, predictability of cash flows, earnings persistence, earnings response coefficient)	HD3: − HD9: +
2021	Bansal	Journal of Asia Business Studies	India 2007–2019 26,962 firm-years Panel regression	Agency theory Stewardship theory Managerial hegemony theory	HD8: Board independence HD9: CEO duality HD11: Generation	Earnings management (discretionary accruals)	HD8: + HD9: + HD11: − HD8*HD11: weaker
2020	Borralho et al.	Spanish Accounting Review	Spain 2011–2016 3887 observations OLS	Agency theory SEW	HD8: Board size, board gender diversity HD9: CEO duality HD15: Big 4/non-Big 4 auditor	Financial reporting quality (discretionary accruals)	HD8: o/+ HD9: + HD15: +
2020	Boujelben and Boujelben	Journal of Financial Reporting and Accounting	France 2015 87 firms OLS	SEW	HD8: Family board representation HD11: Generation HD17: SEW	Voluntary KPI disclosure	HD8: − HD11: − HD17: −
2000	Carey et al.	Auditing—A Journal of Practice & Theory	Australia 1997 186 firms Logistic regression	Agency theory	HD7: Family/non-family management HD8: Proportion of non-family board members HD20: Firm size HD23: Level of indebtedness	Voluntary demand for internal & external auditing	External: HD7: + HD8: + HD20: o HD23: + Internal: HD7, HD8, HD20, HD23: o

Year	Author(s)	Journal	Regime Time frame Sample size Model	Theoretical fundament	Heterogeneity dimensions (HD)	Dependent variable	Effect of heterogeneity variables towards dependent variable (+/−/o)[a]
2010	Cascino et al.	Family Business Review	Italy 1998–2004 778 firms Pooled OLS; fixed effects OLS	Agency theory	HD1: Institutional ownership HD8: Board independence HD15: Big 4/non-Big 4 auditor	Earnings quality (accrual quality, persistence, predictability, smoothness)	HD1: − HD8: + HD15: +
2010	Chau and Gray	Journal of International Accounting, Auditing and Taxation	China 2002 273 firms OLS; 2SLS regression	Agency theory	HD1: Family ownership (low, high) HD8: Board independence and independent chair	Voluntary disclosure (based on index which relies on actual versus maximum possible disclosure)	HD1: + HD1*HD8: weaker HD8: +
2021	Chen et al.	Family Business Review	Taiwan 2005–2014 277 firms Panel regression	Agency theory	HD3: Control-ownership divergence HD15: Big 4/non-Big 4 auditor	Disclosure quality (based on official Taiwanese rating system), credit ratings	HD3: − HD3*HD15: +
2014	Chen et al.	European Accounting Review	USA 1996–2005 8264 firm-years Panel regression	Agency theory	HD1: Family ownership, non-family CEO ownership HD8: Family board representation HD9: Founder/non-founder CEO	Conservatism (based on non-operating accruals)	HD1: +/+ HD8: + HD9: −
2015	Corten et al.	Accounting and Business Research	USA 2003 482 firms Multinomial logit; ordered logit	Agency theory	HD11: Generation	Audit demand	HD11: +
2017	Corten et al.	Journal of Family Business Strategy	Belgium 2015 125 firms Logit	Agency theory	HD8: Board monitoring effectiveness	Audit demand	HD8: −
2018	Drago et al.	Journal of Family Business Strategy	Italy 2008–2013 288 firms OLS	SEW	HD11: Generation HD12: Family power HD19: Family name as brand	Financial report readability (FOG index)	HD11: − HD12: + HD19: +

Year	Author(s)	Journal	Regime Time frame Sample size Model	Theoretical fundament	Heterogeneity dimensions (HD)	Dependent variable	Effect of heterogeneity variables towards dependent variable (+/−/o)[a]
2018	Duréndez and Madrid-Guijarro	Journal of Family Business Strategy	Spain 2011 251 firms OLS	Agency theory	HD12: F-PEC power and experience dimension	Financial reporting quality (discretionary accruals, real earnings management, earnings persistence, conservatism)	HD12: +/−
2017	Gavana et al.	Sustainability	Italy 2004–2013 230 firms Panel regression	Legitimacy theory Stakeholder theory SEW	HD1: Family ownership HD8: Multiple family board members HD9: Founder as board member or family CEO HD19: Family name as brand HD21: Environmentally sensitive industries	Sustainability disclosure	HD1: − HD8: o HD9: + HD19: o HD21: −
2001	Ho and Wong	Journal of International Accounting, Auditing and Taxation	China 1997 98 firms OLS	Agency theory Information theory	HD8: Family members on board, board independence, existence of audit committee	Voluntary disclosure (importance-adjusted relative disclosure index (RDI))	HD8: -/o/+
2012	Hope et al.	Accounting Organizations and Society	Norway 2000–2007 185,109 firm-years OLS; logit	Agency theory	HD1: CEO Ownership HD2: Ownership concentration, second blockholder HD8: Board members related to controlling family, board members related to CEO HD9: Family/non-family CEO	Audit fees (proxy for audit effort)	HD1: + HD2: −/− HD8: +/− HD9: +

Year	Author(s)	Journal	Regime Time frame Sample size Model	Theoretical fundament	Heterogeneity dimensions (HD)	Dependent variable	Effect of heterogeneity variables towards dependent variable (+/−/o)[a]
2009	Jaggi et al.	Journal of Accounting and Public Policy	China 1998–2000 770 and 309 firm-years 2SLS regression; IV	Agency theory Stewardship theory	HD8: Family board members	Earnings management (discretionary accruals)	HD8: +
2007	Jaggi and Leung	Journal of International Accounting, Auditing and Taxation	China 1999–2000 523 firms OLS, 2SLS, 3SLS regression	Agency theory	HD8: Existence of audit committee, family board members	Earnings management (discretionary accruals)	HD8: +/−
2011	Khalil et al.	Accounting Horizons	USA 2004–2008 153 auditor resignations OLS; Logit	Agency theory	HD9: Founder/descendant CEO, family/non-family CEO	Auditor resignation (likelihood, subsequent capital market reaction)	HD9: −/+ (likelihood) HD9: +/o (market reaction)
2010	Niskanen et al.	Family Business Review	Finland 2000–2006 476 firms Logit (pooled, multinomial)	Agency theory	HD1: Family ownership, CEO ownership HD12: Collective differences in family involvement HD20: Firm size HD22: Firm age HD23: Leverage	Demand for audit quality (measured by auditor size)	HD1: −/− HD12: + HD20: + HD22: − HD23: +
2021	Palma et al.	Accounting Forum	Europe 2019 360 firms Logistic regression	SEW Legitimacy theory	HD1: Family ownership, billionaire shareholders HD9: Family/non-family CEO	Web-based sustainability reporting (representation of sustainability reporting on website)	HD1: +/+ HD9: +
2013	Pazzaglia et al.	Family Business Review	Italy 1995–2008 1254 firms Fixed-effects panel regression	SEW	HD1: Acquired/non-acquired ownership HD9: Family/non-family CEO	Earnings quality (discretionary accruals)	HD1: − HD1*HD9: +/−

Year	Author(s)	Journal	Regime Time frame Sample size Model	Theoretical fundament	Heterogeneity dimensions (HD)	Dependent variable	Effect of heterogeneity variables towards dependent variable (+/−/o)[a]
2011	Prencipe et al.	Corporate Governance—An International Review	Italy 2001–2004 135 firms Logit	Agency theory Stewardship theory	HD1: Institutional ownership HD8: Board independence, family member as board chair HD9: Family/non-family CEO, CEO duality	Income smoothing (likelihood, based on variation in income compared to sales)	HD1: o HD8: −/− HD9:—(family CEO); o (duality)
2011	Prencipe and Bar-Yosef	Journal of Accounting, Auditing & Finance	Italy 2003–2004 127 firms OLS, tobit	Agency theory	HD8: Board independence HD9: CEO duality	Earnings management (abnormal working capital accruals (AWCA))	HD9: + HD8: −
2019	Raithatha and Shaw	International Journal of Accounting	India 2006–2015 2534 firms Cross-sectional regression, IV	Agency theory	HD4: Affiliation with business groups HD7: Family management	Conservatism (based on stock returns, accruals and non-operating accruals)	HD4: + HD7: +
2021	Schierstedt and Corten	Managerial Auditing Journal	Germany 2010–2016 204 firms Panel regression	Agency theory	HD1: Family ownership HD7: Family management HD8: Family members in supervisory board HD19: Family name as brand	Audit fees	HD1: + HD7: − HD7*HD19: weaker HD8: −
2010	Stockmans et al.	Family Business Review	Belgium 2001 132 firms OLS	SEW	HD9: Founder/descendant/external CEO HD11: Generation	Earnings management	HD9: o HD11: -
2006	Wang	Journal of Accounting Research	USA 1994–2002 500 firms OLS	Agency theory	HD9: Founder/descendant/external CEO	Earnings quality (abnormal accruals, earnings informativeness, and persistence of transitory loss components in earnings)	HD9: o

Year	Author(s)	Journal	Regime Time frame Sample size Model	Theoretical fundament	Heterogeneity dimensions (HD)	Dependent variable	Effect of heterogeneity variables towards dependent variable (+/−/o)[a]
2009	Wan-Hussin	The International Journal of Accounting	Malaysia 2001 64 firms Logistic regression (binary, multinomial)	Agency theory	HD1: Institutional ownership HD8: Family members (or affiliates) on board	Corporate transparency (based on full/partial early adoption of FRS 114 segment disclosure rules)	HD1: o HD8: +
2010	Yang	Family Business Review	Taiwan 2001–2008 3914 firm-years OLS	Agency theory	HD1: Insider ownership HD9: Family/non-family CEO	Earnings management (discretionary accruals)	HD1: + HD9: +
Panel D: Tax, esp. tax avoidance (n = 12)							
2020	Bauwer-aerts et al.	Canadian Journal of Administrative Sciences	Belgium 2012–2014 242 firms Panel regression	SEW	HD1: Family ownership (weak, strong position) HD10: Family/non-family CFO HD11: Generation HD19: Family name as brand	Tax aggressiveness (ETR and cash ETR)	HD1: − HD10: + HD11: + HD19: −
2019	Brune et al.	Family Business Review	Germany 2009–2014 814 firms OLS	SEW	HD8: Founder as board member HD9: Founder/descendant/external CEO, substantial ownership position of founder HD12: Collective differences in family involvement (ownership and management)	Tax avoidance (GAAP ETR)	HD9: − HD9*HD9: o HD9*HD8: o HD12: −

Year	Author(s)	Journal	Regime Time frame Sample size Model	Theoretical fundament	Heterogeneity dimensions (HD)	Dependent variable	Effect of heterogeneity variables towards dependent variable (+/−/o)[a]
2019	Brune et al.	Managerial and Decision Economics	Germany 2011–2016 4141 firms OLS; panel; tobit	SEW	HD1: Number of non-family owners HD5: Public/private firm HD7: Family/non-family shareholders	Tax avoidance (GAAP ETR)	HD1: + HD5: + HD7: +
2021	Clemente-Almendros et al.	Journal of Small Business Strategy	Spain 2009–2016 401 firms Quasi-experiment; diff-in-diff models	Agency theory	HD11: Generation	Tax avoidance (based on leverage ratio subsequent to legislative change which reduced tax benefit of financial debt)	HD11: +
2020	Eddleston and Mulki	Entrepreneurship Theory and Practice	India not specified 206 firms OLS	Organizational identity theory SEW	HD19: Family firm identity HD24: Firm performance	Tax evasion (underreported revenues)	HD19*HD24: +/−
2021	Flamini et al.	Sustainability	Italy 2013–2014 227 firm-year observations OLS	Agency theory SEW	HD2: Ownership concentration HD8: Board independence HD9: Family/non-family CEO	Tax avoidance (ETR, cash ETR and net cash ETR)	HD2: + HD8: + HD9: −
2019	Kovermann and Wendt	Journal of Contemporary Accounting & Economics	Germany 2010–2014 678 firms Pooled OLS; random-effects panel regression	Agency theory	HD1: Family ownership, number of family owners	Tax avoidance (ETR)	HD1: +/+
2021	Lee and Bose	Journal of Contemporary Accounting & Economics	Taiwan 1998–2014 9360 firm-year observations PSM; Heckman-2-stage; SEM	Agency theory	HD6: Corporate opacity	Tax avoidance (ETR, current ETR, book tax difference, discretionary book tax difference)	HD6: −

Year	Author(s)	Journal	Regime Time frame Sample size Model	Theoretical fundament	Heterogeneity dimensions (HD)	Dependent variable	Effect of heterogeneity variables towards dependent variable (+/−/o)[a]
2016	Mafrolla and D'Amico	Journal of Family Business Strategy	Italy 2006–2011 183 firms Tobit	Agency theory	HD12: Collective differences in family involvement (ownership, management, CEO duality, board independence)	Tax avoidance (GAAP ETR)	HD12: +
2021	Sánchez-Marín et al.	Journal of Family Business Management	Spain 2011 282 firms SEM	RBV	HD12: F-PEC scale and subdimensions	Tax aggressiveness (ETR, book tax gap)	HD12 (P): + HD12 (E): − HD12 (C): o
2014	Steijvers and Niskanen	Journal of Family Business Strategy	Finland 2000–2005 621 firms OLS	Agency theory	HD1: CEO ownership HD8: Outside board members	Tax avoidance (ETR)	HD1: - HD1*HD8: weaker
2021	Temouri et al.	British Journal of Management	USA 2010–2018 1024 firms Probit and poisson models	SEW	HD9: Founder involvement HD11: Generation HD15: Big 4/non-big 4 auditor	Internationalization to tax havens (likelihood and no. of locations)	HD9: − HD11: − HD15: +

[a]The findings presented regarding the effects of each heterogeneity variable represent significant findings at different levels of significance (e.g., 1% or 5% level) for positive (+) and negative effects (−), while also non-significant findings are indicated (o).

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References

Achleitner A-K, Günther N, Kaserer C, Siciliano G (2014) Real earnings management and accrual-based earnings management in family firms. Eur Account Rev 23:431–461. https://doi.org/10.1080/09638180.2014.895620

Ali A, Chen T-Y, Radhakrishnan S (2007) Corporate disclosures by family firms. J Account Econ 44:238–286. https://doi.org/10.1016/j.jacceco.2007.01.006

Amore MD, Minichilli A, Corbetta G (2011) How do managerial successions shape corporate financial policies in family firms? J Corp Finan 17:1016–1027. https://doi.org/10.1016/j.jcorpfin.2011.05.002

Anderson R, Reeb D (2003) Founding-family ownership and firm performance: evidence from the S&P 500. J Finan 58:1301–1328

Astrachan JH, Klein SB, Smyrnios KX (2002) The F-PEC scale of family influence: a proposal for solving the family business definition problem. Fam Bus Rev 15:45–58

Audretsch DB, Hülsbeck M, Lehmann EE (2013) Families as active monitors of firm performance. J Fam Bus Strat 4:118–130. https://doi.org/10.1016/j.jfbs.2013.02.002

Baixauli-Soler JS, Belda-Ruiz M, Sánchez-Marín G (2021) Socioemotional wealth and financial decisions in private family SMEs. J Bus Res 123:657–668. https://doi.org/10.1016/j.jbusres.2020.10.022

Bansal M (2021) Board independence and earnings management: influence of family business generation. JABS 15:748–768. https://doi.org/10.1108/JABS-07-2020-0280

Bauweraerts J, Vandernoot J, Buchet A (2020) Family firm heterogeneity and tax aggressiveness: a mixed gamble approach. Can J Adm Sci 37:149–163. https://doi.org/10.1002/cjas.1528

Becht M, Bolton P, Röell A (2003) Corporate Governance and control. In: Kōnstantinidēs G (ed) Handbook of the economics of finance, vol 1. Elsevier, Amsterdam, pp 1–109

Belda-Ruiz M, Sánchez-Marín G, Baixauli-Soler JS (2021) Influence of family-centered goals on dividend policy in family firms: a socioemotional wealth approach. Int Entrep Manag J. https://doi.org/10.1007/s11365-021-00741-x

Berrone P, Cruz C, Gomez-Mejia LR (2012) Socioemotional wealth in family firms. Fam Bus Rev 25:258–279. https://doi.org/10.1177/0894486511435355

Bjuggren P-O, Duggal R, Giang DT (2012) Ownership dispersion and capital structures in family firms: a study of closed medium-sized enterprises. J Small Bus Entrep 25:185–200. https://doi.org/10.1080/08276331.2012.10593568

Blanco-Mazagatos V, de Quevedo-Puente E, Castrillo LA (2007) The trade-off between financial resources and agency costs in the family business: an exploratory study. Fam Bus Rev 20:199–213. https://doi.org/10.1111/j.1741-6248.2007.00095.x

Borralho JM, Gallardo-Vázquez D, Hernández-Linares R, de Sousa C, Paiva I (2020) The effect of corporate governance factors on the quality of financial reporting in family and non-family firms. RCSAR 23:167–179. https://doi.org/10.6018/rcsar.358451

Boujelben S, Boujelben C (2020) Socio-emotional wealth preservation and KPI voluntary disclosure quality. JFRA 18:459–482. https://doi.org/10.1108/JFRA-09-2019-0113

Brune A, Thomsen M, Watrin C (2019a) Family firm heterogeneity and tax avoidance: the role of the founder. Fam Bus Rev 32:296–317. https://doi.org/10.1177/0894486519831467

Brune A, Thomsen M, Watrin C (2019b) Tax avoidance in different firm types and the role of nonfamily involvement in private family firms. Manage Decis Econ 40:950–970. https://doi.org/10.1002/mde.3082

Brune A, Thomsen M, Watrin C (2021) Family firms in business research—a literature review on financial strategy, tax planning, and earnings management. BFuP 2:134–160

Burgstaller J, Wagner E (2015) How do family ownership and founder management affect capital structure decisions and adjustment of SMEs? J Risk Finan 16:73–101. https://doi.org/10.1108/JRF-06-2014-0091

Carey P, Simnett R, Tanewski G (2000) Voluntary demand for internal and external auditing by family businesses. Auditing 19:37–51. https://doi.org/10.2308/aud.2000.19.s-1.37

Carney M (2005) Corporate governance and competitive advantage in family-controlled firms. Entrep Theory Pract 29:249–265

Cascino S, Pugliese A, Mussolino D, Sansone C (2010) The influence of family ownership on the quality of accounting information. Fam Bus Rev 23:246–265. https://doi.org/10.1177/0894486510374302

Chan KS, Dang VQT, Yan IKM (2012) Chinese firms' political connection, ownership, and financing constraints. Econ Lett 115:164–167. https://doi.org/10.1016/j.econlet.2011.12.008
Chau G, Gray SJ (2010) Family ownership, board independence and voluntary disclosure: evidence from Hong Kong. J Int Account Audit Tax 19:93–109. https://doi.org/10.1016/j.intaccaudtax.2010.07.002
Chen S, Chen X, Cheng Q, Shevlin T (2010) Are family firms more tax aggressive than non-family firms? J Financ Econ 95:41–61. https://doi.org/10.1016/j.jfineco.2009.02.003
Chen S, Chen X, Cheng Q (2014) Conservatism and equity ownership of the founding family. Eur Account Rev 23:403–430. https://doi.org/10.1080/09638180.2013.814978
Chen J, Chen N-Y, He L, Patel C (2021) The effect of ownership structure on disclosure quality and credit ratings in family firms: the moderating role of auditor choice. Family Bus Rev. https://doi.org/10.1177/08944865211057854
Chrisman JJ, Chua JH, Litz RA (2004) Comparing the agency costs of family and non-family firms: conceptual issues and exploratory evidence. Entrep Theory Pract 28:335–354. https://doi.org/10.1111/j.1540-6520.2004.00049.x
Chua JH, Chrisman JJ, Kellermanns F, Wu Z (2011) Family involvement and new venture debt financing. J Bus Ventur 26:472–488. https://doi.org/10.1016/j.jbusvent.2009.11.002
Chua JH, Chrisman JJ, Steier LP, Rau SB (2012) Sources of heterogeneity in family firms: an introduction. Entrep Theory Pract 36:1103–1113. https://doi.org/10.1111/j.1540-6520.2012.00540.x
Cirillo A, Romano M, Ardovino O (2015) Does family involvement foster IPO value? Empirical analysis on Italian stock market. Manag Decis 53:1125–1154. https://doi.org/10.1108/MD-11-2014-0639
Clemente-Almendros JA, Camisón-Haba S, Camisón-Zornoza C (2021) Family firm heterogeneity and tax aggressiveness: a quasi-experimental analysis of the impact of different family generations. J Small Bus Strateg 31:102–121
Comino-Jurado M, Sánchez-Andújar S, Parrado-Martínez P (2021a) Do dissimilarities in the family involvement in family firms lead to different levels of indebtedness? Evidence from Spain. Manage Decis 59:2891–2906. https://doi.org/10.1108/MD-05-2020-0582
Comino-Jurado M, Sánchez-Andújar S, Parrado-Martínez P (2021b) Reassessing debt-financing decisions in family firms: family involvement on the board of directors and generational stage. J Bus Res 135:426–435. https://doi.org/10.1016/j.jbusres.2021.06.060
Corten M, Steijvers T, Lybaert N (2015) The demand for auditor services in wholly family-owned private firms: the moderating role of generation. Account Bus Res 45:1–26. https://doi.org/10.1080/00014788.2014.959462
Corten M, Steijvers T, Lybaert N (2017) The effect of intrafamily agency conflicts on audit demand in private family firms: the moderating role of the board of directors. J Fam Bus Strat 8:13–28. https://doi.org/10.1016/j.jfbs.2017.01.003
Croci E, Doukas JA, Gonenc H (2011) Family control and financing decisions. Eur Financ Manag 17:860–897. https://doi.org/10.1111/j.1468-036X.2011.00631.x
Daspit JJ, Chrisman JJ, Ashton T, Evangelopoulos N (2021) Family firm heterogeneity: a definition, common themes, scholarly progress, and directions forward. Fam Bus Rev 34:296–322. https://doi.org/10.1177/08944865211008350
Debicki BJ, Kellermanns FW, Chrisman JJ, Pearson AW, Spencer BA (2016) Development of a socioemotional wealth importance (SEWi) scale for family firm research. J Fam Bus Strat 7:47–57. https://doi.org/10.1016/j.jfbs.2016.01.002
DeFond M, Zhang J (2014) A review of archival auditing research. J Account Econ 58:275–326. https://doi.org/10.1016/j.jacceco.2014.09.002
Di Giuli A, Caselli S, Gatti S (2011) Are small family firms financially sophisticated? J Bank Finan 35:2931–2944. https://doi.org/10.1016/j.jbankfin.2011.03.021
Dibrell C, Memili E (2019) A brief history and a look to the future of family business heterogeneity: an introduction. In: Memili E, Dibrell C (eds) The Palgrave handbook of heterogeneity among family firms. Springer International Publishing, Cham, pp 1–15
Drago C, Ginesti G, Pongelli C, Sciascia S (2018) Reporting strategies: What makes family firms beat around the bush? Family-related antecedents of annual report readability. J Fam Bus Strat 9:142–150. https://doi.org/10.1016/j.jfbs.2017.11.006
Duréndez A, Madrid-Guijarro A (2018) The impact of family influence on financial reporting quality in small and medium family firms. J Fam Bus Strat 9:205–218. https://doi.org/10.1016/j.jfbs.2018.08.002

Ebihara T, Kubota K, Takehara H, Yokota E (2014) Market liquidity, private information, and the cost of capital: market microstructure studies on family firms in Japan. Jpn World Econ 32:1–13. https://doi.org/10.1016/j.japwor.2014.07.001

Eddleston KA, Mulki JP (2021) Differences in family-owned SMEs' ethical behavior: a mixed gamble perspective of family firm tax evasion. Entrep Theory Pract 45:767–791. https://doi.org/10.1177/1042258720964187

Fang H, Kellermanns FW, Eddleston KA (2019) Empirical modeling in testing for family firm heterogeneity. In: Memili E, Dibrell C (eds) The Palgrave handbook of heterogeneity among family firms. Springer International Publishing, Cham, pp 69–85

Fehre K, Weber F (2019) Why some are more equal: family firm heterogeneity and the effect on management's attention to CSR. Bus Ethics 28:321–334. https://doi.org/10.1111/beer.12225

Filbeck G, Lee S (2000) Financial management techniques in family businesses. Fam Bus Rev 13:201–216. https://doi.org/10.1111/j.1741-6248.2000.00201.x

Fisch C, Block J (2018) Six tips for your (systematic) literature review in business and management research. Manag Rev Q 68:103–106. https://doi.org/10.1007/s11301-018-0142-x

Flamini G, Vola P, Songini L, Gnan L (2021) The determinants of tax aggressiveness in family firms: an investigation of Italian private family firms. Sustainability 13:7654. https://doi.org/10.3390/su13147654

Gaaya S, Lakhal N, Lakhal F (2017) Does family ownership reduce corporate tax avoidance? The moderating effect of audit quality. MAJ 32:731–744. https://doi.org/10.1108/MAJ-02-2017-1530

Gavana G, Gottardo P, Moisello A (2017) Sustainability reporting in family firms: a panel data analysis. Sustainability 9:38. https://doi.org/10.3390/su9010038

Gaynor LM, Kelton AS, Mercer M, Yohn TL (2016) Understanding the relation between financial reporting quality and audit quality. Auditing 35:1–22. https://doi.org/10.2308/ajpt-51453

Gedajlovic E, Carney M, Chrisman JJ, Kellermanns FW (2012) The adolescence of family firm research. J Manag 38:1010–1037. https://doi.org/10.1177/0149206311429990

Gillan SL (2006) Recent developments in corporate governance: an overview. J Corp Finan 12:381–402. https://doi.org/10.1016/j.jcorpfin.2005.11.002

Goel S, Mazzola P, Phan PH, Pieper TM, Zachary RK (2012) Strategy, ownership, governance, and socio-psychological perspectives on family businesses from around the world. J Fam Bus Strat 3:54–65. https://doi.org/10.1016/j.jfbs.2012.03.005

Gomez-Mejia LR, Cruz C, Berrone P, de Castro J (2011) The bind that ties: socioemotional wealth preservation in family firms. Acad Manag Ann 5:653–707. https://doi.org/10.1080/19416520.2011.593320

González M, Guzmán A, Pombo C, Trujillo M-A (2013) Family firms and debt: risk aversion versus risk of losing control. J Bus Res 66:2308–2320. https://doi.org/10.1016/j.jbusres.2012.03.014

González M, Guzmán A, Pombo C, Trujillo M-A (2014) Family involvement and dividend policy in closely held firms. Fam Bus Rev 27:365–385. https://doi.org/10.1177/0894486514538448

Hansen C, Block J (2021) Public family firms and capital structure: a meta-analysis. Corp Gov Int Rev 29:297–319. https://doi.org/10.1111/corg.12354

Haynes GW, Walker R, Rowe BR, Hong G-S (1999) The intermingling of business and family finances in family-owned businesses. Fam Bus Rev 12:225–239. https://doi.org/10.1111/j.1741-6248.1999.00225.x

Hearn B (2011) The performance and the effects of family control in North African IPOs. Int Rev Financ Anal 20:140–151. https://doi.org/10.1016/j.irfa.2011.02.006

Heider A, Hülsbeck M, von Schlenk-Barnsdorf L (2022) The role of family firm specific resources in innovation: an integrative literature review and framework. Manag Rev Q. https://doi.org/10.1007/s11301-021-00256-3

Hermalin BE, Weisbach MS (2003) Boards of directors as an endogenously determined institution: a survey of the economic literature. Econ Policy Rev 9:7–26

Hiebl M (2012) Peculiarities of financial management in family firms. Int Bus Econ Res J 11(3):315–323

Hiebl M (2021) Sample selection in systematic literature reviews of management research. Organiz Res Methods. https://doi.org/10.1177/1094428120986851

Ho SSM, Wong KS (2001) A study of the relationship between corporate governance structures and the extent of voluntary disclosure. J Int Account Audit Tax 10:139–156. https://doi.org/10.1016/S1061-9518(01)00041-6

Holt DT, Pearson AW, Carr JC, Barnett T (2017) Family firm(s) outcomes model: structuring financial and nonfinancial outcomes across the family and firm. Fam Bus Rev 30:182–202. https://doi.org/10.1177/0894486516680930

Hoon C, Baluch AM (2020) The role of dialectical interrogation in review studies: theorizing from what we see rather than what we have already seen. J Manage Stud 57:1246–1271. https://doi.org/10.1111/joms.12543

Hope O-K, Langli JC, Thomas WB (2012) Agency conflicts and auditing in private firms. Acc Organ Soc 37:500–517. https://doi.org/10.1016/j.aos.2012.06.002

Huang Y, Chen A, Kao L (2012) Corporate governance in Taiwan: the nonmonotonic relationship between family ownership and dividend policy. Asia Pac J Manag 29:39–58. https://doi.org/10.1007/s10490-011-9279-z

Hulland J, Houston MB (2020) Why systematic review papers and meta-analyses matter: an introduction to the special issue on generalizations in marketing. J Acad Mark Sci 48:351–359. https://doi.org/10.1007/s11747-020-00721-7

Hülsbeck M, Meoli M, Vismara S (2019) The board value protection function in young, mature and family firms. Brit J Manage 30:437–458. https://doi.org/10.1111/1467-8551.12322

Jaggi B, Leung S (2007) Impact of family dominance on monitoring of earnings management by audit committees: evidence from Hong Kong. J Int Account Audit Tax 16:27–50. https://doi.org/10.1016/j.intaccaudtax.2007.01.003

Jaggi B, Leung S, Gul F (2009) Family control, board independence and earnings management: evidence based on Hong Kong firms. J Account Public Policy 28:281–300. https://doi.org/10.1016/j.jaccpubpol.2009.06.002

Jain BA, Shao Y (2015) Family firm governance and financial policy choices in newly public firms. Corp Gov 23:452–468. https://doi.org/10.1111/corg.12113

Jaskiewicz P, Combs JG, Shanine KK, Kacmar KM (2017) Introducing the family: a review of family science with implications for management research. Acad Manag Ann 11:309–341. https://doi.org/10.5465/annals.2014.0053

Jensen MC (1986) Agency costs of free cash flow, corporate finance, and takeovers. Am Econ Rev 76:323–329

Jensen MC, Meckling WH (1976) Theory of the firm: managerial behavior, agency costs and owernship structure. J Finan Econ 3(4):305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Keasey K, Martinez B, Pindado J (2015) Young family firms: financing decisions and the willingness to dilute control. J Corp Finan 34:47–63. https://doi.org/10.1016/j.jcorpfin.2015.07.014

Khalil SK, Cohen JR, Trompeter GM (2011) Auditor resignation and firm ownership structure. Account Horiz 25:703–727. https://doi.org/10.2308/acch-50061

King R, Peng WQ (2013) The effect of industry characteristics on the control longevity of founding-family firms. J Fam Bus Strat 4:281–295. https://doi.org/10.1016/j.jfbs.2013.10.004

King MR, Santor E (2008) Family values: ownership structure, performance and capital structure of Canadian firms. J Bank Finan 32:2423–2432. https://doi.org/10.1016/j.jbankfin.2008.02.002

Klein SB, Astrachan JH, Smyrnios KX (2005) The F-PEC scale of family influence: construction, validation, and further implication for theory. Entrep Theory Pract 29:321–339

Koropp C, Grichnik D, Kellermanns F (2013a) Financial attitudes in family firms: the moderating role of family commitment. J Small Bus Manage 51:114–137. https://doi.org/10.1111/j.1540-627X.2012.00380.x

Koropp C, Grichnik D, Gygax AF (2013b) Succession financing in family firms. Small Bus Econ 41:315–334. https://doi.org/10.1007/s11187-012-9442-z

Koropp C, Kellermanns FW, Grichnik D, Stanley L (2014) Financial decision making in family firms. Fam Bus Rev 27:307–327. https://doi.org/10.1177/0894486514522483

Kovermann J, Velte P (2019) The impact of corporate governance on corporate tax avoidance—a literature review. J Int Account Audit Tax 36:100270. https://doi.org/10.1016/j.intaccaudtax.2019.100270

Kovermann J, Wendt M (2019) Tax avoidance in family firms: evidence from large private firms. J Contemp Account Econ 15:145–157. https://doi.org/10.1016/j.jcae.2019.04.003

Kuo C-S (2022) Family firms, tax avoidance, and socioemotional wealth: evidence from tax reform in Taiwan. Rev Quant Finan Acc 58:1535–1572. https://doi.org/10.1007/s11156-021-01029-5

Le Breton-Miller I, Miller D, Lester RH (2011) Stewardship or agency? A social embeddedness reconciliation of conduct and performance in public family businesses. Organ Sci 22:704–721. https://doi.org/10.1287/orsc.1100.0541

Lee C-H, Bose S (2021) Do family firms engage in less tax avoidance than non-family firms? The corporate opacity perspective. J Contemp Account Econ 17:100263. https://doi.org/10.1016/j.jcae.2021.100263
Leitterstorf MP, Rau SB (2014) Socioemotional wealth and IPO underpricing of family firms. Strat Mgmt J 35:751–760. https://doi.org/10.1002/smj.2236
Lietz GM (2013) Tax avoidance vs. tax aggressiveness: a unifying conceptual framework. SSRN J. https://doi.org/10.2139/ssrn.2363828
Lozano MB, Durán RF (2017) Family control and adjustment to the optimal level of cash holding. Eur J Finan 23:266–295. https://doi.org/10.1080/1351847X.2016.1168748
Ma L, Ma S, Tian G (2017) Corporate opacity and cost of debt for family firms. Eur Account Rev 26:27–59. https://doi.org/10.1080/09638180.2015.1087868
Mafrolla E, D'Amico E (2016) Tax aggressiveness in family firms and the non-linear entrenchment effect. J Fam Bus Strat. https://doi.org/10.1016/j.jfbs.2016.08.003
Magrelli V, Rovelli P, Benedetti C, Überbacher R, de Massis A (2022) Generations in family business: a multifield review and future research agenda. Fam Bus Rev 35:089448652110697. https://doi.org/10.1177/08944865211069781
Michiels A, Molly V (2017) Financing decisions in family businesses: a review and suggestions for developing the field. Fam Bus Rev 30:369–399. https://doi.org/10.1177/0894486517736958
Michiels A, Voordeckers W, Lybaert N, Steijvers T (2015) Dividends and family governance practices in private family firms. Small Bus Econ 44:299–314. https://doi.org/10.1007/s11187-014-9594-0
Michiels A, Botero IC, Kidwell RE (2022) Toward a family science perspective on executive compensation in family firms: a review and research agenda. Fam Bus Rev 35:45–67. https://doi.org/10.1177/08944865211064410
Miller D, Le Breton-Miller I (2006) Family governance and firm performance: agency, stewardship, and capabilities. Fam Bus Rev 14:73–88
Miller D, Minichilli A, Corbetta G (2013) Is family leadership always beneficial? Strat Mgmt J 34:553–571. https://doi.org/10.1002/smj.2024
Mishra CS, McConaughy DL (1999) Founding family control and capital structure: the risk of loss of control and the aversion to debt. Entrep Theory Pract 23:53–64. https://doi.org/10.1177/104225879902300404
Molly V, Michiels A (2021) Dividend decisions in family businesses: a systematic review and research agenda. J Econ Surv. https://doi.org/10.1111/joes.12460
Molly V, Laveren E, Deloof M (2010) Family business succession and its impact on financial structure and performance. Fam Bus Rev 23:131–147. https://doi.org/10.1177/089448651002300203
Molly V, Laveren E, Jorissen A (2012) Intergenerational differences in family firms: impact on capital structure and growth behavior. Entrep Theory Pract 36:703–725. https://doi.org/10.1111/j.1540-6520.2010.00429.x
Moores K (2009) Paradigms and theory building in the domain of business families. Fam Bus Rev 22:167–180. https://doi.org/10.1177/0894486509333372
Morck R, Shleifer A, Vishny RW (1988) Management ownership and market valuation. J Financ Econ 20:293–315. https://doi.org/10.1016/0304-405X(88)90048-7
Morck R, Wolfenzon D, Yeung B (2005) Corporate governance, economic entrenchment, and growth. J Econ Lit 43:655–720. https://doi.org/10.1257/002205105774431252
Myers SC, Majluf NS (1984) Corporate financing and investment decisions when firms have information that investors do not have. J Financ Econ 13:187–221. https://doi.org/10.1016/0304-405X(84)90023-0
Neubaum DO (2018) Family business research: roads travelled and the search for unworn paths. Fam Bus Rev 31:259–270. https://doi.org/10.1177/0894486518792948
Neubaum DO, Kammerlander N, Brigham KH (2019) Capturing family firm heterogeneity: how taxonomies and typologies can help the field move forward. Fam Bus Rev 32:106–130. https://doi.org/10.1177/0894486519848512
Niskanen M, Karjalainen J, Niskanen J (2010) The role of auditing in small, private family firms: Is it about quality and credibility? Fam Bus Rev 23:230–245. https://doi.org/10.1177/0894486510374456
Nordqvist M, Sharma P, Chirico F (2014) Family firm heterogeneity and governance: a configuration approach. J Small Bus Manage 52:192–209. https://doi.org/10.1111/jsbm.12096
OECD (2015) G20/OECD principles of corporate governance. OECD, Paris

Owens JK (2021) Systematic reviews: brief overview of methods, limitations, and resources. Nurse Author Ed 31:69–72. https://doi.org/10.1111/nae2.28
Palma M, Lourenço IC, Branco MC (2021) Web-based sustainability reporting by family companies: the role of the richest European families. Account Forum. https://doi.org/10.1080/01559982.2021.1979331
Pazzaglia F, Mengoli S, Sapienza E (2013) Earnings quality in acquired and nonacquired family firms. Fam Bus Rev 26:374–386. https://doi.org/10.1177/0894486513486343
Pindado J, Requejo I, Torre C (2012) Do family firms use dividend policy as a governance mechanism? Evidence from the Euro zone. Corp Gov 20:413–431. https://doi.org/10.1111/j.1467-8683.2012.00921.x
Pindado J, Requejo I, La de Torre C (2015) Does family control shape corporate capital structure? An empirical analysis of Eurozone firms. J Bus Financ Acc 42:965–1006. https://doi.org/10.1111/jbfa.12124
Post C, Sarala R, Gatrell C, Prescott JE (2020) Advancing theory with review articles. J Manage Stud 57:351–376. https://doi.org/10.1111/joms.12549
Prencipe A, Bar-Yosef S (2011) Corporate governance and earnings management in family-controlled companies. J Acc Audit Financ 26:199–227. https://doi.org/10.1177/0148558X11401212
Prencipe A, Bar-Yosef S, Mazzola P, Pozza L (2011) Income smoothing in family-controlled companies: evidence from Italy. Corp Gov 19:529–546. https://doi.org/10.1111/j.1467-8683.2011.00856.x
Prencipe A, Bar-Yosef S, Dekker HC (2014) Accounting Research in Family Firms: Theoretical and Empirical Challenges. European Accounting Review 23:361–385. https://doi.org/10.1080/09638180.2014.895621
Prigge S, Thiele FK (2019) Corporate governance codes: how to deal with the bright and dark sides of family influence. In: Memili E, Dibrell C (eds) The Palgrave handbook of heterogeneity among family firms. Springer International Publishing, Cham, pp 297–331
Raithatha M, Shaw TS (2019) Do family firms choose conservative accounting practices? Int J Acc 54:1950014. https://doi.org/10.1142/S1094406019500148
Rau SB, Schneider-Siebke V, Günther C (2019) Family firm values explaining family firm heterogeneity. Fam Bus Rev 32:195–215. https://doi.org/10.1177/0894486519846670
Rojo Ramírez AA, Martínez Romero MJ (2018) Required and obtained equity returns in privately held businesses: the impact of family nature—evidence before and after the global economic crisis. Rev Manag Sci 12:771–801. https://doi.org/10.1007/s11846-017-0230-7
Rosecká N, Machek O (2022) Non-family members and conflict processes in family firms: a systematic review of literature. J Bus Econ 92:235–281. https://doi.org/10.1007/s11573-021-01054-9
Ross SA (1973) The economic theory of agency: the principal's problem. Am Econ Rev 62:134–139
Rothstein HR, Sutton AJ, Borenstein M, Sutton AJ, Rothstein H (eds) (2005) Publication bias in meta-analysis: prevention, assessment and adjustments. Wiley, Chichester
Salvato C, Moores K (2010) Research on accounting in family firms: past accomplishments and future challenges. Fam Bus Rev 23:193–215. https://doi.org/10.1177/0894486510375069
Sánchez-Marín G, Portillo-Navarro M-J, Clavel JG (2016) The influence of family involvement on tax aggressiveness of family firms. JFBM 6:143–168. https://doi.org/10.1108/JFBM-03-2015-0017
Santos MS, Moreira AC, Vieira ES (2014) Ownership concentration, contestability, family firms, and capital structure. J Manage Gov 18:1063–1107. https://doi.org/10.1007/s10997-013-9272-7
Sardo F, Vieira ES, Serrasqueiro Z (2022) The role of gender and succession on the debt adjustments of family firm capital structure. Eurasian Bus Rev 12:349–372. https://doi.org/10.1007/s40821-021-00186-w
Schierstedt B, Corten M (2021) The influence of private family firm characteristics on audit fees: the family name as a red flag. MAJ 36:785–811. https://doi.org/10.1108/MAJ-05-2020-2662
Schmid T (2013) Control considerations, creditor monitoring, and the capital structure of family firms. J Bank Finance 37:257–272. https://doi.org/10.1016/j.jbankfin.2012.08.026
Schulze WS, Lubatkin MH, Dino RN (2003) Exploring the agency consequences of ownership dispersion among the directors of private family firms. AMJ 46:179–194. https://doi.org/10.2307/30040613
Sciascia S, Mazzola P, Chirico F (2013) Generational involvement in the top management team of family firms: exploring nonlinear effects on entrepreneurial orientation. Entrep Theory Pract 37:69–85. https://doi.org/10.1111/j.1540-6520.2012.00528.x

Setia-Atmaja L, Tanewski GA, Skully M (2009) The role of dividends, debt and board structure in the governance of family controlled firms. J Bus Financ Acc 36:863–898. https://doi.org/10.1111/j.1468-5957.2009.02151.x

Sharma P (2004) An overview of the field of family business studies: current status and directions for the future. Fam Bus Rev 17:1–36

Shleifer A, Vishny RW (1997) A Survey of corporate governance. J Financ 52:737–783

Shyu Y-W, Lee CI (2009) Excess control rights and debt maturity structure in family-controlled firms. Corp Gov 17:611–628. https://doi.org/10.1111/j.1467-8683.2009.00755.x

Song H, Wang L (2013) The impact of private and family firms' relational strength on financing performance in clusters. Asia Pac J Manag 30:735–748. https://doi.org/10.1007/s10490-012-9316-6

Steijvers T, Niskanen M (2014) Tax aggressiveness in private family firms: an agency perspective. J Fam Bus Strat 5:347–357. https://doi.org/10.1016/j.jfbs.2014.06.001

Stockmans A, Lybaert N, Voordeckers W (2010) Socioemotional wealth and earnings management in private family firms. Fam Bus Rev 23:280–294. https://doi.org/10.1177/0894486510374457

Suess-Reyes J (2017) Understanding the transgenerational orientation of family businesses: the role of family governance and business family identity. J Bus Econ 87:749–777. https://doi.org/10.1007/s11573-016-0835-3

Temouri Y, Nardella G, Jones C, Brammer S (2021) Haven-Sent? Tax havens, corporate social irresponsibility and the dark side of family firm internationalization. Br J Manage. https://doi.org/10.1111/1467-8551.12559

Thesing J, Velte P (2021) Do fair value measurements affect accounting-based earnings quality? A literature review with a focus on corporate governance as moderator. J Bus Econ 91:965–1004. https://doi.org/10.1007/s11573-020-01025-6

Thiele FK, Wendt M (2017) Family firm identity and capital structure decisions. JFBM 7:221–239. https://doi.org/10.1108/JFBM-05-2017-0012

Tranfield D, Denyer D, Smart P (2003) Towards a methodology for developing evidence-informed management knowledge by means of systematic review. Brit J Manage 14:207–222

Tricker B (2015) Corporate governance: principles, policies and practices. Oxford University Press, Oxford

Umans I, Corten M (2022) Ownership succession intentions affecting earnings management in private family firms. Small Bus Econ. https://doi.org/10.1007/s11187-022-00696-5

Vandemaele S, Vancauteren M (2015) Nonfinancial goals, governance, and dividend payout in private family firms. J Small Bus Manage 53:166–182. https://doi.org/10.1111/jsbm.12063

Velte P, Weber S (2021) Sustainable corporate purpose and sustainable corporate governance: integrative theoretical framework and reform recommendations. ZfU 44:287–323

Villalonga B, Amit R (2006) How do family ownership, control and management affect firm value? J Financ Econ 80:385–417. https://doi.org/10.1016/j.jfineco.2004.12.005

Villalonga B, Amit R, Trujillo M-A, Guzmán A (2015) Governance of family firms. Annu Rev Financ Econ 7:635–654. https://doi.org/10.1146/annurev-financial-110613-034357

Wang D (2006) Founding family ownership and earnings quality. J Account Res 44:619–656. https://doi.org/10.1111/j.1475-679X.2006.00213.x

Wan-Hussin WN (2009) The impact of family-firm structure and board composition on corporate transparency: evidence based on segment disclosures in Malaysia. Int J Account 44:313–333. https://doi.org/10.1016/j.intacc.2009.09.003

Wiseman RM, Gomez-Mejia LR (1998) A behavioral agency model of managerial risk taking. Acad Manag Rev. https://doi.org/10.2307/259103

Wu Z, Chua JH, Chrisman JJ (2007) Effects of family ownership and management on small business equity financing. J Bus Ventur 22:875–895. https://doi.org/10.1016/j.jbusvent.2006.07.002

Yang M-L (2010) The impact of controlling families and family CEOs on earnings management. Fam Bus Rev 23:266–279. https://doi.org/10.1177/0894486510374231

Yen J-F, Lin C-Y, Chen Y-S, Huang Y-C (2015) Founding family firms and bank loan contracts. J Financ Serv Res 48:53–82. https://doi.org/10.1007/s10693-014-0199-1

Yilmazer T, Schrank H (2006) Financial intermingling in small family businesses. J Bus Ventur 21:726–751. https://doi.org/10.1016/j.jbusvent.2005.04.011

Yoshikawa T, Rasheed AA (2010) Family control and ownership monitoring in family-controlled firms in Japan. J Manage Stud 47:274–295. https://doi.org/10.1111/j.1467-6486.2009.00891.x

Yuan Y, Hunt RH (2009) Systematic reviews: the good, the bad, and the ugly. Am J Gastroenterol 104:1086–1092. https://doi.org/10.1038/ajg.2009.118

Zellweger T, Eddleston KA, Kellermanns FW (2010) Exploring the concept of familiness: introducing family firm identity. J Fam Bus Strat 1:54–63. https://doi.org/10.1016/j.jfbs.2009.12.003
Zellweger TM, Nason RS, Nordqvist M, Brush CG (2013) Why do family firms strive for nonfinancial goals? An Organizational identity perspective. Entrep Theory Pract 37:229–248. https://doi.org/10.1111/j.1540-6520.2011.00466.x

Business Strategy and the Environment

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Female Directors, Family Firms, Climate Talk and Climate Walk: European Evidence

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ABSTRACT

Growing attention is attributed to symbolic and substantive climate efforts, labelled as climate talk and walk. Focusing on the European capital market, we study the relationship between board gender diversity, family ownership and different levels of corporate climate activities along the continuum from climate talk to climate walk. Using emission reduction target data from the Carbon Disclosure Project (CDP), we conduct various panel regression analyses and propose several additional robustness tests. Our results extend prior research on carbon performance and reporting by providing novel insights into how firms translate their climate ambitions into actionable targets and how they subsequently deliver on those targets. This study stresses that firms with gender-diverse boards engage more in symbolic climate talk but not in substantive climate walk. Empirical evidence on the family ownership impact is mixed. Overall, family ownership tends to exhibit a negative association with climate actions, although the effect depends on the ownership concentration threshold and varies with family management. Our results also indicate that female directors mitigate the negative direct consequences of family ownership for climate actions. Our study contributes to the ongoing discourse regarding symbolic and substantive climate efforts among European businesses and sheds light on the particular role of different corporate governance mechanisms for attaining international climate objectives. As climate-related regulatory initiatives unfold rapidly, the results are highly relevant to European firms, their stakeholders and regulators. In terms of their practical application, our results may inform the pending 'omnibus' proposals to revise European sustainability legislation while also helping firms to reflect on their governance structures in line with climate needs.

1 | Introduction

Global climate change mitigation efforts have become increasingly urgent, exerting substantial pressure on firms to account for and reduce their carbon emissions and strengthen their carbon reporting quality (Block et al. 2024; Qian and Schaltegger 2017). Meanwhile, the literature on carbon and environmental outcomes is facing significant challenges to differentiate between symbolic and substantive efforts, referred to as 'climate talk and walk' (Bingler et al. 2024; Coen et al. 2022; Herman et al. 2024; Morrison et al. 2024). In line with previous research, we define *climate talk* as merely symbolic climate efforts focusing on climate-related communications, whereas *climate walk* indicates substantive efforts based on fundamental improvements in climate-related performance. The notion of climate talk and walk thus implies

that there is a continuum of climate efforts that can be divided into symbolic and substantive sets of actions. Among others, symbolic climate efforts include the (voluntary) disclosure of carbon information or signalling the intention to reduce emissions through carbon targets. These represent communicative acts not directly representative of any substantive underlying efforts to reduce emissions (Bingler et al. 2024; Dahlmann 2024), which is why we consider these as *climate talk* throughout our analysis. In contrast, beyond mere symbolism, firms may prioritize fundamental improvements in climate-related performance. This includes efforts to align their climate objectives with the wider implications of climate science as well as subsequently following up on their commitments to reduce emissions (Ben-Amar et al. 2024; Bendig et al. 2023; Ioannou et al. 2016). We refer to these substantive climate efforts as *climate walk* throughout our study.

The role of the board of directors in aligning corporate objectives with stakeholder demands to improve carbon outputs has attracted considerable attention (Dyck et al. 2023; Michelon and Parbonetti 2012; Velte 2024a). As an important aspect of board composition, the impact of board gender diversity (BGD) has been widely addressed in academic research. Previous studies document a positive relationship between BGD and corporate carbon performance and reporting (Konadu et al. 2022; Kordsachia et al. 2023; Nimer et al. 2024; Velte 2025). However, although gender-diverse boards are frequently associated with superior carbon outcomes, studies also raise questions as to what extent gender-diverse boards catalyse substantive climate action beyond merely symbolic improvements (Ghitti et al. 2024; Haque 2017; Taglialatela et al. 2024). Accordingly, Taglialatela et al. (2024) find that higher levels of BGD are linked to a more pronounced focus on green communications vis-á-vis implementation, that is, talk is being prioritized over walk. Similarly, although gender-diverse boards tend to favour more carbon reduction initiatives, this may not lead to actual emission reductions (Haque 2017).

Thus, although the BGD–carbon link is generally well established in the literature, several research gaps can be identified. For instance, it remains unclear to what extent female directors contribute to the formalization of decarbonization strategies by means of setting decarbonization targets and what role they subsequently play in meeting these commitments. To the best of our knowledge, no prior study has analysed the role of female board members in the process of setting, validating and finally achieving decarbonization targets as a new means to distinguish between climate talk and walk.

Besides the board of directors, differences in the ownership structure are found to affect firms' climate change strategies (Velte 2024a). In this regard, family ownership (FO) is of high significance, with 32% of all publicly listed firms in Europe being identified as family firms (Gregorič et al. 2022). Family owners, as presumably long-term-oriented, are expected to follow idiosyncratic sustainability motives, yet mixed results prevail within empirical research (Kavadis and Thomsen 2023; Lorenzen et al. 2024; Miroshnychenko et al. 2022). Emphasizing the need to differentiate between symbolic and substantive environmental efforts in the family business domain, Miroshnychenko et al. (2022, 80) call for more research to disentangle the '(mis) alignment between environmental operational practices and environmental communications'. In this regard, no prior study, as far as we are aware, has directly addressed the relationship between family involvement and climate talk and walk. Initial results tend to suggest that family firms may favour implementation over communication, because they engage less in public displays of their commitments despite better or at least equal carbon performance and may, therefore, be less inclined to greenwash (Borsuk et al. 2024; Dyck et al. 2024; Kim et al. 2017). However, these results do not seem to hold among European publicly listed firms (Dyck et al. 2024; Lorenzen et al. 2024), which is our research context.

The interaction between the board of directors and ownership structure may help to further explain the individual and joint effects of BGD and FO on corporate climate strategies. Early studies have started to assess the specific interactions of BGD and FO to explain environmental reporting as well as performance outcomes, but the results remain ambiguous (Borsuk et al. 2024; Cordeiro et al. 2020; Maggi et al. 2023). This perspective is particularly promising to derive novel insights because BGD and FO are being discussed as potentially competing corporate governance mechanisms concerning environmental outcomes (Campopiano et al. 2019; Dyck et al. 2023; Fan et al. 2023; Farooq et al. 2023).

Overall, the mixed findings in previous literature indicate that there is significant untapped potential to understand climate talk and walk strategies within the European capital market. Following previous calls for research, we therefore aim to answer the research question of how BGD and FO affect corporate climate action, and whether BGD and FO influence climate talk and walk differently.

The European capital market is a particularly apposite setting to explore this topic, given that the European regulatory landscape strongly emphasizes climate legislation as well as gender equality in corporate governance. The goal of the ambitious EU Green Deal project and its related sustainable finance, reporting and corporate governance regulations is to achieve a climate-neutral economy by 2050. The dominant role of climate change can also be attributed to precise carbon reporting duties in line with the Corporate Sustainability Reporting Directive (CSRD), the EU Taxonomy Regulation and the Corporate Sustainability Due Diligence Directive (CSDDD), as well as the directive on mandatory female quotas on the board of directors in listed firms. These regulations are currently being discussed controversially, as the EU Commission plans to implement an 'omnibus' law to strengthen their linkages. Moreover, the particular context of our sample provides fertile ground to investigate the role of family owners in climate-related business decisions among European firms. On the one hand, family businesses represent a large fraction of all firms in the region, both in terms of economic output and carbon emissions (Botero et al. 2015; Gregorič et al. 2022). On the other hand, family owners, as key decision makers in many European firms, are uniquely positioned to boost (or slow down) the green transformation of the European economy, which has been under-researched to date.

Our paper contributes to the sustainability (carbon), corporate governance and family business literature in several ways.

First, our results shed light on the complex interplay between symbolic and substantive climate efforts, widely regarded as a key challenge within extant research. Second, besides the high practical relevance of achieving global decarbonization targets, our results further contribute to the academic discourse on greenwashing by providing quantifiable evidence on the extent to which firms follow up on their decarbonization commitments. Third, our findings support prior evidence that indicates that BGD and FO may be regarded as competing corporate governance mechanisms in terms of their influence on corporate climate strategies.

The rest of this paper is structured as follows. In Section 2, we summarize the findings of previous research and derive our hypotheses from a legitimacy theory perspective. In Section 3, we introduce the underlying data and method, before presenting the empirical results in Section 4. In Section 5, we discuss the results, including their robustness and limitations. In Section 6, we present our conclusions.

2 | Theory, Literature Review and Hypotheses

2.1 | Legitimacy Theory as Our Main Framework

Legitimacy theory has been identified as the most prevalent theoretical lens to explain the BGD–carbon relationship and is widely established in the literature, also in the family firm context (Nuber and Velte 2021; Panwar et al. 2014; Richards et al. 2017). Legitimacy is defined as a 'generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions' (Suchman 1995, 574), implying that organizations exist as part of broader social systems in which they gain legitimacy by aligning organizational interests with the expectations of the superordinate social system as part of an ongoing social contract (Dowling and Pfeffer 1975; Shocker and Sethi 1973). With the increasing urgency of climate change, stakeholder expectations are evolving from a reporting perspective focused on measuring and disclosing carbon emissions (Deegan 2002) towards the underlying carbon performance as a means to gain legitimacy (Qian and Schaltegger 2017).

From a legitimacy theory perspective, enhancing sustainable board dynamics to improve carbon reporting and performance should align organizational activities with societal expectations and ultimately favour firm legitimacy (Khatri 2024; Nuber and Velte 2021; Suchman 1995). Sustainable board composition, such as gender diversity among directors, affects its monitoring ability and thereby impacts carbon efforts (de Villiers et al. 2011).

BGD plays an important role in the process of gaining and maintaining legitimacy concerning climate outcomes, as female directors are more sensitive to environmental harm due to gender-specific socialization, which emphasizes altruism, benevolence and universalism (Glass et al. 2016; Liu 2018; Nadeem et al. 2020). Given their greater sensitivity for environmental impact, gender-diverse boards are regarded as more likely to respond adequately to environmental stakeholder interests, thereby presumably favouring legitimacy-seeking strategies.

However, the consequences of BGD for different types of legitimacy-seeking strategies may vary, with important implications for climate talk and walk. Based on Suchman's distinction between moral and pragmatic legitimacy, Taglialatela et al. (2024, 2894) argue that 'a higher proportion of women on the board could spur moral legitimacy seeking strategies that consist of increasing participation in public discourse proxied by more communication efforts'. According to Suchman (1995), although moral legitimacy is contingent on a normative evaluation of the organization's activities based on the audience's socially constructed value system, pragmatic legitimacy rests on the self-interested calculations of an organization's audiences, rendering the latter more transactional in nature.

Based on this distinction, Taglialatela et al. (2024) suggest that gender-diverse boards are more likely to adopt environmental strategies that focus on green communications (moral legitimacy-seeking) compared with environmental strategies that focus on implementing green practices (pragmatic legitimacy-seeking). Following their reasoning, we consider firms with more gender-diverse boards as more likely to engage in symbolic climate efforts that focus on climate-related communications such as climate talk (e.g., voluntary disclosure of carbon emissions). However, we do not anticipate increased BGD to significantly affect substantive climate efforts based on fundamental improvements in climate-related performance such as climate walk (e.g., meeting emission reduction targets).

Although the existing literature provides a very solid theoretical basis to build upon, there are several ways in which a distinct focus on climate talk and walk is warranted, going beyond previous research with a focus on environmental aspects more broadly. First and foremost, this relates to the predominant role of climate issues within the EU Green Deal project and its related regulations, drawing significant public attention to corporate climate transformation. Consequently, this raises the stakes for firms to either emphasize (or conceal) their climate progress. Within the EU taxonomy's six environmental objectives, climate change mitigation represents the most quantifiable and arguably also the most regulated objective (Velte 2024b). In contrast, other taxonomy objectives address the protection of marine resources, the transition to a circular economy and the protection of biodiversity, all of which are less specifically operationalized within the taxonomy regulation. Moreover, the European Sustainability Reporting Standards (ESRS) include a detailed standard on climate change (ESRS E1). Therefore, the growing regulatory pressure on climate actions aggravates firms' incentives to engage in symbolic climate efforts to maintain a legitimate stance. In other words, as climate issues tend to imply the most pressing legitimacy threats, a detailed analysis of symbolic and substantive climate efforts is warranted.

This notion is further reinforced by the diverse range of environmental outcomes studied in prior research, which may prove as too inclusive to allow for differentiated inference (Miroshnychenko et al. 2022). In fact, environmental performance is generally regarded as a multidimensional construct that needs to be decomposed into its specific dimensions (Endrikat et al. 2014). For instance, Taglialatela et al. (2024) covered a wide range of environmental aspects across the domains of pollution prevention (incl. carbon emissions),

supply chain management, product development, corporate governance aspects such as sustainability board committees, the firm's UN global compact signatory status or CSR assurance, among others. Yet, to distinguish between symbolic and substantive efforts, the ability to measure and quantify them more narrowly constitutes an important precondition. Our research setting concerning climate talk and walk provides a unique opportunity to differentiate between symbolic and substantive climate efforts. Namely, the inherent link between carbon reporting, the formalization of decarbonization objectives through targets and their subsequent achievement offer a unique setting to distinguish between symbolic/substantive climate efforts beyond previous studies.

2.2 | The Impact of BGD on Climate Talk and Walk

In the previous section, we have argued, from a legitimacy perspective, that gender-diverse boards are likely to respond adequately to environmental stakeholder interests. Yet, based on the distinction of moral and pragmatic legitimacy (Suchman 1995), we have further applied and extended the reasoning of Taglialatela et al. (2024) to theorize that more gender-diverse boards may emphasize specific legitimacy-seeking strategies to different extents. Accordingly, we consider BGD to be associated with a focus on climate talk (moral legitimacy-seeking) rather than climate walk (pragmatic legitimacy-seeking). Building upon these considerations, below, we further review recent empirical findings concerning the BGD–carbon link to substantiate our hypotheses.

Prior research on the impact of BGD on carbon reporting and performance has increased in recent years. In terms of *carbon reporting*, prior research finds that BGD is positively associated with the (voluntary) disclosure of carbon information, demonstrating the board's ability to effectively respond to stakeholder calls for climate reporting (Caby et al. 2024; Park et al. 2023; Taglialatela et al. 2024). Furthermore, not only the existence of carbon reporting but also the quality of the disclosed carbon information is affected positively, indicating that BGD is linked to higher carbon reporting quality (García-Sánchez et al. 2025; Houqe and Khan 2023; Nimer et al. 2024). Although most evidence is drawn from non-European settings, a positive link between BGD and carbon reporting is also supported for European firms (Jizi 2017; Taglialatela et al. 2024; Tingbani et al. 2020). The positive effect of BGD is particularly prevalent among corporate boards in which female directors represent a critical mass, stressing a substantive use of sustainable boards (Gavana et al. 2024; Nuber and Velte 2021).

Regarding *carbon performance*, similar findings concerning the positive effect of BGD can be observed. BGD is associated with higher carbon performance, both in terms of absolute emissions (García Martín and Herrero 2020; Issa and In'airat 2024; Konadu et al. 2022; Kordsachia et al. 2023; Kreuzer and Priberny 2022; Kyaw et al. 2022; Marchini et al. 2022; Muktadir-Al-Mukit and Bhaiyat 2024; Oyewo 2023; Valls Martínez et al. 2022) and emissions intensity (Altunbas et al. 2022; Benlemlih and Yavaş 2024; Elsayih et al. 2021; Kordsachia et al. 2023; Lu and Wang 2021; Nuber and Velte 2021; Rjiba and Thavaharan 2022; Toukabri and Jilani 2023).

As an important intermediate mechanism translating environmental ambition into quantifiable goals, recent studies have also started to assess the influence of BGD on *emission reduction targets*. Nimer et al. (2024) found that BGD is positively associated with the establishment of emission reduction targets. However, decarbonization targets and their potential to distinguish between symbolic and substantive climate efforts have thus far been underexplored. To the best of our knowledge, the relationship between BGD and the respective *achievement on a target-level* has not been studied before, similar to the approach of Ioannou et al. (2016). Moreover, the properties of these emissions targets, such as validation by the science-based targets initiative (SBTi) as an external quality signal regarding alignment with the Paris agreement, have not been explored in depth (Bendig et al. 2023).

Despite the abundant evidence of a positive BGD–carbon relationship, a growing number of studies raise questions as to what extent BGD actually catalyses substantive climate-related improvements compared with merely symbolic climate action (Ghitti et al. 2024; Haque 2017; Taglialatela et al. 2024). Although prior research documents that BGD is linked to more carbon reduction initiatives or better reporting, this may not materialize in the form of actual emission reductions (Cordova et al. 2021; Haque 2017; Narsa Goud 2022). As such, Haque (2017) stated that although gender-diverse boards are more likely to engage in carbon reduction initiatives (process-oriented carbon performance), they do not achieve actual improvements in carbon performance. In the same vein, Taglialatela et al. (2024) found that BGD is associated with a preponderance of green communication over implementation.

Based on legitimacy theory (moral vs. pragmatic legitimacy-seeking; see Section 2.1) and empirical research emphasizing that BGD may favour symbolic over substantive climate efforts, we assume that firms with more gender-diverse boards engage more in (symbolic) climate talk but do not engage more in (substantive) climate walk, as indicated in Hypothesis 1.

Hypothesis 1. *BGD increases climate talk but not climate walk.*

2.3 | The Impact of FO on Climate Talk and Walk

From a legitimacy perspective, prior research argues that family firms are expected to be more concerned about their reputation and therefore put a particular emphasis on maintaining their legitimacy (Brunelli et al. 2024; Ma 2023; Maughan 2023). Thus, for the owning families whose image and reputation are tied to the business, the pursuit of legitimacy in general tends to be an important issue (Bammens and Hünermund 2020; Sageder et al. 2018). However, to gain legitimacy, family firms may prioritize engaging in other areas of corporate social responsibility beyond environmental matters. Namely, family firms have been found to favour social over environmental aspects, for example, in terms of strong social ties with their local communities (Herrero et al. 2024; Kim et al. 2024; Miroshnychenko et al. 2024), while also focusing more strongly on closer (internal) stakeholder groups (Block et al. 2024; Rivera-Franco et al. 2024).

In this regard, applying the concept of moral versus pragmatic legitimacy (Suchman 1995; Taglialatela et al. 2024) to the relationship between FO and climate talk and walk adds new insights to the debate on the symbolic versus substantive climate strategies among family firms. Considering the case of voluntary sustainability certifications as a communicative act, Richards et al. (2017) theorize that family firms predominantly derive moral legitimacy from well-established close relationships with stakeholders in the 'domestic world', reducing the need to communicate their sustainable practices more widely (Baumann-Pauly et al. 2013). Thus, Richards et al. (2017) suggest that family firms that frequently enjoy considerable trust in their communities are likely to believe that their family legacy and reputation guarantee sufficient legitimacy, diminishing their desire to engage in sustainability-related communications.

Extending this notion, we propose that family firms are less likely to seek moral legitimacy through symbolic climate-related communications, for example, voluntary emissions disclosure. We anticipate that family firms, having more concentrated shareholdings and dominant family owners, answer to a smaller investor base compared with firms with dispersed ownership. Consequently, family firms should be less dependent on gaining external legitimacy by engaging in climate talk.

At the same time, the 'domestic world' metaphor as a source for legitimacy in family firms described by Richards et al. (2017) implies a stronger focus on more proximate stakeholder groups, based on nonanonymous personal relationships, being negotiated at a local level between directly involved parties. This strongly resembles the pragmatic legitimacy construct introduced by Suchman (1995), in which firms gain legitimacy by more directly addressing the needs of self-interested stakeholders, such as customers or suppliers (Taglialatela et al. 2024), thereby following a more transactional give-and-take logic of legitimacy compared with moral legitimacy. Thus, contrary to their supposed under-engagement in symbolic climate talk, we consider family firms to be as likely as nonfamily firms to engage in substantive climate-related efforts (climate walk). We therefore argue that to protect their reputation in the 'domestic world', family firms seek to satisfy measurable demands of their direct audiences, for example, in the form of realized carbon emission reductions.

Empirically, in terms of *carbon reporting*, Terlaak et al. (2018) documented a non-linear effect of FO on carbon reporting, with negative consequences for moderate levels of FO, turning positive for absolute majority ownership. Qosasi et al. (2022) found a positive relationship between FO and carbon reporting, especially when the controlling family is involved in management.

In terms of *carbon performance*, Borsuk et al. (2024) found a positive effect of family involvement on carbon performance. Dyck et al. (2024) stressed that family-controlled firms exhibit equal carbon performance and even outperform nonfamily firms in countries with weak climate regulation. According to Gómez-Mejía et al. (2025), family firms under the EU emission trading system, most of which are private firms, pollute less. Earlier studies have also addressed pollution and its toxicity, such as the seminal work of Berrone et al. (2010) showing that US family firms pollute less. Oussii and Jeriji (2024) further identified a negative moderating effect of FO for the BGD–carbon performance relationship. Apart from the studies of Borsuk et al. (2024), Gómez-Mejía et al. (2025) and Dyck et al. (2024), the prior evidence on the family firm–carbon relationship is largely drawn from single-country designs with relatively small samples, such as South Korea, Indonesia and Italy.

Addressing differences in symbolic and substantive decarbonization strategies, Block et al. (2024, 14) found that 'family-owned firms seem to be less attentive than nonfamily-owned firms toward external stakeholder pressures'. Previous research showed that family-owned firms tend to engage less strongly in climate talk—that is, different communicative efforts of a symbolic nature—while engaging at least equally in climate walk. More specifically, family firms are found to engage less in public displays of their commitments despite better or at least equal carbon performance (Borsuk et al. 2024; Dyck et al. 2024). As such, 'family firms tackle carbon emissions with actions and are simply not interested in producing formal policy statements or engaging in "box-checking"' (Dyck et al. 2024, 27), indicating that while polluting less, family firms also communicate less about it (Borsuk et al. 2024).

Similarly, family firms are found to connect environmental attention with subsequent action, thereby being less likely to greenwash (Kim et al. 2017). However, these results are subject to several contingencies, questioning their validity among European publicly listed firms. Namely, the results may not apply to European countries, publicly listed firms and ownership-based family firm definitions (Dyck et al. 2024; Lorenzen et al. 2024).

Because the FO–carbon link has attracted comparably little research to date, we further contextualize the findings with evidence on environmental reporting and performance more broadly, of which carbon issues represent only one subpillar. In terms of *environmental reporting*, Maggi et al. (2023) and Ma et al. (2022) stressed a negative effect of FO, which is mitigated by a critical mass of female board members or family board chairs. Arena and Michelon (2018) indicated that strong family control and influence is associated with less environmental disclosure, whereas a strong family identity is linked to higher environmental disclosure. Likewise, Cabeza-García et al. (2017) found negative consequences of family involvement for sustainability disclosure more widely. In terms of *environmental performance*, recent meta-analyses stressed mixed results (Lorenzen et al. 2024; Miroshnychenko et al. 2022). On the one hand, family businesses exhibit slightly worse environmental performance (Miroshnychenko et al. 2022). On the other hand, family firms are found to not differ from nonfamily firms, even performing better when it comes to their environmental footprint (Lorenzen et al. 2024).

Overall, considering the moral versus pragmatic legitimacy perspective as well as the recent empirical evidence in favour of family firms potentially prioritizing implementation over communication, we consider FO to be negatively related with climate talk, yet having no noticeable effect on climate walk.

Hypothesis 2. *FO decreases climate talk but not climate walk.*

2.4 | FO as a Moderator of the Relationship Between Female Board Directors and Climate Talk and Walk

Considering the different preferences of family-owned versus nonfamily-owned firms to gain and maintain legitimacy, we hypothesize that FO (pragmatic legitimacy seeking) may mitigate or even counteract the positive impact of higher BGD (moral legitimacy seeking), especially when it comes to climate-related communications. Although board oversight is an important mechanism to limit poor environmental conduct, family firm boards may be dominated by family members whose family or economic priorities exceed environmental concerns (Galbreath 2017; Miroshnychenko et al. 2024).

Several recent studies have addressed the specific interaction between BGD and FO, indicating that BGD enhances environmental reporting and performance, whereas FO tends to inhibit this relationship, suggesting a potential negative moderating effect. Maggi et al. (2023) and Dyck et al. (2023) found a positive effect of BGD towards environmental disclosure and performance, which is reduced (but not fully offset) by family control. The adverse consequences are particularly prevalent in firms with strong family control (Arena and Michelon 2018). Reinforcing the negative perspective, the broader sustainability reporting literature shows that although BGD promotes it, the positive influence is constrained by family involvement: Stronger involvement of the family in the business is associated with a dysfunctional view in which boards reinforce family interests at the expense of sustainability reporting (El Ghoul et al. 2016; Farooq et al. 2023; Oh et al. 2019).

A potential mechanism explaining the hypothesized negative moderating effect of FO on the BGD–carbon relationship lies in lower levels of independence among female family board members (Ali Gull et al. 2023; Biswas et al. 2022; Campopiano et al. 2019; Fan et al. 2023; Gavana et al. 2024; Ghaleb et al. 2024; Rodríguez-Ariza et al. 2017; Wang et al. 2023; Yu et al. 2021). Applying these rationales and findings to our climate talk and walk setting, we hypothesize that FO negatively moderates the relationship between BGD and climate talk and walk.

Hypothesis 3. *FO negatively moderates the relationship between BGD and climate talk and walk.*

Figure 1 summarizes our conceptual model.

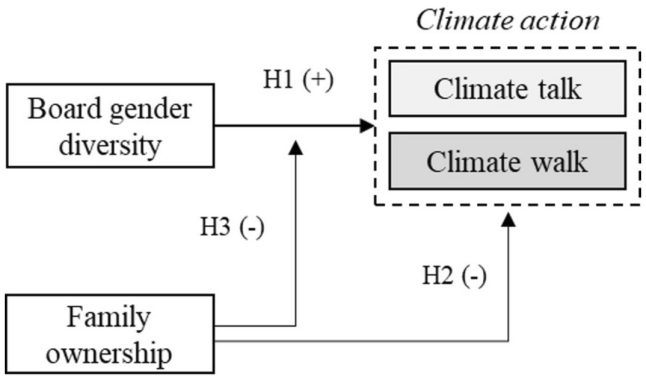

FIGURE 1 | Overview of hypotheses.

3 | Data and Method

3.1 | Sample

The dataset is compiled from three sources. First, our sample incorporates all European publicly listed firms invited to participate in the CDP (formerly known as the Carbon Disclosure Project) survey between 2010 and 2021, including nonrespondents. We focus on the European capital market since extant research has mostly addressed US samples (e.g., Berrone et al. 2010; Block and Wagner 2014; Cordeiro et al. 2020), whereas the scarce evidence concerning Europe remains ambiguous (Dyck et al. 2024). Our focus can be further justified by the EU Green Deal project and the major goal to reach a climate-neutral economy by 2050, leading to the necessity of successful corporate carbon transformation. Our specific sampling period and the European context allow us to capture a timeline of relevant decarbonization efforts among European firms after the financial crisis of 2008–2009, with a substantial uptake of voluntary emissions disclosure. With our observation period between 2010 and 2021, we specifically focus on the time prior to the introduction of the EU CSRD and the EU BGD Directive in 2022. Thus, our sampling period ensures a homogeneous regulatory environment, as these legislative changes entail significant consequences for our model variables, both the dependent and independent ones. Second, financial and ESG data from Refinitiv are matched to the CDP sample firms. Third, global ultimate ownership information is drawn from the Bureau van Dijk Orbis Europe database, which is widely used in similar studies (Block et al. 2024; Meier and Schier 2021; Requejo et al. 2018). The sample collection process is summarized in Table 1.

The total number of publicly listed CDP firms (respondents and nonrespondents) remains stable over time. Similar to other studies, we exclude financial service firms (Haque 2017; Nuber and Velte 2021). Furthermore, to clean the dataset, we drop observations from firms that are missing in any of the three databases (Orbis Europe, Refinitiv, CDP). The implied data loss decreases over time with improving carbon reporting quality. Overall, this results in an unbalanced panel of 1387 firms (9597 firm-year observations).

The composition of the sample across countries and industries is presented in Table 2. The country with the highest number of firms is the United Kingdom, followed by Germany, France and Switzerland. Regarding the sample's industry structure, manufacturing firms are predominant, followed by other energy-intensive industries including mining, utilities, transportation and real estate. Thus, apart from information technology, the sample is composed of many firms from heavy industries with high emission intensity.

3.2 | Variables

3.2.1 | Dependent Variables

To study the effect of BGD and FO on climate talk and walk, we consider different aspects of the firms' climate actions. We address increasingly selective measures of climate action across different levels, from the mere reporting of carbon emissions, to setting emission reduction targets, to achieving these targets,

TABLE 1 | Sample collection.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Publicly listed CDP firms from Europe	2938	2960	2994	2997	3000	2959	2924	2873	2825	2746	2660	2559
less												
Financial service firms	536	539	554	557	547	541	532	521	516	505	493	481
Firms with missing values in CDP, Refinitiv or Orbis database	1812	1808	1815	1809	1800	1714	1678	1573	1266	1127	971	1143
Final sample	590	613	625	631	653	704	714	779	1043	1114	1196	935

thus allowing us to differentiate between *climate talk* and *walk*. Specifically, we consider five items (see Appendix A for a full description). First, we consider *participation* in the CDP survey, which is widely used in similar studies as a dummy variable concerning the voluntary disclosure of carbon emissions (Ben-Amar et al. 2017; Caby et al. 2024). Second, we consider the subsequent *publication* of the CDP survey data, which represents a standalone decision irrespective of CDP participation (Ott et al. 2017). Third, we analyse whether a firm has set an *emission reduction target*, which has been used in prior studies of firms' decarbonization objectives (Nimer et al. 2024).

These three variables (*participation*, *publication* and *target*) relate to the disclosure of carbon information or the intention to reduce carbon emissions and, thus, represent communicative efforts that are not representative of any substantive underlying efforts to reduce emissions. Although target setting implies a public commitment to reduce emissions (Borsuk et al. 2024), prior research shows that targets may be used as a tool to gain superficial legitimacy without following up on these commitments (Dahlmann 2024). Therefore, we consider these three items as part of our *climate talk* variable, representing symbolic climate actions.

As increasingly substantive climate actions and, hence, part of our *climate walk* variable, we consider *science-based targets* (SBTs) and the *adherence to these targets*. SBTs are emission reduction targets that are validated externally by the SBTi and are regarded as significantly more challenging compared with prevailing emission reduction targets due to their alignment with climate science (Ben-Amar et al. 2024; Bendig et al. 2023; Dahlmann 2024; Mateo-Márquez et al. 2025).

Finally, as the fifth and most substantive climate action measure, we incorporate the *adherence to targets*. Aside from the application in Ioannou et al. (2016), the adherence to targets is not yet widely used in the literature but holds significant potential to differentiate between climate talk and walk. Decarbonization targets exhibit substantial complexity along several dimensions, including their extent, form and time horizon (Bendig et al. 2023; Dahlmann et al. 2019). To accommodate different emission reduction targets in our analysis, we introduce the variable *adherence*, which is computed for each firm-year based on the delta between time passed for a given target and the (partial or full) achievement of this target. We draw from a pool of 14,362 data points of firm-year targets to calculate the adherence variable. Our approach is in line with Ioannou et al. (2016), except that we also incorporate ongoing targets, allowing us to consider a larger number of targets, and also reflect the 'work-in-progress' nature of firms' climate transitions. The targets in our sample have an average duration of 9.68 years, measured from start to target year. Overall, 25.41% of all targets are fully elapsed, whereas 74.59% are ongoing targets. On average, 66.70% of all targets are being met successfully (or are on track to do so), a ratio that is relatively stable across industries. A full description of the respective variable definitions, as well as a breakdown of the target-level data, can be found in Appendices A and B.

Generally, there are several barriers to target comparability, for example, differences in emission scopes, partial exclusion of certain emission subcategories or varying target duration and baseline years (Dahlmann 2024). To overcome these challenges and account for the diversity in emission reduction targets, *adherence* is introduced as a relative measure of progress made against a given target. This variable captures in relative terms to what extent firms achieve their committed decarbonization targets, contingent on each target's inherent characteristics. Thereby, we can address a considerably larger sample of targets compared with previous analyses, increasing the robustness of our results significantly.

In turn, this approach raises the need to also address the level of target ambition in our analysis to not penalize more ambitious (harder-to-achieve) targets vis-á-vis less ambitious ones. We account for this by using science-based targets as a proxy for target ambition (Ben-Amar et al. 2024; Bendig et al. 2023).

Finally, by also including ongoing targets and evaluating their partial achievement, our analysis builds on the assumption of time-proportional emission reduction pathways. Generally, firms that are behind schedule to meet a given target could in theory be able to catch up in later years. Yet, absent a more comprehensive strategic rationale (e.g., anticipated non-linear technological advancements), planning for disproportionate reductions at the end of the target period may itself decelerate decarbonization efforts, especially if expectations of more extensive emission reductions do not materialize towards the target's final year (Dahlmann 2024; Malen 2022).

3.2.2 | Independent Variables

As the model's two main independent variables, we employ BGD (*BGD*) and FO (*famown*). To operationalize BGD, we use the percentage of female board members, which is widely used in similar studies (Caby et al. 2024; Houqe and Khan 2023; Lemma

TABLE 2 | Sample composition by country and industry.

Panel A: By country	Number	Percent
Austria	189	1.97
Belgium	258	2.69
Cyprus	1	0.01
Czech Republic	12	0.13
Denmark	271	2.82
Finland	339	3.53
France	1027	10.70
Germany	1047	10.91
Greece	87	0.91
Hungary	41	0.43
Iceland	4	0.04
Ireland	267	2.78
Italy	113	1.18
Luxembourg	84	0.88
Malta	7	0.07
Netherlands	300	3.13
Norway	269	2.80
Poland	251	2.62
Portugal	60	0.63
Romania	2	0.02
Russia	254	2.65
Slovenia	6	0.06
Spain	324	3.38
Sweden	592	6.17
Switzerland	781	8.14
Turkey	96	1.00
United Kingdom	2915	30.37
Total	9597	100.00

Panel B: By industry (NAICS sector)	Number	Percent
Accommodation and Food Services	179	1.87
Admin. Support, Waste Mgmt. and Remediation Services	284	2.96
Agriculture, Forestry, Fishing and Hunting	45	0.47
Arts, Entertainment and Recreation	108	1.13
Construction	433	4.51
Educational Services	6	0.06
Health Care and Social Assistance	73	0.76
Information	860	8.96
Management of Companies and Enterprises	4	0.04
Manufacturing	3812	39.72
Mining, Quarrying and Oil and Gas Extraction	564	5.88
Other Services (except Public Administration)	51	0.53
Professional, Scientific and Technical Services	653	6.80
Real Estate and Rental and Leasing	732	7.63
Retail Trade	642	6.69
Transportation and Warehousing	439	4.57
Utilities	474	4.94
Wholesale Trade	238	2.48
Total	9597	100.00

et al. 2023; Nimer et al. 2024). Considering the time needed to implement climate-related policies, we use lagged values of the independent variables ($t-1$); lagging the variables, along with our robustness tests, allows us to identify causal relationships (Zhang et al. 2022). Besides the ratio of female board members, we also use the Blau index (*blau_index*) as an alternative measure of BGD in our robustness tests (Maggi et al. 2023).

To operationalize FO, we use a dummy variable indicating whether the firm is owned by 'one or more named individuals or families' at the global ultimate ownership level. Similar to other family business studies, in our main analysis, we use the 25.01% threshold (Requejo et al. 2018). The global ultimate ownership data is only available for one time period, implying stability over time. This is common practice in other studies (Ali et al. 2007; Brune et al. 2019a) as FO is regarded as relatively persistent, with little variation over shorter time periods, partly due to the long transgenerational time horizon of family owners. However, we also test lower FO thresholds used in other studies, namely, more than 5% or 10% of FO, respectively. To complement our main FO variable and to address some data limitations, these are computed at the direct shareholders level rather than the global ultimate ownership level (*famown_direct*). In our robustness tests, we furthermore analyse family management (*fam_mgmt*), which enables us to capture whether the family owners are directly involved in the firm's management. A detailed overview of all variables can be found in Appendix A.

3.2.3 | Control Variables

Similar to previous related studies (Borsuk et al. 2024; Döring et al. 2023), we control for firm financial characteristics such as profitability (*roa*) and firm size (*size*) as measured by the

logarithm of total assets. More profitable and larger firms are expected to devote more resources to climate-related initiatives, such as carbon reporting (Baumann-Pauly et al. 2013; Wickert et al. 2016). As corporate governance-related controls, we consider board independence (*independence*), board size (*B_size*), the number of board members' affiliations (*B_affiliation*) and board members with specific skills (*B_skills*), in line with prior research (Haque 2017; de Villiers et al. 2011). We also include complementary sustainable board governance variables beyond BGD that are found to positively affect carbon reporting and performance (Velte 2025), namely, sustainability-related management compensation (*incentive*) and the existence of a sustainability board committee (*CSR_comm*). As an inverse measure of blockholder effects (Fattoum-Guedri et al. 2018), we include the percentage of shares in free float (*float*). Furthermore, we control for total emission intensity (*emissions*) to account for differences in high- versus low-emitting firms, in line with recent discussions in the literature in favour of emission intensity (Aswani et al. 2024). Higher emissions expose firms to greater carbon risks, potentially leading to an increased focus in managing their emissions but also greater incentives to potentially conceal their environmental harm (Asafu-Adjaye and Mahadevan 2013; Littlewood et al. 2018). Finally, we include firm age (*ln_age*) as an additional control, which may serve as a proxy for generational effects among family firms (Richards et al. 2017). In line with common practice, we have treated outliers by winsorizing values at the 1st and 99th percentiles to avoid distortion in our estimates.

3.3 | Model

We run several random-effects panel data models, all of which include year- and industry-fixed effects. Methodologically, given that FO is time-constant in our sample, we need to rely on random-effects estimators, similar to Brune et al. (2019b); fixed-effects estimators cannot be used in our setting. More specifically, it is not possible to estimate the effects of time-invariant variables using fixed-effects models since they are eliminated because of perfect collinearity (Schunck 2013). As Wooldridge (2013) explains 'The transformation in [the random-effects estimator] allows for explanatory variables that are constant over time, and this is one advantage of random effects (RE) over either fixed effects or first differencing'; the econometrician also states that 'if the key explanatory variable is constant over time, we cannot use FE to estimate its effect'. Given that FO is regarded as relatively stable over time, random-effects estimators are commonly used to test the role of FO for environmental performance and CSR more widely (Cordeiro et al. 2020; Farooq et al. 2023).

$$\begin{aligned} Climate\ talk/walk_{it} = {} & \beta_0 + \beta_1{}^{*}BGD_{i,t-1} + \beta_2{}^{*}famown_{i,t-1} \\ & + \beta_3{}^{*}BGD_{i,t-1} \times famown_{i,t-1} \\ & + \beta_4{}^{*}independence_{i,t-1} + \beta_5{}^{*}incentive_{i,t-1} \\ & + \beta_6{}^{*}CSR\_comm_{i,t-1} \\ & + \beta_7{}^{*}B\_size_{i,t-1} \\ & + \beta_8{}^{*}B\_skills_{i,t-1} + \beta_9{}^{*}B\_affiliation_{i,t-1} \\ & + \beta_{10}{}^{*}emissions_{i,t-1} + \beta_{11}{}^{*}roa_{i,t-1} \\ & + \beta_{12}{}^{*}size_{i,t-1} + \beta_{13}{}^{*}ln\_age_{i,t-1} \\ & + \beta_{14}{}^{*}\ float_{i,t-1} + yearFE + industryFE + e_{it} \end{aligned}$$

We use lagged values for the independent and control variables to consider the time needed to implement climate-related policies and to be able to establish causal relationships. Acknowledging that endogeneity issues permeate both the family firm as well as the carbon literature, we additionally perform a number of robustness tests (Zhang et al. 2022). Besides the use of panel data and lagged explanatory variables, we further replicate our results using alternative variable definitions, which allows us to mitigate endogeneity from measurement error. Moreover, we use *coarsened exact matching* (CEM) to find comparable treatment and control groups in order to alleviate endogeneity problems related to selection bias or omitted variables (Blackwell et al. 2009). Finally, we conduct a two-stage least squares regression (2SLS) using instrumental variables to substantiate the results derived from our base model. In this way, we can mitigate endogeneity attributable to reverse causality (see Section 4.2 for a detailed discussion).

3.4 | Descriptive Statistics

Tables 3 and 4 present the descriptive statistics of the variables as well as their pairwise correlation. The descriptive statistics indicate that the sample mean ratio of BGD is 23.5%. Meanwhile, family firms represent 19.8% of all observations (6.2% being managed by family members). At lower FO thresholds (based on direct ownership), family firms represent between 21.5% and 31.5% of observations, albeit for a smaller sample due to reduced data availability of direct shareholder data.

The pairwise correlations suggest that there are no multicollinearity problems in our regression analyses. The highest correlations among independent variables are between size and board size (0.566). Computing variance inflation factors (VIFs) indicates that multicollinearity issues likely do not affect our analyses. The VIF values for all variables lie between 1 and 3—that is, they fall well below established thresholds (Fox and Monette 1992; O'brien 2007).

Similar to Miroshnychenko et al. (2022), we further conduct two-sample *t*-tests on the equality of means to explore univariate differences among family and nonfamily firms (see Table 5). Our preliminary findings indicate that family firms tend to engage less in climate talk and walk.

4 | Results

4.1 | Main Analysis

The base model results (see Table 6) indicate that BGD has a significant positive relationship with climate talk ($p < 0.05$) but not with climate walk (n.s., see Models 1–3). Thus, Hypothesis 1 is fully supported. These results indicate that firms with more gender-diverse boards engage more in climate-related communications (talk), but not more in terms of substantive climate-related efforts (walk). Our results also suggest significant negative effects of FO on climate walk ($p < 0.05$) but not on climate talk (n.s.), contrary to Hypothesis 2 (see Models 1–3). Beyond statistical significance, these findings are also economically meaningful. The negative consequences of FO for climate

TABLE 3 | Descriptive statistics.

	N	Mean	Median	Std. dev.	Min	Max
Dependent						
talk_and_walk	9597	1.802	1.000	1.823	0	5
talk	9597	1.396	1.000	1.372	0	3
walk	9597	0.406	0.000	0.77	0	2
Independent						
BGD	9597	23.524	23.077	14.451	0	80
blau index	9597	0.318	0.355	0.155	0	0.5
famown	9597	0.198	0.000	0.399	0	1
famown direct 10pct	4125	0.215	0.000	0.411	0	1
famown direct 5pct	4125	0.315	0.000	0.465	0	1
fam mgmt	9597	0.062	0.000	0.241	0	1
Controls						
independence	9597	54.612	55.556	25.424	0	100
incentive	9597	0.322	0.000	0.467	0	1
csr com	9597	0.687	1.000	0.464	0	1
B size	9597	10.022	9.000	3.648	4	21
B skills	9597	41.757	41.667	22.547	0	92.308
B affiliation	9597	0.882	0.769	0.648	0	3
emissions	9597	363.484	41.081	1035.788	0.124	6980.331
roa	9597	4.876	4.570	8.021	−40.401	34.485
size	9597	22.027	21.938	1.568	16.337	26.739
ln age	9597	3.145	3.135	1.006	0	4.898
freefloat	9597	70.9	77.934	27.093	0.53	100

walk ($\beta = -0.0998$) correspond to 18.17% (= [−0.0998/0.77]*100) of a standard deviation of the walk variable, indicating the practical relevance of this evidence.

In our hypotheses, we had anticipated that family-owned firms would be less inclined to seek moral legitimacy and thereby engage less in climate-related communications. Among others, we derived these hypotheses from the previous literature, indicating that family firms enjoyed considerable trust based on their well-established close relationships with their proximate stakeholders in the 'domestic world' (Richards et al. 2017), resulting in a lower necessity for climate communication. We interpret our results as evidence that these theoretical perspectives may be less applicable to the case of large publicly listed family firms. Generally, these firms have already transformed significantly by going public, opening themselves up to the capital markets and the corresponding disclosure requirements. Thus, the theoretical arguments that imply a lower propensity for climate-related communications may not be as applicable for the group of publicly listed family firms.

Despite the fact that the European sample is generally subject to common regulation in climate matters, in Models 4 and 5, we also control for country-level effects. The results from these models are in line with the base model results. Only the relationship between BGD and climate talk is now significant at the $p < 0.1$ level (before: $p < 0.05$).

Against this background, we have also tested the sensitivity of our results with regard to lower FO thresholds (see Models 6–11). We now observe a negative relationship between FO and climate talk ($p < 0.05$), but not with climate walk. We interpret this as evidence that a decrease in the levels of family control also coincides with less negative consequences of FO for substantive climate efforts; the detrimental effect of FO in this case tends to be more pronounced for higher levels of FO. Yet, at the lower FO thresholds, family firms seem to engage less in symbolic climate talk, while not differing from nonfamily firms in terms of climate walk.

Finally, concerning Hypothesis 3, we do not find a significant moderating role of FO in the relationship between BGD and

TABLE 4 | Pairwise correlations.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1) *talk_and_walk*	1.00																			
(2) *talk*	0.922*	1.00																		
(3) *walk*	0.725*	0.402*	1.00																	
(4) *BGD*	0.196*	0.177*	0.149*	1.00																
(5) *blau_index*	0.219*	0.201*	0.160*	0.944*	1.00															
(6) *famown*	−0.131*	−0.125*	−0.087*	−0.01	−0.038*	1.00														
(7) *famown_direct_10pct*	−0.147*	−0.141*	−0.097*	−0.02	−0.04	0.177*	1.00													
(8) *famown_direct_5pct*	−0.174*	−0.167*	−0.115*	−0.01	−0.02	0.174*	0.771*	1.00												
(9) *fam_mgmt*	−0.073*	−0.077*	−0.034*	−0.058*	−0.076*	0.517*	0.143*	0.124*	1.00											
(10) *independence*	0.186*	0.187*	0.108*	0.216*	0.248*	−0.158*	−0.123*	−0.144*	−0.054*	1.00										
(11) *incentive*	0.214*	0.205*	0.141*	0.117*	0.111*	−0.078*	−0.110*	−0.110*	−0.053*	0.129*	1.00									
(12) *csr_com*	0.424*	0.422*	0.253*	0.163*	0.187*	−0.127*	−0.157*	−0.183*	−0.076*	0.165*	0.213*	1.00								
(13) *B_size*	0.315*	0.254*	0.292*	0.062*	0.094*	−0.01	−0.092*	−0.090*	−0.062*	−0.146*	0.111*	0.235*	1.00							
(14) *B_skills*	−0.050*	−0.01	−0.092*	−0.196*	−0.180*	−0.079*	−0.134*	−0.157*	−0.01	0.030*	0.077*	0.02	−0.220*	1.00						
(15) *B_affiliation*	0.216*	0.202*	0.152*	0.073*	0.079*	−0.069*	−0.210*	−0.231*	−0.00	0.203*	0.127*	0.169*	0.092*	0.142*	1.00					
(16) *roa*	0.02	0.01	0.02	−0.047*	−0.048*	0.041*	−0.02	−0.01	0.068*	0.00	−0.02	−0.01	−0.047*	0.051*	0.01	1.00				
(17) *size*	0.438*	0.368*	0.380*	0.101*	0.116*	−0.040*	−0.180*	−0.195*	−0.028*	0.114*	0.183*	0.324*	0.566*	−0.155*	0.343*	−0.055*	1.00			
(18) *ln_age*	0.180*	0.184*	0.099*	0.100*	0.104*	0.01	−0.02	0.00	−0.064*	0.00	0.042*	0.141*	0.104*	−0.071*	0.049*	0.01	0.080*	1.00		
(19) *freefloat*	0.156*	0.151*	0.099*	0.045*	0.079*	−0.353*	−0.168*	−0.173*	−0.164*	0.302*	0.087*	0.100*	−0.130*	0.227*	0.199*	0.031*	−0.00	−0.00	1.00	
(20) *emissions*	−0.053*	−0.054*	−0.028*	−0.116*	−0.119*	−0.02	−0.03	−0.066*	0.01	−0.046*	0.01	0.02	0.088*	−0.041*	0.02	−0.070*	0.140*	−0.067*	−0.149*	1.00

*$p < 0.01$.

TABLE 5 | Univariate tests.

	Nonfamily (1) *Mean*	Family (2) *Mean*	Difference in means (1)–(2)
Talk and walk	1.922	1.321	0.601***
Talk	1.482	1.049	0.433***
Walk	0.439	0.271	0.168***

Note: This panel presents the two-sample *t*-tests with unequal variances on the equality of means with respect to the total climate talk and walk, as well as the talk and walk variables individually, by family and nonfamily firms.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

climate talk and walk; thus, Hypothesis 3 is not supported (see Models 1–3).

Notably, the positive significant effect of BGD on climate talk and walk is observed only when firms have at least two ($p < 0.1$) or three ($p < 0.05$) female board members, thereby reinforcing the notion of the critical mass theory (see Table 7, Models 1–3). We interpret these results as evidence that boards with one female director, potentially being appointed just as a 'token' director (Torchia et al. 2011), are not sufficiently equipped to promote and implement corporate climate strategies. Only with more notable steps towards equal representation do significant positive effects arise in our analysis.

Considering the positive consequences of BGD and the negative consequences of FO in the main models, as well as the evidence in favour of more female directors to achieve the desired outcome, we conclude that a more detailed look into the interaction between female board members and FO is warranted. In Table 7, the interaction is therefore split by family and nonfamily firms and their respective number of female directors (none, more than one, more than two). Across all models (climate talk and walk), the results indicate that family-owned firms benefit from having relatively more female directors. Specifically, family firms without female board members perform worse in terms of climate talk and climate walk, whereas family firms with at least one female board member (see Models 4–6) perform better (i.e., less negative). Family firms with more than two female directors perform best compared with their counterparts with less female directors (see Models 7–9). These results indicate that female board members have a mitigating effect in family firms. In particular, the negative direct effect of FO on climate talk and walk decreases as family firms incorporate more females into their boards.

4.2 | Robustness Tests and Endogeneity Checks

To test the robustness of the results derived from the random-effects models, we conduct several additional analyses. First, we replicate the main results using alternative variable definitions for both explanatory and dependent variables. The positive direct effect of BGD ($p < 0.05$) and the negative direct effect of FO ($p < 0.1$) for climate talk and walk are confirmed using the *emission score* from LSEG (formerly known as Refinitiv) as an external measure approximating our climate-related dependent variables from the CDP data (see Table 8, Model 1). Furthermore, the results remain robust for different definitions of BGD, namely, the *Blau index* ($p < 0.05$), which has been widely used as an alternative BGD measure (Maggi et al. 2023; Nuber and Velte 2021) (see Table 8, Model 2).

Although our analysis focuses on FO, we also test differential effects of family involvement in management. Contrary to the findings concerning FO, the results do not show a significant relationship between *family management* and climate talk and walk (see Table 8, Model 3). This finding is in line with the meta-analytic results of Lorenzen et al. (2024), suggesting that FO, but not family management, has a significant negative relationship with environmental sustainability performance.

Second, to account for the underlying variable structure in our climate talk and walk measures, we further introduce *ordered logistic regression models* (Fullerton 2009) to further strengthen the validity of our base regressions. These are applicable to situations in which the dependent variable(s) represents two or more categories in sequential order, where larger values represent 'higher' outcomes. This resembles the structure of our climate talk and walk variables, where a higher value corresponds to increasingly substantive climate efforts. The results of the ordered logistic regressions (see Table 8, Models 4–6) further support the findings from our base regressions.

Third, to substantiate the estimation of causal effects, we use *coarsened exact matching* (CEM) to construct comparable treatment and control groups. CEM is a matching method used to improve the estimation of causal effects by reducing imbalance in covariates between treated and control groups and holds several practical advantages over other matching approaches (Blackwell et al. 2009). As a matching method, CEM addresses endogeneity problems based on selection bias or omitted variable bias (Zhang et al. 2022). We apply the CEM command in Stata, using firm size, industry, and country as matching criteria and FO as treatment (with nonfamily as the control group). Matching based on firm size, industry and country takes into account the limited total number of family firms to be matched. We use the 'k2k' specification, creating treatment and control groups of equal sizes, which implies losing some observations. This gives a CEM-matched subsample of 466 firms, equivalent to 2728 firm-year observations. We opt for the 'k2k' specification as this is a more restrictive approach compared with matching multiple nonfamily firm observations to one family firm observation using weights. Further, we implement the CEM matching at the firm level rather than by observation. More specifically, we match firms at the beginning of the sample period based on their first year of occurrence to compare the evolution of matched firms over time. This process effectively reduces the imbalance in covariates between treatment (family-owned) and control groups, as measured by the multivariate L1 distance (Blackwell et al. 2009). In our analysis, the L1 distance is reduced from 0.671 (prematch) to 0.016 (postmatch), indicating increased similarity between treatment and control groups. A further overview of how the matching reduces variation between treatment and control groups is presented in Appendix C.

TABLE 6 | Base regression results: Random-effects panel regressions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Talk & walk	**Talk**	**Walk**	**Talk**	**Walk**	**Talk & walk**	**Talk**	**Walk**	**Talk & walk**	**Talk**	**Walk**
$BGD_{i,t-1}$	0.00448**	0.00411**	0.000382	0.00332*	0.000250	0.00625**	0.00567**	0.000505	0.00622**	0.00568**	0.000472
	(0.00193)	(0.00180)	(0.000427)	(0.00187)	(0.000425)	(0.00271)	(0.00244)	(0.000609)	(0.00271)	(0.00243)	(0.000606)
$famown_{i,t-1}$	−0.272**	−0.171	−0.0998**	−0.102	−0.0865**						
	(0.133)	(0.119)	(0.0430)	(0.116)	(0.0434)						
$famown\_BGD_{i,t-1}$	0.00124	0.000410	0.000620	0.000549	0.000501	−0.00555	−0.00603*	0.000327	−0.00543	−0.00599*	0.000362
	(0.00462)	(0.00433)	(0.000955)	(0.00431)	(0.000969)	(0.00365)	(0.00309)	(0.00125)	(0.00365)	(0.00308)	(0.00126)
$famown\_direct\_5percent_{i,t-1}$						−0.114**	−0.121**	0.00907			
						(0.0563)	(0.0534)	(0.0162)			
$famown\_direct\_10percent_{i,t-1}$									−0.112**	−0.104*	−0.0159
									(0.0571)	(0.0537)	(0.0136)
$independence_{i,t-1}$	0.00138	0.00166*	0.000110	0.000832	0.0000	0.00283**	0.00212*	0.00114***	0.00280**	0.00210*	0.00113***
	(0.000938)	(0.000852)	(0.000257)	(0.000876)	(0.000259)	(0.00125)	(0.00112)	(0.000434)	(0.00126)	(0.00113)	(0.000437)
$incentive_{i,t-1}$	0.103***	0.0924***	0.0166*	0.0849***	0.0165*	0.0621	0.0539	0.0127	0.0602	0.0523	0.0127
	(0.0331)	(0.0321)	(0.00916)	(0.0321)	(0.00919)	(0.0478)	(0.0455)	(0.0140)	(0.0478)	(0.0454)	(0.0141)
$csr\_com_{i,t-1}$	0.415***	0.441***	0.00314	0.424***	0.00177	0.428***	0.457***	0.000355	0.427***	0.457***	−0.000289
	(0.0535)	(0.0500)	(0.00703)	(0.0503)	(0.00699)	(0.0783)	(0.0722)	(0.0103)	(0.0785)	(0.0725)	(0.0103)
$B\_size_{i,t-1}$	0.0278***	0.0220***	0.00449*	0.0258***	0.00405	0.0351***	0.0284**	0.00640**	0.0351***	0.0284**	0.00637**
	(0.00939)	(0.00843)	(0.00268)	(0.00881)	(0.00271)	(0.0130)	(0.0116)	(0.00307)	(0.0130)	(0.0116)	(0.00307)
$B\_skills_{i,t-1}$	0.000224	0.000908	−0.000418**	0.000484	−0.000363*	0.00127	0.00209*	−0.000659**	0.00129	0.00210*	−0.000658**
	(0.000841)	(0.000794)	(0.000200)	(0.000831)	(0.000203)	(0.00130)	(0.00118)	(0.000309)	(0.00129)	(0.00118)	(0.000309)
$B\_affiliation_{i,t-1}$	0.132***	0.131***	−0.00374	0.137***	−0.00176	0.0323	0.0619	−0.0282*	0.0301	0.0609	−0.0295*
	(0.0507)	(0.0452)	(0.0112)	(0.0469)	(0.0113)	(0.0622)	(0.0541)	(0.0169)	(0.0624)	(0.0543)	(0.0169)
$emissions_{i,t-1}$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

(Continues)

TABLE 6 | (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Talk & walk	**Talk**	**Walk**	**Talk**	**Walk**	**Talk & walk**	**Talk**	**Walk**	**Talk & walk**	**Talk**	**Walk**
$roa_{i,t-1}$	0.000664	0.00105	−0.000285	0.00140	−0.000219	0.00184	0.00142	0.000365	0.00204	0.00160	0.000344
	(0.00244)	(0.00233)	(0.000396)	(0.00235)	(0.000395)	(0.00380)	(0.00353)	(0.000544)	(0.00381)	(0.00354)	(0.000548)
$size_{i,t-1}$	0.305***	0.211***	0.0542***	0.233***	0.0514***	0.314***	0.209***	0.0682***	0.314***	0.208***	0.0670***
	(0.0314)	(0.0246)	(0.00819)	(0.0251)	(0.00826)	(0.0396)	(0.0317)	(0.0106)	(0.0395)	(0.0316)	(0.0106)
$ln\_age_{i,t-1}$	0.189***	0.143***	0.0205*	0.123***	0.0164	0.181***	0.142***	0.0177	0.182***	0.143***	0.0181
	(0.0333)	(0.0262)	(0.0114)	(0.0266)	(0.0117)	(0.0400)	(0.0327)	(0.0135)	(0.0399)	(0.0326)	(0.0135)
$freefloat_{i,t-1}$	0.00675***	0.00420***	0.00238***	0.00291**	0.00299***	0.00699***	0.00377**	0.00294***	0.00701***	0.00381**	0.00290***
	(0.00156)	(0.00123)	(0.000641)	(0.00127)	(0.000674)	(0.00190)	(0.00160)	(0.000708)	(0.00190)	(0.00160)	(0.000709)
Constant	−6.714***	−4.675***	−1.122***	−5.176***	−1.066***	−7.685***	−5.236***	−1.620***	−7.676***	−5.238***	−1.593***
	(0.743)	(0.576)	(0.207)	(0.631)	(0.253)	(0.807)	(0.648)	(0.221)	(0.806)	(0.647)	(0.220)
Observations	8180	8180	8180	8180	8180	3553	3553	3553	3553	3553	3553
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	No	Yes	Yes	No	No	No	No	No	No
R^2	0.324	0.276	0.174	0.315	0.195	0.345	0.291	0.220	0.347	0.293	0.220

Note: Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE 7 | Variation in interaction terms: Random-effects panel regressions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Talk & walk	**Talk & walk**	**Talk & walk**	**Talk & walk**	**Talk**	**Walk**	**Talk & walk**	**Talk**	**Walk**
$women\_atleast1_{i,t-1}$	0.0354								
	(0.0544)								
$women\_atleast2_{i,t-1}$		0.0809*							
		(0.0414)							
$women\_atleast3_{i,t-1}$			0.0901**						
			(0.0432)						
$famown_{i,t-1}$	−0.332**	−0.317**	−0.316**						
	(0.131)	(0.131)	(0.129)						
$famown\_BGD_{i,t-1}$	0.00398	0.00326	0.00310						
	(0.00436)	(0.00439)	(0.00429)						
At least one female director									
Nonfamily × At least one female director$_{i,t-1}$				0.0289	0.0438	−0.00451			
				(0.0571)	(0.0563)	(0.00922)			
Family × No female director$_{i,t-1}$				−0.313**	−0.216*	−0.114***			
				(0.142)	(0.123)	(0.0410)			
Family × At least one female director$_{i,t-1}$				−0.196*	−0.103	−0.0836**			
				(0.110)	(0.0901)	(0.0408)			
At least two female directors									
Nonfamily × More than two female directors$_{i,t-1}$							0.0808*	0.0937**	−0.00612
							(0.0439)	(0.0431)	(0.00898)
Family × Less than two female directors$_{i,t-1}$							−0.269***	−0.166**	−0.105***
							(0.102)	(0.0846)	(0.0383)
Family × More than two female directors$_{i,t-1}$							−0.144	−0.0635	−0.0781*
							(0.107)	(0.0848)	(0.0421)

(Continues)

TABLE 7 | (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Talk & walk	**Talk & walk**	**Talk & walk**	**Talk & walk**	**Talk**	**Walk**	**Talk & walk**	**Talk**	**Walk**
$independence_{i,t-1}$	0.00159*	0.00146	0.00147	0.00159*	0.00185**	0.000129	0.00146	0.00171**	0.000135
	(0.000940)	(0.000936)	(0.000940)	(0.000940)	(0.000854)	(0.000253)	(0.000936)	(0.000850)	(0.000256)
$incentive_{i,t-1}$	0.104***	0.103***	0.107***	0.104***	0.0939***	0.0166*	0.103***	0.0927***	0.0165*
	(0.0332)	(0.0331)	(0.0332)	(0.0332)	(0.0321)	(0.00917)	(0.0331)	(0.0320)	(0.00915)
$csr\_com_{i,t-1}$	0.416***	0.416***	0.417***	0.417***	0.444***	0.00361	0.417***	0.443***	0.00366
	(0.0533)	(0.0532)	(0.0534)	(0.0532)	(0.0498)	(0.00697)	(0.0531)	(0.0496)	(0.00697)
$B\_size_{i,t-1}$	0.0280***	0.0251***	0.0245**	0.0282***	0.0219**	0.00457*	0.0251***	0.0189**	0.00468*
	(0.00948)	(0.00970)	(0.00981)	(0.00944)	(0.00852)	(0.00273)	(0.00968)	(0.00874)	(0.00280)
$B\_skills_{i,t-1}$	0.000135	0.000150	0.000162	0.0000	0.000782	−0.000436**	0.000127	0.000820	−0.000427**
	(0.000846)	(0.000845)	(0.000845)	(0.000844)	(0.000797)	(0.000200)	(0.000846)	(0.000798)	(0.000200)
$B\_affiliation_{i,t-1}$	0.134***	0.133***	0.133***	0.133***	0.132***	−0.00384	0.134***	0.132***	−0.00316
	(0.0509)	(0.0509)	(0.0507)	(0.0509)	(0.0454)	(0.0112)	(0.0509)	(0.0453)	(0.0112)
$emissions_{i,t-1}$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
$roa_{i,t-1}$	0.000736	0.000767	0.000754	0.000766	0.00111	−0.000270	0.000798	0.00117	−0.000276
	(0.00243)	(0.00244)	(0.00243)	(0.00243)	(0.00232)	(0.000399)	(0.00244)	(0.00232)	(0.000394)
$size_{i,t-1}$	0.310***	0.307***	0.306***	0.311***	0.215***	0.0547***	0.307***	0.212***	0.0545***
	(0.0314)	(0.0313)	(0.0313)	(0.0313)	(0.0246)	(0.00820)	(0.0313)	(0.0245)	(0.00817)
$ln\_age_{i,t-1}$	0.190***	0.189***	0.190***	0.189***	0.144***	0.0200*	0.189***	0.143***	0.0205*
	(0.0334)	(0.0333)	(0.0334)	(0.0335)	(0.0263)	(0.0114)	(0.0334)	(0.0262)	(0.0114)
$freefloat_{i,t-1}$	0.00682***	0.00675***	0.00684***	0.00681***	0.00424***	0.00239***	0.00673***	0.00417***	0.00239***
	(0.00157)	(0.00157)	(0.00157)	(0.00157)	(0.00123)	(0.000643)	(0.00157)	(0.00123)	(0.000643)
Constant	−6.797***	−6.695***	−6.652***	−6.804***	−4.757***	−1.123***	−6.694***	−4.643***	−1.125***
	(0.749)	(0.745)	(0.748)	(0.748)	(0.580)	(0.207)	(0.744)	(0.576)	(0.207)
Observations	8180	8180	8180	8180	8180	8180	8180	8180	8180

(Continues)

TABLE 7 | (Continued)

	(1) Talk & walk	(2) Talk & walk	(3) Talk & walk	(4) Talk & walk	(5) Talk	(6) Walk	(7) Talk & walk	(8) Talk	(9) Walk
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	No	No	No	No	No	No	No
R^2	0.319	0.321	0.322	0.319	0.273	0.172	0.321	0.275	0.171

Note: Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Using the CEM-matched samples, we replicate the base model results. Specifically, after applying CEM, we also find positive significant effects of BGD for climate talk ($p < 0.05$) but not for climate walk. Likewise, the results show negative significant effects of FO for climate walk ($p < 0.05$). In line with the base model, the relationship between FO and climate talk is insignificant. Also, the interaction term of BGD and FO remains insignificant (see Table 8, Models 7–9).

Finally, as a fourth robustness test, we use *a 2SLS instrumental variables* method (see Table 9). Although it is generally challenging to find appropriate instruments (Voordeckers et al. 2023), Zhang et al. (2022) identify different classes of instruments to be used in family business research, including family- or time-related instruments (lagged variables) as well as 'higher level instruments'—that is, instruments derived from higher levels than individual observations (e.g., region- or industry-level) with no direct connection to the dependent variables and the error term.

Using the latter approach to find suitable instruments, in line with prior studies, we employ three instruments, namely, the *mean value of BGD and FO by country and industry*, as well as *the country-level legislation on board gender diversity*. It is common practice within the CSR and environmental management literature to employ mean values of explanatory variables on an industry-level as instruments (Cordeiro et al. 2020; Jiraporn and Chintrakarn 2013) because they frequently predict the endogenous independent variables well in first-stage regressions but are uncorrelated with the error term, thereby reducing endogeneity concerns. Similarly, prior research employs state- or country-level regulatory differences as an instrument (Flammer et al. 2019). We use the existence of BGD legislation within European countries prior to the recent EU board gender directive (no law, soft law and hard law) as an instrument to predict BGD, with data being derived from Arndt and Wrohlich (2019) and complemented by manual research for nonreported sample countries.

The first-stage regression results confirm that our instruments are significantly correlated with our explanatory variables BGD and FO ($p < 0.01$). The second stage results of the 2SLS model are in line with our base regressions (see Table 9), indicating that the predicted value of BGD has a positive relationship with climate talk ($p < 0.01$) and that the predicted value of FO has a negative relationship with climate walk ($p < 0.1$). In the 2SLS specification, the relationships between the predicted value of BGD and climate walk and FO and climate talk, which were not significant in the base model specification, now become significant.

5 | Discussion

5.1 | Overall Findings

Our analysis has yielded several important findings concerning the relationship between BGD, FO and climate talk and walk. First, the findings show that BGD is associated with *more symbolic climate talk but not with more substantive*

TABLE 8 | Robustness tests: Alternative variable definitions, ordered logistic regressions and coarsened exact matching (CEM).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	EmissionScore	**Talk & walk**	**Talk & walk**	**Talk & walk**	**Talk**	**Walk**	**Talk & walk**	**Talk**	**Walk**
				ologit	ologit	ologit	CEM matched	CEM matched	CEM matched
$BGD_{i,t-1}$	0.0824**		0.00494***	0.0174***	0.0121***	0.0321***	0.0118***	0.00971**	0.00102
	(0.0361)		(0.00189)	(0.00221)	(0.00233)	(0.00340)	(0.00415)	(0.00392)	(0.00104)
$famown_{i,t-1}$	−3.876*	−0.292**		−0.228**	−0.121	−0.439**	−0.363*	−0.245	−0.137**
	(2.134)	(0.132)		(0.111)	(0.116)	(0.183)	(0.191)	(0.169)	(0.0674)
$famown \times BGD_{i,t-1}$	0.0887	0.00229	−0.00155	−0.000703	−0.00221	−0.000164	−0.00320	−0.00286	0.000125
	(0.0594)	(0.00451)	(0.00383)	(0.00403)	(0.00415)	(0.00573)	(0.00620)	(0.00593)	(0.00137)
$blau\_index_{i,t-1}$		0.330**							
		(0.162)							
$fam\_mgmt_{i,t-1}$			−0.147						
			(0.144)						
$independence_{i,t-1}$	0.0487***	0.00138	0.00140	0.00275**	0.00420***	−0.00137	0.000366	0.000708	0.000220
	(0.0164)	(0.000940)	(0.000940)	(0.00112)	(0.00120)	(0.00149)	(0.00155)	(0.00141)	(0.000410)
$incentive_{i,t-1}$	1.042**	0.104***	0.104***	0.358***	0.347***	0.313***	0.128**	0.0921	0.0333**
	(0.517)	(0.0332)	(0.0332)	(0.0501)	(0.0554)	(0.0676)	(0.0639)	(0.0626)	(0.0160)
$csr\_com_{i,t-1}$	9.408***	0.414***	0.417***	1.362***	1.325***	1.129***	0.482***	0.482***	0.00871
	(0.912)	(0.0534)	(0.0535)	(0.0582)	(0.0568)	(0.0990)	(0.0919)	(0.0864)	(0.0103)
$B\_size_{i,t-1}$	0.757***	0.0272***	0.0282***	0.0804***	0.0715***	0.0762***	0.0289*	0.0241*	0.00259
	(0.149)	(0.00946)	(0.00938)	(0.00906)	(0.0100)	(0.0129)	(0.0150)	(0.0138)	(0.00554)
$B\_skills_{i,t-1}$	0.0188	0.000192	0.000217	−0.000791	0.000769	−0.00548***	0.000583	0.00131	−0.000514
	(0.0135)	(0.000845)	(0.000842)	(0.00126)	(0.00135)	(0.00179)	(0.00147)	(0.00141)	(0.000316)
$B\_affiliation_{i,t-1}$	−0.262	0.132***	0.132***	0.156***	0.213***	0.118*	0.0844	0.116*	−0.0158
	(0.710)	(0.0508)	(0.0508)	(0.0431)	(0.0464)	(0.0625)	(0.0707)	(0.0644)	(0.0220)
$emissions_{i,t-1}$	−0.000242	0.0000	0.0000	−0.000158***	−0.000161***	−0.000121***	0.0000	0.0000	0.0000
	(0.000551)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

(Continues)

TABLE 8 | (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	EmissionScore	**Talk & walk**	**Talk & walk**	**Talk & walk**	**Talk**	**Walk**	**Talk & walk**	**Talk**	**Walk**
$roa_{i,t-1}$	0.0647	0.000641	0.000687	0.0151***	0.0108***	0.0237***	0.00418	0.00476	−0.000668
	(0.0406)	(0.00244)	(0.00244)	(0.00336)	(0.00359)	(0.00501)	(0.00375)	(0.00357)	(0.000875)
$size_{i,t-1}$	6.962***	0.307***	0.305***	0.414***	0.368***	0.461***	0.255***	0.173***	0.0406***
	(0.466)	(0.0313)	(0.0314)	(0.0226)	(0.0252)	(0.0308)	(0.0556)	(0.0452)	(0.0151)
$ln\_age_{i,t-1}$	3.029***	0.189***	0.187***	0.110***	0.143***	0.0297	0.165***	0.114**	0.0240
	(0.609)	(0.0333)	(0.0335)	(0.0235)	(0.0252)	(0.0331)	(0.0577)	(0.0448)	(0.0231)
$freefloat_{i,t-1}$	0.0249	0.00673***	0.00758***	0.00478***	0.00353***	0.00688***	0.00584**	0.00416*	0.00162
	(0.0231)	(0.00156)	(0.00153)	(0.00105)	(0.00116)	(0.00136)	(0.00270)	(0.00223)	(0.00107)
Observations	8180	8180	8180	8180	8180	8180	2728	2728	2728
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	No	Yes	Yes	Yes	No	No	No
R^2	0.415	0.323	0.322				0.308	0.257	0.161

Note: Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE 9 | Instrumental variable regressions (2SLS).

Panel A: First stage	(1) BGD	(2) famown
Instruments		
BGD_mean	0.6140***	
	(0.017)	
BGD_legislation	1.0611***	
	(0.2994)	
famown_mean		0.3360***
		(0.0478)
Controls	Yes	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	8885	8885
R^2	0.437	0.187

Panel B: Second stage	(3) Talk & walk	(4) Talk	(5) Walk
BGD	0.0160***	0.0113***	0.00465***
	(0.00352)	(0.00278)	(0.00141)
famown	−2.281***	−1.914***	−0.367*
	(0.477)	(0.370)	(0.196)
independence	0.00178*	0.00143*	0.000351
	(0.000991)	(0.000789)	(0.000394)
incentive	0.240***	0.161***	0.0793***
	(0.0435)	(0.0345)	(0.0186)
csr_com	0.733***	0.599***	0.134***
	(0.0571)	(0.0460)	(0.0219)
B_size	0.0297***	0.0127**	0.0170***
	(0.00693)	(0.00538)	(0.00302)
B_skills	−0.000295	0.00148**	−0.00177***
	(0.000892)	(0.000724)	(0.000349)
B_affiliation	0.0776**	0.0628**	0.0148
	(0.0314)	(0.0249)	(0.0131)
emissions	−0.000128***	0.0000***	0.0000***
	(0.0000)	(0.0000)	(0.0000)
roa	0.0128***	0.00805***	0.00475***
	(0.00267)	(0.00216)	(0.000988)
size	0.356***	0.216***	0.140***
	(0.0176)	(0.0138)	(0.00730)
ln_age	0.163***	0.138***	0.0247***
	(0.0188)	(0.0149)	(0.00759)
freefloat	−0.00455*	−0.00519***	0.000639
	(0.00253)	(0.00197)	(0.00102)
Observations	8885	8885	8885
R^2	0.196	0.083	0.219
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

Note: Robust standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$.

climate walk. In this regard, our results align with prior studies showing that higher BGD has been associated with more (and better) carbon reporting and emission reduction initiatives but not with actual emission reductions (Córdova Román et al. 2021; Haque 2017). In a similar fashion, Taglialatela et al. (2024, 2890) find that 'more gender-diverse [...] boards are associated with a preponderance of green communication over implementation', which they attribute to firms participating in public discourse to gain moral legitimacy. From a theoretical point of view, our results point in a similar direction, suggesting that more gender-diverse boards tend to seek legitimacy through symbolic climate efforts, without corresponding fundamental improvements in climate-related performance. Thus, reinforcing previous findings from the literature, our research substantiates legitimacy theory perspectives that associate more gender-diverse boards with moral legitimacy-seeking strategies over pragmatic legitimacy-seeking strategies, materializing through distinct climate strategies in our analysis. These findings are highly relevant, as climate matters play a predominant role in the EU Green Deal project, drawing significant public attention to corporate climate transformation. In turn, this raises the stakes for firms to either emphasize (or conceal) their climate progress. Thus, our results provide important timely evidence that specifies the role of BGD for both symbolic and substantive climate efforts. Second, concerning the role of FO, our results allow for several nuanced interpretations. Across the different model specifications, we have observed negative effects of FO on both climate talk and climate walk; however, the negative impact of FO on climate walk has remained particularly robust throughout several tests. Notably, the negative significant results concerning the role of FO for substantive climate efforts (walk) contradict our hypothesis. Generally, our results align with prior studies emphasizing the potentially adverse consequences of FO for environmental outcomes, such as the meta-analysis by Miroshnychenko et al. (2022). Concerning the 'dual nature' discussion within the family business literature relating to the sustainability consequences of family involvement, our results thus add to the negative view of family firms' climate talk and walk strategies. Our hypothesis from

a legitimacy theory perspective was not supported. We interpret our findings as evidence that some of the theoretical arguments that prevail in the family business literature, such as well-established stakeholder relationships, proximity or trust, tend to be less applicable to large publicly listed family firms. Generally, this group of firms has already transformed significantly by going public, opening themselves up to the capital markets and the corresponding disclosure requirements. Furthermore, our results suggest that family-owned firms are reluctant to engage in substantive climate efforts, contrary to our expectations. These effects tend to be more pronounced for higher levels of family control and are not evident for family-managed firms. This suggests that family owners with higher stakes, who are relatively more exposed to climate risks affecting their assets, are counterintuitively more hesitant to transform their business through substantive climate strategies.

Considering the partially mixed results within the literature, our analysis documents several contingencies that help explain some seemingly conflicting findings. For instance, both Borsuk et al. (2024) and Dyck et al. (2024) indicate that family firms engage less in reporting their commitments and have lower environmental ratings, yet they do not underperform when measured by carbon emissions (and in some settings even outperform nonfamily firms). Although the first observation is in line with our own results on family firms engaging less in climate talk, the latter results indicate that family firms would engage at least as strongly in climate walk, which contradicts our own findings. However, upon closer inspection, the different results can be explained by regional differences in the sample structure and the implied institutional and legislative environment. Accordingly, Dyck et al. (2024) show that family-controlled firms have lower carbon emissions only in countries where there is little climate regulation, posing the risk of policy tightening in the future. The opposite is the case for our European sample, already subject to restrictive climate regulation.

However, it is not only regional differences that help reconcile some of the seemingly conflicting evidence. Although the meta-analysis of Lorenzen et al. (2024) indicates that family firms overall tend to perform better in terms of their environmental footprint, they specify that the effect is in fact negative for large and publicly listed family firms, in line with our own findings. Supporting this potential divide between public and private family firms, the results of Gómez-Mejía et al. (2025) document that family involvement is associated with lower emissions among *private* European firms. Besides differences between public and private family firms, differences between family-owned and family-managed firms may explain diverging results. Accordingly, Lorenzen et al. (2024) find that negative consequences of family involvement are more pronounced for FO-based definitions, but not for family management. This notion has also been observed in our analysis, indicating a negative effect of FO, while yielding insignificant results for family management in our robustness test.

Finally, the expected *negative moderating role of family ownership* in the BGD–climate policy relationship has not been supported by the data. However, when disaggregating the interaction results, our findings indicate a mitigating effect of female board members in family firms, applicable to both climate talk and climate walk and across different thresholds of female directorships. Accordingly, family firms can benefit from appointing relatively more female board members in terms of their climate strategies.

Overall, our research yields several important contributions that extend across the sustainability (carbon), corporate governance and family business literature in various ways. First, our results shed light on the complex interplay between symbolic and substantive climate efforts, which still constitute a key challenge and continue to attract researchers' attention. Second, besides the high practical relevance of achieving global decarbonization targets, our results also contribute to the academic debate on greenwashing by providing empirical evidence on the extent to which firms meet their decarbonization commitments. Third, our findings support previous studies showing that BGD and FO are corporate governance mechanisms that shape corporate climate strategies.

5.2 | Limitations and Opportunities for Further Research

Our study is subject to limitations, which give opportunities for further research. First, our sample focuses on European publicly listed firms. Thus, future research on private firms and beyond Europe is still needed to complement our analyses (Gómez-Mejía et al. 2025). Second, the FO information used in our study is limited in terms of its granularity. Although we have employed different FO thresholds, tested for differential effects of family involvement in management as well as controlled for firm age as a proxy for the family firm generation, further considerations of family firm heterogeneity are not feasible with the available data. Thus, we see potential for further refinement by analysing the interaction of family involvement and BGD at the level of each individual board member. Likewise, other aspects of board diversity beyond its demographic composition, as well as the role of other board governance mechanisms related to sustainability, represent promising opportunities. Also, this includes further inquiry into non-linear (e.g., U-shaped) relationships between BGD and climate talk and walk. These may also benefit from prior studies analysing non-linear effects of family control (Qosasi et al. 2022; Terlaak et al. 2018).

Furthermore, extending the findings of this study, we see potential for additional research concerning the internal relationship between climate talk and walk among family firms. Within the literature, there is a lively discourse on the intention–action relationship among family firms specifically, considering different rationales for particularly action-oriented corporate behaviour, which makes them less susceptible to greenwashing (Kim et al. 2017). In this regard, researchers may also benefit from the rich literature addressing the link between willingness and ability in family firms, which has informed several prior studies beyond carbon outcomes (Chrisman et al. 2015; Debellis et al. 2021; Schepers et al. 2021).

The target-level data that feed into the climate walk variable (adherence to emission reduction targets) is subject to restrictions. The target data are drawn from a diverse set of emission reduction targets with different characteristics, such as target type and time period. Our metric of target adherence addresses these issues by looking at performance in relative terms—that is, comparing time passed and progress made on the level of each target and firm-year. In this regard, we see potential for future research to use other target-level information to ensure reliability, including data on target materiality or the share of emissions covered by a given target, as carbon targets are subject to increasing scrutiny (Callery and Kim 2024).

Finally, we see several opportunities for further research related to regulatory changes on a European level, namely, the introduction of the CSRD/ESRS as well as the EU BGD directive, which are not yet reflected in our sample period. Although future research should critically review the overall success of regulatory reform, studies may also benefit from additional or higher quality climate data.

6 | Conclusion

To avert the imminent climate crisis and meet internationally agreed climate targets, firms must account for and reduce their greenhouse gas emissions considerably (Christy et al. 2024; Hettler and Graf-Vlachy 2024). However, distinguishing between symbolic and substantive climate efforts remains a key challenge (Coen et al. 2022). We address this challenge by analysing different levels of climate action from climate talk to climate walk. By using CDP data on the process of setting, validating and finally achieving decarbonization targets as a new means to distinguish between climate talk and walk, we extend prior literature that has primarily focused on carbon performance (Busch et al. 2022; Nuber and Velte 2021). In this regard, BGD and FO have been identified as important determinants of firms' climate strategies.

Drawing from target-level data of 1387 publicly listed European firms between 2010 and 2021, our results show that firms with higher BGD engage *more strongly in climate talk but not in climate walk*. Thereby, we confirm prior findings indicating that BGD is more strongly associated with symbolic climate efforts, which do not always translate into substantive improvements (Cordova et al. 2021; Haque 2017; Taglialatela et al. 2024). Meanwhile, our results support *negative effects of FO*, mainly attributable to climate walk and to a lesser extent to climate talk, in line with the negative view of family involvement for carbon outcomes.

Considering the mixed results of prior studies, we identify several contingencies that help to reconcile our findings with the extant literature, including regional differences, public versus private firms and family-owned versus family-managed firms. Contrary to our hypothesis, we did *not* find a negative moderating role of FO in the relationship between BGD and climate talk or walk. Rather, the results indicate a mitigating effect of female board members in family firms, who reduce the negative effect of FO; this result suggests that family firms benefit from appointing relatively more female board members in terms of their climate strategies.

Our results contribute to the ongoing debate concerning the role of board mechanisms and their effectiveness in aligning firm objectives with climate-related stakeholder needs. Our findings substantiate prior evidence that indicates that BGD and FO may be regarded as competing corporate governance mechanisms in terms of their influence on corporate climate strategies (Maggi et al. 2023). In this regard, our study has several important *theoretical implications*. By separating symbolic from substantive efforts, our results shed light on the more nuanced dynamics that encompass corporate climate efforts that are facing persistent greenwashing allegations frequently not addressed in extant research. Namely, our results indicate that although BGD is associated with positive consequences, firms focusing merely on BGD as a measure of demographic board diversity may not be sufficiently equipped to catalyse substantive climate efforts. We associate our results with a particular emphasis on moral legitimacy-seeking strategies among these firms, which prioritize climate-related communications. Furthermore, regarding the role of FO, our results suggest that family-owned firms are reluctant to engage in substantive climate efforts, contrary to our expectations. These effects tend to be more pronounced for higher levels of family control and are not evident for family-managed firms. We interpret this as evidence that family owners with higher stakes, who are relatively more exposed to climate risks affecting their assets, are counterintuitively more reluctant to transform their business through substantive climate strategies.

Finally, our results have important *practical implications* for corporations as well as regulators, specifying the joint and individual effects of BGD and FO for corporate climate strategies. Firms, being subject to increasingly tight regulation and mounting expectations to reduce their carbon emissions, must set up their corporate governance systems in accordance with the climate expectations of their stakeholders. Regulators, at both the national and European levels, may gain additional insights into the opportunities and limits of regulatory initiatives, such as the European BGD directive and the CSDDD, to promote substantive climate efforts within the European capital market. Besides the high practical relevance of achieving global decarbonization targets, the results contribute to the ongoing academic discourse on greenwashing by providing quantifiable evidence on the extent to which firms follow up on their decarbonization commitments.

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Conflicts of Interest

The authors declare no conflicts of interest.

References

Ali, A., T.-Y. Chen, and S. Radhakrishnan. 2007. "Corporate Disclosures by Family Firms." *Journal of Accounting and Economics* 44, no. 1–2: 238–286. https://doi.org/10.1016/j.jacceco.2007.01.006.

Ali Gull, A., N. Hussain, S. Akbar Khan, M. Nadeem, and A. Mansour Zalata. 2023. "Walking the Talk? A Corporate Governance Perspective on Corporate Social Responsibility Decoupling." *British Journal of Management* 34, no. 4: 2186–2211. https://doi.org/10.1111/1467-8551.12695.

Altunbas, Y., L. Gambacorta, A. Reghezza, and G. Velliscig. 2022. "Does Gender Diversity in the Workplace Mitigate Climate Change?" *Journal of Corporate Finance* 77: 102303. https://doi.org/10.1016/j.jcorpfin.2022.102303.

Arena, C., and G. Michelon. 2018. "A Matter of Control or Identity? Family Firms' Environmental Reporting Decisions Along the Corporate Life Cycle." *Business Strategy and the Environment* 27, no. 8: 1596–1608. https://doi.org/10.1002/bse.2225.

Arndt, P., & K. Wrohlich 2019. Gender Quotas in a European Comparison: Tough Sanctions Most Effective. Advance online publication. https://doi.org/10.18723/DIW_DWR:2019-38-1.

Asafu-Adjaye, J., and R. Mahadevan. 2013. "Implications of CO_2 Reduction Policies for a High Carbon Emitting Economy." *Energy Economics* 38: 32–41. https://doi.org/10.1016/j.eneco.2013.03.004.

Aswani, J., A. Raghunandan, and S. Rajgopal. 2024. "Are Carbon Emissions Associated With Stock Returns?" *Review of Finance* 28, no. 1: 75–106. https://doi.org/10.1093/rof/rfad013.

Bammens, Y., and P. Hünermund. 2020. "Nonfinancial Considerations in Eco-Innovation Decisions: The Role of Family Ownership and Reputation Concerns." *Journal of Product Innovation Management* 37, no. 5: 431–453. https://doi.org/10.1111/jpim.12550.

Baumann-Pauly, D., C. Wickert, L. J. Spence, and A. G. Scherer. 2013. "Organizing Corporate Social Responsibility in Small and Large Firms: Size Matters." *Journal of Business Ethics* 115, no. 4: 693–705. https://doi.org/10.1007/s10551-013-1827-7.

Ben-Amar, W., M. Chang, and P. McIlkenny. 2017. "Board Gender Diversity and Corporate Response to Sustainability Initiatives: Evidence From the Carbon Disclosure Project." *Journal of Business Ethics* 142, no. 2: 369–383. https://doi.org/10.1007/s10551-015-2759-1.

Ben-Amar, W., B. Comyns, and I. Martinez. 2024. "Firm Commitments on Climate Change: Effects of Science-Based Targets on Financial Outcomes During the COVID-19 Crisis." *Business Strategy and the Environment* 33, no. 8: 7768–7787. https://doi.org/10.1002/bse.3890.

Bendig, D., A. Wagner, and K. Lau. 2023. "Does It Pay to Be Science-Based Green? The Impact of Science-Based Emission-Reduction Targets on Corporate Financial Performance." *Journal of Industrial Ecology* 27, no. 1: 125–140. https://doi.org/10.1111/jiec.13341.

Benlemlih, M., and Ç. V. Yavaş. 2024. "Economic Policy Uncertainty and Climate Change: Evidence From CO_2 Emission." *Journal of Business Ethics* 191, no. 3: 415–441. https://doi.org/10.1007/s10551-023-05389-x.

Berrone, P., C. Cruz, L. R. Gomez-Mejia, and M. Larraza-Kintana. 2010. "Socioemotional Wealth and Corporate Responses to Institutional Pressures: Do Family-Controlled Firms Pollute Less?" *Administrative Science Quarterly* 55: 82–113.

Bingler, J. A., M. Kraus, M. Leippold, and N. Webersinke. 2024. "How Cheap Talk in Climate Disclosures Relates to Climate Initiatives, Corporate Emissions, and Reputation Risk." *Journal of Banking & Finance* 164: 107191. https://doi.org/10.1016/j.jbankfin.2024.107191.

Biswas, P. K., H. Roberts, and R. H. Whiting. 2022. "Female Directors and CSR Disclosure in Bangladesh: The Role of Family Affiliation." *Meditari Accountancy Research* 30, no. 1: 163–192. https://doi.org/10.1108/MEDAR-10-2019-0587.

Blackwell, M., S. Iacus, G. King, and G. Porro. 2009. "Cem: Coarsened Exact Matching in Stata." *Stata Journal: Promoting Communications on Statistics and Stata* 9, no. 4: 524–546. https://doi.org/10.1177/1536867X0900900402.

Block, J. H., P. Sharma, and L. Benz. 2024. "Stakeholder Pressures and Decarbonization Strategies in Mittelstand Firms." *Journal of Business Ethics* 193, no. 3: 511–533. https://doi.org/10.1007/s10551-023-05576-w.

Block, J. H., and M. Wagner. 2014. "The Effect of Family Ownership on Different Dimensions of Corporate Social Responsibility: Evidence From Large US Firms." *Business Strategy and the Environment* 23, no. 7: 475–492. https://doi.org/10.1002/bse.1798.

Borsuk, M., N. Eugster, P.-O. Klein, and O. Kowalewski. 2024. "Family Firms and Carbon Emissions." *Journal of Corporate Finance* 89: 102672. https://doi.org/10.1016/j.jcorpfin.2024.102672.

Botero, I. C., C. Cruz, A. de Massis, and M. Nordqvist. 2015. "Family Business Research in the European Context." *European Journal of Innovation Management* 9, no. 2: 139. https://doi.org/10.1504/EJIM.2015.067858.

Brune, A., M. Thomsen, and C. Watrin. 2019a. "Family Firm Heterogeneity and Tax Avoidance: The Role of the Founder." *Family Business Review* 32, no. 3: 296–317. https://doi.org/10.1177/0894486519831467.

Brune, A., M. Thomsen, and C. Watrin. 2019b. "Tax Avoidance in Different Firm Types and the Role of Nonfamily Involvement in Private Family Firms." *Managerial and Decision Economics* 40, no. 8: 950–970. https://doi.org/10.1002/mde.3082.

Brunelli, S., S. Sciascia, and M. Baù. 2024. "Nonfinancial Reporting in Family Firms: A Systematic Review and Agenda for Future Research." *Business Strategy and the Environment* 33, no. 2: 162–179. https://doi.org/10.1002/bse.3484.

Busch, T., M. Johnson, and T. Pioch. 2022. "Corporate Carbon Performance Data: Quo Vadis?" *Journal of Industrial Ecology* 26, no. 1: 350–363. https://doi.org/10.1111/jiec.13008.

Cabeza-García, L., M. Sacristán-Navarro, and S. Gómez-Ansón. 2017. "Family Involvement and Corporate Social Responsibility Disclosure." *Journal of Family Business Strategy* 8, no. 2: 109–122. https://doi.org/10.1016/j.jfbs.2017.04.002.

Caby, J., C. Coron, and Y. Ziane. 2024. "How Does Gender Diversity in Top Management Teams Affect Carbon Disclosure and Its Quality: Evidence From the Technological Industry." *Technological Forecasting and Social Change* 199: 123077. https://doi.org/10.1016/j.techfore.2023.123077.

Callery, P. J., and E.-H. Kim. 2024. "Set & Done? Trade-Offs Between Stakeholder Expectation and Attainment Pressures in Corporate Carbon Target Management." *Journal of Management Studies*. https://doi.org/10.1111/joms.13140.

Campopiano, G., F. R. Rinaldi, S. Sciascia, and A. de Massis. 2019. "Family and Non-Family Women on the Board of Directors: Effects on Corporate Citizenship Behavior in Family-Controlled Fashion Firms." *Journal of Cleaner Production* 214: 41–51. https://doi.org/10.1016/j.jclepro.2018.12.319.

Chrisman, J. J., J. H. Chua, A. de Massis, F. Frattini, and M. Wright. 2015. "The Ability and Willingness Paradox in Family Firm Innovation." *Journal of Product Innovation Management* 32, no. 3: 310–318. https://doi.org/10.1111/jpim.12207.

Christy, A., M. Elnahass, J. Amezaga, A. Browne, and O. Heidrich. 2024. "A Dynamic Framework to Align Company Climate Reporting and Action With Global Climate Targets." *Business Strategy and the Environment* 33, no. 4: 3103–3128. https://doi.org/10.1002/bse.3635.

Coen, D., K. Herman, and T. Pegram. 2022. "Are Corporate Climate Efforts Genuine? An Empirical Analysis of the Climate 'Talk–Walk' Hypothesis." *Business Strategy and the Environment* 31, no. 7: 3040–3059. https://doi.org/10.1002/bse.3063.

Cordeiro, J. J., G. Profumo, and I. Tutore. 2020. "Board Gender Diversity and Corporate Environmental Performance: The Moderating Role of Family and Dual-Class Majority Ownership Structures." *Business Strategy and the Environment* 29, no. 3: 1127–1144. https://doi.org/10.1002/bse.2421.

Cordova, C., A. Zorio-Grima, and P. Merello. 2021. "Contextual and Corporate Governance Effects on Carbon Accounting and Carbon Performance in Emerging Economies." *Corporate Governance: The International Journal of Business in Society* 21, no. 3: 536–550. https://doi.org/10.1108/CG-10-2020-0473.

Córdova Román, C., A. Zorio-Grima, and P. Merello. 2021. "Economic Development and CSR Assurance: Important Drivers for Carbon Reporting ... Yet Inefficient Drivers for Carbon Management?" *Technological Forecasting and Social Change* 163: 120424. https://doi.org/10.1016/j.techfore.2020.120424.

Dahlmann, F. 2024. "Corporate Carbon Targets: The Role of Goal Setting in Driving Organisational Change for Climate Action." In *The Handbook of Climate Change Leadership in Organizations: Developing Leadership for the Age of Sustainability*, edited by D. MacKie and D. MacKie. New York, London: Routledge Taylor & Francis Group.

Dahlmann, F., L. Branicki, and S. Brammer. 2019. "Managing Carbon Aspirations: The Influence of Corporate Climate Change Targets on Environmental Performance." *Journal of Business Ethics* 158, no. 1: 1–24. https://doi.org/10.1007/s10551-017-3731-z.

de Villiers, C., V. Naiker, and C. J. van Staden. 2011. "The Effect of Board Characteristics on Firm Environmental Performance." *Journal of Management* 37, no. 6: 1636–1663. https://doi.org/10.1177/0149206311411506.

Debellis, F., A. de Massis, A. Messeni Petruzzelli, F. Frattini, and M. Del Giudice. 2021. "Strategic Agility and International Joint Ventures: The Willingness-Ability Paradox of Family Firms." *Journal of International Management* 27, no. 1: 100739. https://doi.org/10.1016/j.intman.2020.100739.

Deegan, C. 2002. "Introduction." *Accounting, Auditing & Accountability Journal* 15, no. 3: 282–311. https://doi.org/10.1108/09513570210435852.

Döring, S., W. Drobetz, S. El Ghoul, O. Guedhami, and H. Schröder. 2023. "Foreign Institutional Investors, Legal Origin, and Corporate Greenhouse Gas Emissions Disclosure." *Journal of Business Ethics* 182, no. 4: 903–932. https://doi.org/10.1007/s10551-022-05289-6.

Dowling, J., and J. Pfeffer. 1975. "Organizational Legitimacy: Social Values and Organizational Behavior." *Pacific Sociological Review* 18, no. 1: 122–136. https://doi.org/10.2307/1388226.

Dyck, A., K. V. Lins, L. Roth, M. Towner, and H. F. Wagner. 2023. "Renewable Governance: Good for the Environment?" *Journal of Accounting Research* 61, no. 1: 279–327. https://doi.org/10.1111/1475-679X.12462.

Dyck, I. J. A., K. V. Lins, L. Roth, M. Towner, and H. F. Wagner. 2024. "Family-Controlled Firms and Environmental Sustainability: All Bite and No Bark." HKU Jockey Club Enterprise Sustainability Global Research Institute - Archive, European Corporate Governance Institute – Finance Working Paper No. 983/2024. https://doi.org/10.2139/ssrn.4829162.

El Ghoul, S., O. Guedhami, H. Wang, and C. C. Y. Kwok. 2016. "Family Control and Corporate Social Responsibility." *Journal of Banking & Finance* 73: 131–146. https://doi.org/10.1016/j.jbankfin.2016.08.008.

Elsayih, J., R. Datt, and Q. Tang. 2021. "Corporate Governance and Carbon Emissions Performance: Empirical Evidence From Australia." *Australasian Journal of Environmental Management* 28, no. 4: 433–459. https://doi.org/10.1080/14486563.2021.1989066.

Endrikat, J., E. Guenther, and H. Hoppe. 2014. "Making Sense of Conflicting Empirical Findings: A Meta-Analytic Review of the Relationship Between Corporate Environmental and Financial Performance." *European Management Journal* 32, no. 5: 735–751. https://doi.org/10.1016/j.emj.2013.12.004.

Fan, P., X. Qian, and J. Wang. 2023. "Does Gender Diversity Matter? Female Directors and Firm Carbon Emissions in Japan." *Pacific-Basin Finance Journal* 77: 101931. https://doi.org/10.1016/j.pacfin.2022.101931.

Farooq, M., A. Noor, and M. Naeem. 2023. "Does Family Ownership Moderate the Relationship Between Board Characteristics and Corporate Social Responsibility? Evidence From an Emerging Market." *Asian Journal of Business Ethics* 12, no. 1: 71–99. https://doi.org/10.1007/s13520-022-00164-z.

Fattoum-Guedri, A., Z. Guedri, and F. Delmar. 2018. "Multiple Blockholder Structures and Family Firm Performance." *Entrepreneurship Theory and Practice* 42, no. 2: 231–251. https://doi.org/10.1177/1042258717748652.

Flammer, C., B. Hong, and D. Minor. 2019. "Corporate Governance and the Rise of Integrating Corporate Social Responsibility Criteria in Executive Compensation: Effectiveness and Implications for Firm Outcomes." *Strategic Management Journal* 40, no. 7: 1097–1122. https://doi.org/10.1002/smj.3018.

Fox, J., and G. Monette. 1992. "Generalized Collinearity Diagnostics." *Journal of the American Statistical Association* 87, no. 417: 178–183. https://doi.org/10.1080/01621459.1992.10475190.

Fullerton, A. S. 2009. "A Conceptual Framework for Ordered Logistic Regression Models." *Sociological Methods & Research* 38, no. 2: 306–347. https://doi.org/10.1177/0049124109346162.

Galbreath, J. 2017. "The Impact of Board Structure on Corporate Social Responsibility: A Temporal View." *Business Strategy and the Environment* 26, no. 3: 358–370. https://doi.org/10.1002/bse.1922.

García Martín, C. J., and B. Herrero. 2020. "Do Board Characteristics Affect Environmental Performance? A Study of EU Firms." *Corporate Social Responsibility and Environmental Management* 27, no. 1: 74–94. https://doi.org/10.1002/csr.1775.

García-Sánchez, I.-M., M. Núñez-Torrado, C. Aibar-Guzmán, and B. Aibar-Guzmán. 2025. "Beyond Climate Targets: Exploring When and How Female Directors Influence Corporate Decarbonization Transparency." *Business Strategy and the Environment* 34, no. 3: 3892–3912. https://doi.org/10.1002/bse.4183.

Gavana, G., P. Gottardo, and A. M. Moisello. 2024. "The Effect of Board Diversity and Tenure on Environmental Performance. Evidence From Family and Non-Family Firms." *Journal of Family Business Management* 14, no. 3: 534–561. https://doi.org/10.1108/JFBM-06-2023-0088.

Ghaleb, B. A., S. A. Qaderi, and A. A. Al-Qadasi. 2024. "Independent Female Directors and Integrated Reporting Quality: The Moderating Role of Family Ownership." *Corporate Social Responsibility and Environmental Management* 31, no. 4: 3429–3443. https://doi.org/10.1002/csr.2755.

Ghitti, M., G. Gianfrate, and L. Palma. 2024. "The Agency of Greenwashing." *Journal of Management and Governance* 28, no. 3: 905–941. https://doi.org/10.1007/s10997-023-09683-8.

Glass, C., A. Cook, and A. R. Ingersoll. 2016. "Do Women Leaders Promote Sustainability? Analyzing the Effect of Corporate Governance Composition on Environmental Performance." *Business Strategy and the Environment* 25, no. 7: 495–511. https://doi.org/10.1002/bse.1879.

Gómez-Mejía, L. R., F. Muñoz-Bullón, I. Requejo, and M. J. Sanchez-Bueno. 2025. "Ethical Correlates of Family Control: Socioemotional Wealth, Environmental Performance, and Financial Returns." *Journal of Business Ethics* 198: 893–917. https://doi.org/10.1007/s10551-025-05943-9.

Gregorič, A., M. S. Rapp, and I. Requejo. 2022. *Listed Family Firms in Europe: Relevance, Characteristics and Performance*. Munich: Stiftung Familienunternehmen. https://www.familienunternehmen.de/media/public/pdf/publikationen-studien/studien/Listed-Family-Firms-in-Europe_Studie_Stiftung-Familienunternehmen.pdf.

Haque, F. 2017. "The Effects of Board Characteristics and Sustainable Compensation Policy on Carbon Performance of UK Firms." *British Accounting Review* 49, no. 3: 347–364. https://doi.org/10.1016/j.bar.2017.01.001.

Herman, K. S., C. Schiavoni, and G. Guastella. 2024. "Walking, Talking, or Standing Still? Climate Commitment and Performance in Publicly Listed Firms in Five Major Economies." *Business & Society* 64, no. 4: 713–756. https://doi.org/10.1177/00076503241255954.

Herrero, I., C. López, and R. Ruiz-Benítez. 2024. "So … Are Family Firms More Sustainable? On the Economic, Social and Environmental Sustainability of Family SMEs." *Business Strategy and the Environment* 33, no. 5: 4252–4270. https://doi.org/10.1002/bse.3699.

Hettler, M., and L. Graf-Vlachy. 2024. "Corporate Scope 3 Carbon Emission Reporting as an Enabler of Supply Chain Decarbonization: A Systematic Review and Comprehensive Research Agenda." *Business Strategy and the Environment* 33, no. 2: 263–282. https://doi.org/10.1002/bse.3486.

Houqe, M. N., and H. Z. Khan. 2023. "What Determines the Quality of Carbon Reporting? A System-Oriented Theories and Corporate Governance Perspective." *Business Strategy and the Environment* 32, no. 6: 3197–3216. https://doi.org/10.1002/bse.3295.

Ioannou, I., S. X. Li, and G. Serafeim. 2016. "The Effect of Target Difficulty on Target Completion: The Case of Reducing Carbon Emissions." *Accounting Review* 91, no. 5: 1467–1492.

Issa, A., and M. In'airat. 2024. "From Words to Action: Unpacking the Real Impact of Sustainability Initiatives on Carbon Emissions Reduction." *Social Responsibility Journal* 20, no. 3: 585–604. https://doi.org/10.1108/SRJ-06-2023-0320.

Jiraporn, P., and P. Chintrakarn. 2013. "How Do Powerful CEOs View Corporate Social Responsibility (CSR)? An Empirical Note." *Economics Letters* 119, no. 3: 344–347. https://doi.org/10.1016/j.econlet.2013.03.026.

Jizi, M. 2017. "The Influence of Board Composition on Sustainable Development Disclosure." *Business Strategy and the Environment* 26, no. 5: 640–655. https://doi.org/10.1002/bse.1943.

Kavadis, N., and S. Thomsen. 2023. "Sustainable Corporate Governance: A Review of Research on Long-Term Corporate Ownership and Sustainability." *Corporate Governance: An International Review* 31, no. 1: 198–226. https://doi.org/10.1111/corg.12486.

Khatri, I. 2024. "Boardroom Diversity and Carbon Emissions: Evidence From the UK Firms." *Journal of Business Ethics* 195, no. 4: 899–920. https://doi.org/10.1007/s10551-024-05675-2.

Kim, J., S. Fairclough, and C. Dibrell. 2017. "Attention, Action, and Greenwash in Family-Influenced Firms? Evidence From Polluting Industries." *Organization & Environment* 30, no. 4: 304–323. https://doi.org/10.1177/1086026616673410.

Kim, S.-J., J. Bae, and S. Kang. 2024. "The Cross-Cutting Pursuit of Family Values: When and How Do Family Firms Engage in Corporate Environmental Responsibility." *Corporate Social Responsibility and Environmental Management* 31, no. 4: 2749–2769. https://doi.org/10.1002/csr.2714.

Konadu, R., G. S. Ahinful, D. J. Boakye, and H. Elbardan. 2022. "Board Gender Diversity, Environmental Innovation and Corporate Carbon Emissions." *Technological Forecasting and Social Change* 174: 121279. https://doi.org/10.1016/j.techfore.2021.121279.

Kordsachia, O., A. Bassen, C. Fieberg, and K. Wolters. 2023. "Market Perceptions on the Role of Female Leadership in Adapting to Climate Change." *Journal of Risk Finance* 24, no. 4: 424–448. https://doi.org/10.1108/JRF-08-2022-0217.

Kreuzer, C., and C. Priberny. 2022. "To Green or Not to Green: The Influence of Board Characteristics on Carbon Emissions." *Finance Research Letters* 49: 103077. https://doi.org/10.1016/j.frl.2022.103077.

Kyaw, K., S. Treepongkaruna, and P. Jiraporn. 2022. "Board Gender Diversity and Environmental Emissions." *Business Strategy and the Environment* 31, no. 7: 2871–2881. https://doi.org/10.1002/bse.3052.

Lemma, T. T., M. Tavakolifar, D. Mihret, and G. Samkin. 2023. "Board Gender Diversity and Corporate Carbon Commitment: Does Industry Matter?" *Business Strategy and the Environment* 32, no. 6: 3550–3568. https://doi.org/10.1002/bse.3315.

Littlewood, D., R. Decelis, C. Hillenbrand, and D. Holt. 2018. "Examining the Drivers and Outcomes of Corporate Commitment to Climate Change Action in European High Emitting Industry." *Business Strategy and the Environment* 27, no. 8: 1437–1449. https://doi.org/10.1002/bse.2194.

Liu, C. 2018. "Are Women Greener? Corporate Gender Diversity and Environmental Violations." *Journal of Corporate Finance* 52: 118–142. https://doi.org/10.1016/j.jcorpfin.2018.08.004.

Lorenzen, S., M. Gerken, H. Steinmetz, J. Block, M. Hülsbeck, and F. S. Lux. 2024. "Environmental Sustainability of Family Firms: A Meta-Analysis of Handprint and Footprint." *Entrepreneurship Theory and Practice* 48, no. 5: 1266–1284. https://doi.org/10.1177/10422587231221799.

Lu, J., and J. Wang. 2021. "Corporate Governance, Law, Culture, Environmental Performance and CSR Disclosure: A Global Perspective." *Journal of International Financial Markets Institutions and Money* 70: 101264. https://doi.org/10.1016/j.intfin.2020.101264.

Ma, B., Y. Wang, Z. Zhou, Y. Lai, Z. Zhou, and M. F. Bashir. 2022. "Can Controlling Family Involvement Promote Firms to Fulfill Environmental Responsibilities?—Evidence From China." *Managerial and Decision Economics* 43, no. 2: 569–592. https://doi.org/10.1002/mde.3403.

Ma, L. 2023. "Corporate Social Responsibility Reporting in Family Firms: Evidence From China." *Journal of Behavioral and Experimental Finance* 37: 100730. https://doi.org/10.1016/j.jbef.2022.100730.

Maggi, B., R. Gjergji, L. Vena, S. Sciascia, and A. Cortesi. 2023. "Family Firm Status and Environmental Disclosure: The Moderating Effect of Board Gender Diversity." *Business Ethics, the Environment & Responsibility* 32, no. 4: 1334–1351. https://doi.org/10.1111/beer.12578.

Malen, J. 2022. "Moving the Goalposts: Aspiration Reoperationalization in Response to Failure to Achieve Environmental Performance Targets." *Academy of Management Discoveries* 8, no. 3: 357–383. https://doi.org/10.5465/amd.2020.0245.

Marchini, P. L., V. Tibiletti, T. Mazza, and G. Gabrielli. 2022. "Gender Quotas and the Environment: Environmental Performance and Enforcement." *Corporate Social Responsibility and Environmental Management* 29, no. 1: 256–272. https://doi.org/10.1002/csr.2200.

Mateo-Márquez, A. J., J. M. González-González, and C. Zamora-Ramírez. 2025. "Absolute Emissions Targets and Voluntary Carbon Disclosure: An International Empirical Survey." *Sustainability Accounting, Management and Policy Journal* 16, no. 2: 583–616. https://doi.org/10.1108/SAMPJ-09-2023-0634.

Maughan, R. 2023. "Adopting and Adapting Sustainability Accounting: Fit and Faith in a Family Business." *Accounting, Auditing & Accountability Journal* 36, no. 9: 1–31. https://doi.org/10.1108/AAAJ-02-2020-4410.

Meier, O., and G. Schier. 2021. "CSR and Family CEO: The Moderating Role of CEO's Age." *Journal of Business Ethics* 174, no. 3: 595–612. https://doi.org/10.1007/s10551-020-04624-z.

Michelon, G., and A. Parbonetti. 2012. "The Effect of Corporate Governance on Sustainability Disclosure." *Journal of Management and Governance* 16, no. 3: 477–509. https://doi.org/10.1007/s10997-010-9160-3.

Miroshnychenko, I., A. de Massis, R. Barontini, and F. Testa. 2022. "Family Firms and Environmental Performance: A Meta-Analytic Review." *Family Business Review* 35, no. 1: 68–90. https://doi.org/10.1177/08944865211064409.

Miroshnychenko, I., D. Miller, A. de Massis, and I. Le Breton-Miller. 2024. "Are Family Firms Green?" *Small Business Economics* 64, no. 2: 279–306. https://doi.org/10.1007/s11187-024-00907-1.

Morrison, L. J., J. Jia, and M. P. Arora. 2024. "Decoupling the Climate Walk From the Climate Talk: Evidence From Australia." *Business Strategy and the Environment* 33, no. 7: 7368–7382. https://doi.org/10.1002/bse.3856.

Muktadir-Al-Mukit, D., and F. H. Bhaiyat. 2024. "Impact of Corporate Governance Diversity on Carbon Emission Under Environmental Policy via the Mandatory Nonfinancial Reporting Regulation." *Business Strategy and the Environment* 33, no. 2: 1397–1417. https://doi.org/10.1002/bse.3555.

Nadeem, M., E. Gyapong, and A. Ahmed. 2020. "Board Gender Diversity and Environmental, Social, and Economic Value Creation: Does Family Ownership Matter?" *Business Strategy and the Environment* 29: 1268–1284.

Narsa Goud, N. 2022. "Corporate Governance: Does It Matter Management of Carbon Emission Performance? An Empirical Analyses of Indian Companies." *Journal of Cleaner Production* 379: 134485. https://doi.org/10.1016/j.jclepro.2022.134485.

Nimer, K., M. Abdelqader, C. Kuzey, and A. Uyar. 2024. "Emission Targeting and Carbon Emissions: The Moderating Effect of Female Directors." *Business Strategy and the Environment* 33, no. 4: 3480–3504. https://doi.org/10.1002/bse.3669.

Nuber, C., and P. Velte. 2021. "Board Gender Diversity and Carbon Emissions: European Evidence on Curvilinear Relationships and Critical Mass." *Business Strategy and the Environment* 30, no. 4: 1958–1992. https://doi.org/10.1002/bse.2727.

O'brien, R. M. 2007. "A Caution Regarding Rules of Thumb for Variance Inflation Factors." *Quality & Quantity* 41, no. 5: 673–690. https://doi.org/10.1007/s11135-006-9018-6.

Oh, W.-Y., Y. K. Chang, and R. Jung. 2019. "Board Characteristics and Corporate Social Responsibility: Does Family Involvement in Management Matter?" *Journal of Business Research* 103: 23–33. https://doi.org/10.1016/j.jbusres.2019.05.028.

Ott, C., F. Schiemann, and T. Günther. 2017. "Disentangling the Determinants of the Response and the Publication Decisions: The Case of the Carbon Disclosure Project." *Journal of Accounting and Public Policy* 36, no. 1: 14–33. https://doi.org/10.1016/j.jaccpubpol.2016.11.003.

Oussii, A. A., and M. Jeriji. 2024. "Female Directors' Representation and Firm Carbon Emissions Performance: Does Family Control Matter?" *Journal of Family Business Management*. https://doi.org/10.1108/JFBM-06-2024-0121.

Oyewo, B. 2023. "Corporate Governance and Carbon Emissions Performance: International Evidence on Curvilinear Relationships." *Journal of Environmental Management* 334: 117474. https://doi.org/10.1016/j.jenvman.2023.117474.

Panwar, R., K. Paul, E. Nybakk, E. Hansen, and D. Thompson. 2014. "The Legitimacy of CSR Actions of Publicly Traded Companies Versus Family-Owned Companies." *Journal of Business Ethics* 125, no. 3: 481–496. https://doi.org/10.1007/s10551-013-1933-6.

Park, J., J. Lee, and J. Shin. 2023. "Corporate Governance, Compensation Mechanisms, and Voluntary Disclosure of Carbon Emissions: Evidence From Korea." *Journal of Contemporary Accounting and Economics* 19, no. 3: 100361. https://doi.org/10.1016/j.jcae.2023.100361.

Qian, W., and S. Schaltegger. 2017. "Revisiting Carbon Disclosure and Performance: Legitimacy and Management Views." *British Accounting Review* 49, no. 4: 365–379. https://doi.org/10.1016/j.bar.2017.05.005.

Qosasi, A., H. Susanto, R. Rusmin, E. W. Astami, and A. Brown. 2022. "An Alignment Effect of Concentrated and Family Ownership on Carbon Emission Performance: The Case of Indonesia." *Cogent Economics & Finance* 10, no. 1: 1–21. https://doi.org/10.1080/23322039.2022.2140906.

Requejo, I., F. Reyes-Reina, M. J. Sanchez-Bueno, and I. Suárez-González. 2018. "European Family Firms and Acquisition Propensity: A Comprehensive Analysis of the Legal System's Role." *Journal of Family Business Strategy* 9, no. 1: 44–58. https://doi.org/10.1016/j.jfbs.2018.01.003.

Richards, M., T. Zellweger, and J.-P. Gond. 2017. "Maintaining Moral Legitimacy Through Worlds and Words: An Explanation of Firms' Investment in Sustainability Certification." *Journal of Management Studies* 54, no. 5: 676–710. https://doi.org/10.1111/joms.12249.

Rivera-Franco, P., I. Requejo, and I. Suárez-González. 2024. "Internal Versus External CSR Practices: The Trade-Off in Family Firms." *European Management Review*: 1–22. https://doi.org/10.1111/emre.12662.

Rjiba, H., and T. Thavaharan. 2022. "Female Representation on Boards and Carbon Emissions: International Evidence." *Finance Research Letters* 49: 103079. https://doi.org/10.1016/j.frl.2022.103079.

Rodríguez-Ariza, L., B. Cuadrado-Ballesteros, J. Martínez-Ferrero, and I.-M. García-Sánchez. 2017. "The Role of Female Directors in Promoting CSR Practices: An International Comparison Between Family and Non-Family Businesses." *Business Ethics: A European Review* 26, no. 2: 162–174. https://doi.org/10.1111/beer.12140.

Sageder, M., C. Mitter, and B. Feldbauer-Durstmüller. 2018. "Image and Reputation of Family Firms: A Systematic Literature Review of the State of Research." *Review of Managerial Science* 12, no. 1: 335–377. https://doi.org/10.1007/s11846-016-0216-x.

Schepers, J., W. Voordeckers, T. Steijvers, and E. Laveren. 2021. "Entrepreneurial Intention-Action Gap in Family Firms: Bifurcation Bias and the Board of Directors as an Economizing Mechanism." *Eurasian Business Review* 11, no. 3: 451–475. https://doi.org/10.1007/s40821-021-00183-z.

Schunck, R. 2013. "Within and Between Estimates in Random-Effects Models: Advantages and Drawbacks of Correlated Random Effects and Hybrid Models." *Stata Journal: Promoting Communications on Statistics and Stata* 13, no. 1: 65–76. https://doi.org/10.1177/1536867X1301300105.

Shocker, A. D., and S. P. Sethi. 1973. "An Approach to Incorporating Societal Preferences in Developing Corporate Action Strategies." *California Management Review* 15, no. 4: 97–105. https://doi.org/10.2307/41164466.

Suchman, M. C. 1995. "Managing Legitimacy: Strategic and Institutional Approaches." *Academy of Management Review* 20, no. 3: 571. https://doi.org/10.2307/258788.

Taglialatela, J., I. Miroshnychenko, R. Barontini, and F. Testa. 2024. "Talk or Walk? The Board of Directors and Firm Environmental Strategies." *Business Strategy and the Environment* 33, no. 4: 2890–2910. https://doi.org/10.1002/bse.3628.

Terlaak, A., S. Kim, and T. Roh. 2018. "Not Good, Not Bad: The Effect of Family Control on Environmental Performance Disclosure by Business Group Firms." *Journal of Business Ethics* 153, no. 4: 977–996. https://doi.org/10.1007/s10551-018-3911-5.

Tingbani, I., L. Chithambo, V. Tauringana, and N. Papanikolaou. 2020. "Board Gender Diversity, Environmental Committee and Greenhouse Gas Voluntary Disclosures." *Business Strategy and the Environment* 29: 2194–2210.

Torchia, M., A. Calabrò, and M. Huse. 2011. "Women Directors on Corporate Boards: From Tokenism to Critical Mass." *Journal of Business Ethics* 102, no. 2: 299–317. https://doi.org/10.1007/s10551-011-0815-z.

Toukabri, M., and F. Jilani. 2023. "The Power of Critical Mass to Make a Difference: How Gender Diversity in Board Affect US Corporate Carbon Performance." *Society and Business Review* 18, no. 4: 592–617. https://doi.org/10.1108/SBR-11-2021-0224.

Valls Martínez, M. d. C., J. M. Santos-Jaén, R. Soriano Román, and P. A. Martín-Cervantes. 2022. "Are Gender and Cultural Diversities on Board Related to Corporate CO_2 Emissions?" *Journal of Cleaner Production* 363: 132638. https://doi.org/10.1016/j.jclepro.2022.132638.

Velte, P. 2024a. "Archival Research on Carbon Reporting Quality: A Review of Determinants and Consequences for Firm Value." *Journal of Environmental Law and Policy* 46, no. 1: 110–148.

Velte, P. 2024b. "A Literature Review Concerning the Non-Carbon-Related Environmental Goals of the EU Taxonomy Regulation and the European Sustainability Reporting Standards (ESRS)." *Journal of Global Responsibility*. https://doi.org/10.1108/JGR-02-2024-0032.

Velte, P. 2025. "Sustainable Corporate Governance and Corporate Carbon Outputs. Status Quo of Empirical Research and Further Improvements." *Journal of Financial Reporting and Accounting*. https://doi.org/10.1108/JFRA-10-2024-0743.

Voordeckers, W., A. Vandebeek, and L. Peeters. 2023. "Endogeneity and the Family Involvement–Firm Performance Relationship: On the Daunting Search for Instrumental Variables." In *Field Guide to Family Business Research*, edited by K. H. Brigham and G. T. Payne, 229–246. Edward Elgar Publishing. https://doi.org/10.4337/9781800884144.00024.

Wang, J. C., Y. Zhao, S. L. Sun, and J. Zhu. 2023. "Female-Friendly Boards in Family Firms." *Journal of Business Research* 157: 113552. https://doi.org/10.1016/j.jbusres.2022.113552.

Wickert, C., A. G. Scherer, and L. J. Spence. 2016. "Walking and Talking Corporate Social Responsibility: Implications of Firm Size and Organizational Cost." *Journal of Management Studies* 53, no. 7: 1169–1196. https://doi.org/10.1111/joms.12209.

Wooldridge, J. M. 2013. *Introductory Econometrics: A Modern Approach*. 5th ed. Mason, Ohio: South-Western Cengage Learning.

Yu, B., S. Zeng, H. Chen, X. Meng, and C. Tam. 2021. "Doing More and Doing Better Are Two Different Entities: Different Patterns of Family Control and Environmental Performance." *Business Strategy and the Environment* 30, no. 1: 1–20. https://doi.org/10.1002/bse.2605.

Zhang, X., H. Fang, J. Dou, and J. J. Chrisman. 2022. "Endogeneity Issues in Family Business Research: Current Status and Future Recommendations." *Family Business Review* 35, no. 1: 91–116. https://doi.org/10.1177/08944865211049092.

Appendix A

Variable Definitions

Variable name	Definition	Data source
Dependent variables		
Talk and walk	Composite score measuring different levels of climate action on a scale from 0 to 5, including *participation* in the CDP, *publication* of CDP data, existence of a decarbonization *target*, validation of the target by *SBTi* and the subsequent *adherence* to this target. A detailed description of each score item can be found below.	CDP
Talk	The sum of *participation*, *publication* and *target* for each firm-year	CDP
Walk	The sum of *SBTi* and *adherence* for each firm-year	CDP
Individual items		
participation	Dummy variable indicating whether a firm participated in the CDP survey in a given year. 1 = participated in year *t*, 0 otherwise.	CDP
publication	Dummy variable indicating whether a participating firm subsequently published the CDP survey data (see Ott et al. 2017 for a detailed discussion). 1 = published survey results in year *t*, 0 otherwise.	CDP
target	Dummy variable indicating whether a firm has set a decarbonization target in a given year. 1 = emission reduction target is set in year *t*, 0 otherwise.	CDP
SBTi	Dummy variable indicating if at least one emission reduction target has been validated by the science-based targets initiative (SBTi). 1 = at least one science-based target has been approved by SBTi in any year, 0 otherwise.	CDP
adherence	Dummy variable indicating whether a firm adheres to its decarbonization target in a given year. The variable is computed based on the time passed from start to target year (%) versus the progress made to achieve the respective target (%). 1 = emission reduction meets or exceeds the target in year *t*, 0 otherwise. In the case of more than one target per firm-year, the mean value is used, similar to Ioannou et al. (2016). For a detailed discussion, see Section 3.2.	CDP
Independent variables		
BGD	Ratio of female board members in %	LSEG
blau_index	Board gender diversity index that ranges from 0 (complete homogeneity) to 0.5 (complete heterogeneity)	LSEG
One_woman; *two_women*; *three_women*; *four_women*	Dummy variables, where 1 indicates at least one woman, two women, three women or four women on the board of directors, and 0 otherwise	LSEG
famown	Dummy variable equal to 1 if the global ultimate owner at the 25.01% level is 'one or more named individuals or families'	BvD Orbis
famown_direct_5percent	Dummy variable equal to 1 if at least 5% of the company is directly owned by 'one or more named individuals or families' based on data from the top 10 largest direct shareholders	BvD Orbis
famown_direct_10percent	Dummy variable equal to 1 if at least 10% of the company is directly owned by 'one or more named individuals or families' based on data from the top 10 largest direct shareholders	BvD Orbis
fam_mgmt	Dummy variable equal to 1 if the family owner (global ultimate owner) is also involved in management	BvD Orbis
Control variables		
incentive	Dummy variable indicating whether senior executive compensation is linked to sustainability or CSR-related incentives (dummy)	LSEG
independence	Percentage of independent board members	LSEG
csr_com	Existence of CSR/sustainability committee (dummy)	LSEG
B_skills	Board member specific skills (%), i.e., percentage of board members who have either an industry-specific background or a strong financial background	LSEG
B_size	Board size (total number of board members)	LSEG

Variable name	Definition	Data source
B_affiliation	Average number of other corporate affiliations for the board members.	
size	Log of total assets	LSEG
emissions	Total estimated CO_2e emissions by revenues (tCO_2/EUR mn)	LSEG
roa	Return on assets (%)	LSEG
ln_age	Log of firm age	LSEG
freefloat	Free float of shares (%)	LSEG

Appendix B

Breakdown of Target-Level Data

Panel A: Target characteristics		
Average target duration (start yo target-year)	9.86 years	
Total # firm-year targets	14,362	
Thereof ongoing targets	10,713 (74.59%)	
Thereof fully elapsed targets	3649 (25.41%)	
Panel B: Adherence by target type		
Ongoing targets	10,713	
Thereof on track to meet target	7147	
Thereof not on track to meet target	3566	
Fully elapsed targets	3649	
Thereof target met or exceeded	2569	
Thereof target not met	1080	
Panel C: Adherence by industry		
	Meet target (or on track)	Not meet target (or not on track)
Accommodation and Food Services	59.72%	40.28%
Admin. and Support and Waste Management and Remediation Services	63.56%	36.44%
Agriculture, Forestry, Fishing and Hunting	13.33%	86.67%
Arts, Entertainment and Recreation	33.33%	66.67%
Construction	63.06%	36.94%
Health Care and Social Assistance	100.00%	0.00%
Information	69.09%	30.91%
Manufacturing	65.41%	34.59%
Mining, Quarrying and Oil and Gas Extraction	62.39%	37.61%
Other Services (except Public Administration)	72.73%	27.27%
Professional, Scientific and Technical Services	74.52%	25.48%
Real Estate and Rental and Leasing	72.51%	27.49%
Retail Trade	64.24%	35.76%
Transportation and Warehousing	62.13%	37.87%
Utilities	73.75%	26.25%
Wholesale Trade	62.50%	37.50%
Grand total	66.70%	33.30%

Appendix C

Sample Overview Prematch and Postmatch

	Prematch			Prematch		
	Nonfamily (1)	Family (2)	Difference in means	Nonfamily (3)	Family (4)	Difference in means
Panel A: *T*-tests	**Mean**	**Mean**	**(1)–(2)**	**Mean**	**Mean**	**(3)–(4)**
Size	22.060	21.900	0.160***	21.925	21.880	0.045
Emissions	378.604	321.692	56.912**	391.185	355.113	36.072
	Prematch			**Postmatch**		
Panel B: Distribution by country	**Nonfamily**	**Family**	**Total**	**Nonfamily**	**Family**	**Total**
Austria	123	66	189	31	47	78
Belgium	198	60	258	49	20	69
Cyprus	0	1	1	0	1	1
Czech Republic	12	0	12	0	0	0
Denmark	259	12	271	12	12	24
Finland	312	27	339	127	27	154
France	689	338	1027	235	293	528
Germany	720	327	1047	238	265	503
Greece	61	26	87	11	13	24
Hungary	39	2	41	4	0	4
Iceland	4	0	4	0	0	0
Ireland	267	0	267	0	0	0
Italy	79	34	113	14	27	41
Luxembourg	76	8	84	25	0	25
Malta	7	0	7	7	0	7
Netherlands	275	25	300	28	25	53
Norway	234	35	269	30	32	62
Poland	191	60	251	19	24	43
Portugal	54	6	60	4	0	4
Romania	2	0	2	2	0	2
Russia	168	86	254	55	76	131
Slovenia	6	0	6	0	0	0
Spain	265	59	324	36	35	71
Sweden	459	133	592	105	109	214
Switzerland	571	210	781	129	198	327
Turkey	47	49	96	1	49	50
United Kingdom	2578	337	2915	495	304	799
Total	7696	1901	9597	1657	1557	3214

Panel C: Distribution by industry	Prematch			Postmatch		
	Nonfamily	Family	Total	Nonfamily	Family	Total
Accommodation and Food Services	132	47	179	26	26	52
Administrative and Support and Waste Management and Remediation Services	236	48	284	6	17	23
Agriculture, Forestry, Fishing and Hunting	26	19	45	6	19	25
Arts, Entertainment and Recreation	99	9	108	21	4	25
Construction	364	69	433	31	63	94
Educational Services	6	0	6	0	0	0
Health Care and Social Assistance	50	23	73	2	12	14
Information	669	191	860	139	145	284
Management of Companies and Enterprises	4	0	4	0	0	0
Manufacturing	2999	813	3812	790	729	1519
Mining, Quarrying and Oil and Gas Extraction	446	118	564	140	117	257
Other Services (except Public Administration)	28	23	51	6	0	6
Professional, Scientific and Technical Services	538	115	653	120	115	235
Real Estate and Rental and Leasing	630	102	732	142	90	232
Retail Trade	403	239	642	97	165	262
Transportation and Warehousing	393	46	439	35	40	75
Utilities	461	13	474	42	11	53
Wholesale Trade	212	26	238	54	4	58
Total	7696	1901	9597	1657	1557	3214

Note: Considering the limited absolute number of observations across countries and industries, the CEM matching has been performed based on firm size as well as country and industry (see Section 4.2 for a detailed discussion). Panel A presents two-sample *t*-tests with unequal variances on the equality of means, disaggregated by family (treatment) and nonfamily firms (control) before and after matching. The *t*-test results indicate that the matching successfully reduces variation between treatment and control groups. Panels B and C further document the sample distribution by country and industry prematch and postmatch indicating an overall more balanced sample after matching.
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Annex III: Family firms and the financial consequences of corporate decarbonization – European evidence (Article 3)

Bergmann, Niklas; Prigge, Stefan (2025). Family firms and the financial consequences of corporate decarbonization – European evidence.

Abstract

Prior research widely documents a dynamic relationship between carbon performance (CP) and financial performance (FP). From a socioemotional wealth perspective, family firms are assumed to stand out in terms of their ability to reap the financial benefits of their climate efforts. Extending prior research on the CP-FP relationship, we analyze whether firms that adhere to their emission reduction targets also exhibit superior FP. As one mechanism contributing to potential differences in FP, we further investigate the issuance of sustainable bonds. Based on emission reduction target data of a European sample of 2,063 firm-year observations, we employ two-step system generalized method of moments (GMM) models to test the impact of target adherence on FP. We further employ logistic regression models to test the link between CP and sustainable bond issuance. Our results show that the adherence to emission reduction targets is positively associated with (accounting-based) FP and that family ownership negatively moderates this relationship. Moreover, adherence to emission reduction targets facilitates sustainable bond issuance, suggesting a potential source of financial advantage from corporate decarbonization. Meanwhile, family firms are less likely to issue sustainable bonds. The applied measure of emission reduction target adherence goes beyond previous studies on the CP-FP relationship by considering targets as a new means to assess the intention-action link in corporate decarbonization.

Keywords: carbon emissions, emission reduction targets, financial performance, sustainable finance, green bonds, sustainability-linked bonds

1. Introduction

Reducing corporate carbon emissions is an important prerequisite to meet internationally-agreed climate targets and strongly emphasized in European sustainability regulations (Dahlmann, 2024; Block *et al.*, 2023). The quest to decarbonize firms' business operations also entails extensive financial consequences (Velte *et al.*, 2020). Accordingly, researchers have frequently analyzed the complex relationship between carbon performance (CP) and financial performance (FP) (Bendig *et al.*, 2023; Secinaro *et al.*, 2020; Ben-Amar *et al.*, 2024). Prior research widely documents a dynamic relationship between CP and FP, in favor of the 'business case for sustainability' perspective, supposing that improved sustainability may also coincide with financial gain (Velte, 2024a).

A plethora of studies has addressed carbon reporting and performance outcomes and their role for FP (Busch and Lewandowski, 2018; Aswani *et al.*, 2024; Qian and Schaltegger, 2017). Meanwhile, regarding the specific relationship between family ownership and carbon emissions, only few studies have been published (Borsuk *et al.*, 2024; Oussii and Jeriji, 2024; Gómez-Mejía *et al.*, 2025; Block *et al.*, 2023). First results suggest that family firms emit less carbon, from which they benefit financially in certain situations, e.g., when family board representation is high (Borsuk *et al.*, 2024; Gómez-Mejía *et al.*, 2025). Yet, also negative consequences of family ownership for climate efforts are observable (Bergmann *et al.*, 2025). For instance, family-owned firms have been found to be less sensitive to external stakeholder pressure in their decarbonization strategies (Block *et al.*, 2023).

As an important intermediate mechanism between the intention to reduce emissions and subsequent action, also the role of emission reduction targets has gained increasing research attention (Dahlmann, 2024; Callery and Kim, 2024; Ioannou *et al.*, 2016). By formalizing the firm's decarbonization objectives, emission reduction targets are closely connected to CP, yet are not synonymous considering that targets capture additional information not included in

prevailing CP measures. Generally, results indicate that emission reduction targets are positively associated with FP (Liu *et al.*, 2023). As an additional indicator of target ambitiousness, prior findings emphasize the particular role of science-based targets (SBTs) in driving financial performance (Ben-Amar *et al.*, 2024; Bendig *et al.*, 2023; Li *et al.*, 2025).

However, although prior studies have included emission reduction targets, these studies did not account for the actual achievement of these targets. Specifically, it remains unclear whether meeting emission reduction targets benefits FP in a similar way. In this regard, Bendig *et al.* (2023) have called for future research to empirically explore the impact of *achieved* emission reduction targets on FP. This is of particular relevance as previous evidence indicates that announced and realized emission reductions are perceived differently, with announced reductions being experienced more positively (Jacobs, 2014). Similarly, targets merely signal the intention to reduce emissions, but are frequently not achieved as intended (Callery and Kim, 2024; Malen, 2022; Dahlmann, 2024). These issues are addressed in this study by focusing on emission reduction target adherence.

Considering the prior evidence on the CP-FP link, further questions arise about potential mechanisms that may explain financial advantages among firms with superior CP. One potential source of financial advantage is associated with the emergence of new financial instruments, such as *sustainability-linked bonds* or *green bonds*, which provide a range of financial and non-financial incentives for sustainable bond issuers (Vulturius *et al.*, 2024; Bhutta *et al.*, 2022; Anderson and Kish, 2024; Tang and Zhang, 2020). These promise potential benefits in terms of cost of capital (‘greenium’), better overall access to financing, or ways for firms to credibly signal their environmental ambition (Flammer, 2021; Feldhütter *et al.*, 2024), with the signal being beneficial beyond financial markets, e.g., in the labor or product markets. Thus, the issuance of sustainable bonds may represent a distinct channel for firms to exploit superior sustainability (carbon) performance in corporate financing. Yet, it remains unclear

which issuers specifically seek to access these sustainable finance markets. In particular, it has not been studied whether carbon commitments and their achievement increase the likelihood of firms engaging in sustainable finance markets. Considering these research gaps, we also study the issuance of sustainable bonds as part of our investigation of the role of emission reduction target adherence for FP.

Both relationships have important interfaces with the extant research concerning the dominant role of family owners among European publicly listed firms (Gregorič *et al.*, 2022), which we consider as a key contingency in our analysis. In this regard, Michiels and Molly (2017) have amongst others called for additional research into 'alternative forms' of financing and the role of SEW in family business financing decisions. To the best of our knowledge, no prior study has analyzed the use of sustainable finance instruments in family firms. Given the peculiar financing preferences of family firms (Croci *et al.*, 2011; Thiele and Wendt, 2017) and their interplay with the characteristics of prevailing sustainable finance instruments, this represents an important future research direction not yet explored.

Based on GMM and logistic regression models, our results show that the adherence to emission reduction targets is positively associated with (accounting-based) FP among European publicly listed firms. This relationship is moderated negatively by family ownership. Meanwhile, the adherence to emission reduction targets also facilitates sustainable bond issuance. Overall, family firms have been found to be less likely to issue sustainable bonds. The remainder of the paper is structured as follows: In Section 2, we summarize the findings of previous research and derive our hypotheses building upon the business case for sustainability perspective as well as socioemotional wealth theory. In Section 3, we introduce the underlying data and method, before presenting the empirical results in Section 4. In Section 5, we discuss the results, including their robustness and limitations. In Section 6, we present our conclusions.

2. Theory, literature review and hypotheses

2.1. Emission reduction target adherence and financial performance

Generally, there is a rich literature addressing the relationship between CP and FP, referring to the fundamental notion whether it *pays to be green* (Ambec and Lanoie, 2008; Bendig *et al.*, 2023; Gangi *et al.*, 2025). Conceptually, this literature frequently builds on the 'business case for sustainability' concept, indicating that more sustainable business conduct may be linked to financial benefits (Schaltegger *et al.*, 2019). Prior research has applied the business case concept to the particular context of climate change strategies (Busch and Lewandowski, 2018). Theoretically, the business case argument is well-aligned with a legitimacy theory perspective toward carbon emissions. As climate change becomes more urgent, stakeholder expectations are evolving, calling for substantive emission reductions beyond greenwashing (Deegan, 2002; Qian and Schaltegger, 2017; Bergmann *et al.*, 2025). To maintain a legitimate stance, businesses are required to document clear ambitions to reduce their emissions, e.g., formalized through credible emission reduction targets and the subsequent achievement of these targets. In turn, firms that satisfy these stakeholder demands to improve their carbon outputs may also benefit financially (Velte, 2024a).

Empirically, this perspective tends to be supported, as most extant studies support a positive relationship between CP and FP. In their meta-analysis Busch and Lewandowski (2018) consolidated findings showing that carbon emissions are inversely related with FP, i.e., that good CP is associated with higher FP. Based on a systematic literature review, Velte *et al.* (2020) arrive at a similar conclusion, indicating that CP increases FP.

More recently, the role of emission reduction targets has attracted particular attention (Dahlmann, 2024; Callery and Kim, 2024; Ioannou *et al.*, 2016). Overall, results suggest a positive link with FP while also emphasizing a dominant role of SBTs. Specifically, prior studies indicate that SBTs are associated with positive financial consequences (Ben-Amar *et*

al., 2024). Likewise, Bendig *et al.* (2023) show that CP positively related to FP among firms that have set SBTs. In line with these results, Li *et al.* (2025) suggest that adopting SBTs represents a long-term sustainable investment that helps reduce emissions, while not harming profitability. Yet, Bendig *et al.* (2023) also note that the *actual achievement* of emission reduction targets so far has been under-researched.

This research gap is puzzling because carbon reduction targets entail several complexities that are not reflected in prevailing carbon performance metrics (Dahlmann, 2024; Ioannou *et al.*, 2016), raising the need for dedicated research into target adherence. Most importantly, there is growing evidence documenting different kinds of malpractices when failing to meet emission reductions targets. Both Malen (2022) as well as Callery and Kim (2024) report similar findings of firms '*moving the goalpost*' or engaging in '*deceptive parameter changes'*, i.e., subsequent adjustments to emission reduction targets to conceal underperformance. While both the voluntary nature of many climate commitments and the limited standardization in targets pave the way for these practices (Dahlmann, 2024), this raises the question whether prior research findings concerning the CP-FP relationship also apply to emission reduction targets.

Accordingly, the consequences of the adherence to emission reduction targets for FP are not sufficiently understood to date. Extending previous research on the CP-FP relationship (e.g., Bendig *et al.*, 2023; Gomez-Mejia *et al.*, 2025), we hypothesize and test whether the adherence to decarbonization is positively related with FP (Hypothesis 1).

Hypothesis 1: There is a positive link between the adherence to decarbonization targets and financial performance.

2.2. The moderating role of family ownership

Socioemotional wealth (SEW) theory constitutes one of the most prevalent theoretical perspective concerning finance in family business (Michiels and Molly, 2017). SEW theory has

specifically informed recent studies on the link between carbon emissions and FP in family firms (Gomez-Mejia *et al.*, 2025). Thus, we also draw from SEW theory to explain the role of emission reduction target adherence for FP.

A recent stream of the literature on family involvement and its consequences for FP has addressed the particular question whether family firms are more capable in reaping the financial benefits of their decarbonization efforts (Gomez-Mejia *et al.*, 2025), environmental responsibility (Gangi *et al.*, 2025), or their CSR initiatives more widely (Combs *et al.*, 2023). There are lively discussions in the literature whether family firms act more or less responsible in different areas of sustainability (Miroshnychenko *et al.*, 2024; Lorenzen *et al.*, 2024; Miroshnychenko *et al.*, 2022; Caccialanza, 2025), including their carbon emissions (Borsuk *et al.*, 2024; Gomez-Mejia *et al.*, 2025).

Combs *et al.* (2023) have established the notion that family firms may get '*more bang for their buck'*. Specifically, they argue that SEW considerations such as the family owners' desire for identification with the firm, binding stakeholder relationships as well as transgenerational control foster *SEW resources* which should help family firms to better leverage their CSR strategies in favor of financial gain. Consistent with these arguments, Gomez-Mejia *et al.* (2025) extend this notion to the particular context of carbon emissions, showing that family firms tend to benefit financially more from their carbon performance. From an SEW perspective, Gomez-Mejia *et al.* (2025) explain that "family firms enjoy certain advantages over nonfamily firms that make socially minded initiatives more valuable" (p. 6), e.g., their strategic commitments are more credible. Referring to the 'more bang for their buck' notion of Combs *et al.* (2023), they elaborate that "socially responsible actions that family firms take to build and preserve SEW also generate SEW resources that can augment the potential financial gains from those initiatives" (p. 6).

However, the role of family involvement remains ambivalent (Miroshnychenko *et al.*, 2022; Miroshnychenko *et al.*, 2024). Li *et al.* (2023) suggest that the distinction between extended and restricted SEW has been overlooked. It shapes environmental behaviors in family firms, leading to distinct, non-homogenous strategies. In the same vein, Hsueh *et al.* (2023) found "that the same SEW dimensions may lead to polar strategic choices" (p. 191), similarly Miller and Le Breton-Miller (2021). Thus, although SEW can drive positive behaviors, its 'dark side' can emerge when an excessive focus on family control leads to neglect broader stakeholder interests (Zhu *et al.*, 2025).

Overall, these arguments suggest that family ownership plays an important moderating role in the relationship between the adherence to decarbonization targets and FP. However, considering the more optimistic pro-environmental perspectives (e.g., Gómez-Mejía *et al.*, 2025; Combs *et al.*, 2023) but also the contrary view which emphasizes the dual/polar nature of positive and negative environmental choices among family firms (e.g., Li *et al.*, 2023; Miroshnychenko *et al.*, 2024), the direction of this moderating effect remains unclear.

Hypothesis 2: The relationship between adherence to decarbonization targets and financial performance is moderated by FO.

3. Data and method

3.1. Sample

For our analysis, we combine data from four different data sources. First, we match data regarding carbon emissions and reduction targets from CDP (formerly: Carbon Disclosure Project) with financial and governance information from LSEG (formerly: Refinitiv). Family ownership information is added from the Bureau van Dijk Orbis Europe database. All three commercial databases are widely used in archival research practice (Block *et al.*, 2023; Meier

and Schier, 2021; Matisoff *et al.*, 2013). Finally, we include sustainable bond issuance data published by the International Capital Market Association (ICMA, 2025).

In our sample construction, we focus on the European capital market as the European regulatory landscape strongly emphasizes climate legislation, representing a suitable setting for the analysis of the financial consequences of corporate decarbonization. The observation period considers emission reduction target data between 2011 and 2021. We focus on this timeframe to ensure a homogeneous and comparable sample prior to the EU Corporate Sustainability Reporting Directive (CSRD) introduction in 2022. The EU CSRD has established widespread mandatory sustainability reporting requirements that through its associated reporting standards (ESRS) also substantially affect carbon disclosure and emission targets, specifically. Our observations period therefore focuses on the preceding years in which the European Non-Financial Reporting Directive (NFRD) required a limited number of public interest entities to prepare a non-financial declaration since the fiscal year 2017 (Venturelli *et al.*, 2022). Table 1 presents the sample generation process in more detail. We exclude financial service firms (Nuber *et al.*, 2020), firms with missing values as well as firms without continuous responses as a prerequisite to use the GMM estimator (Gómez-Mejía *et al.*, 2025). This yields a final sample of 2,063 firm-year observations between 2011 and 2021.

Table 2 presents the composition of our sample, disaggregated by country and industry. Notably, many sample firms are located in the UK, where the CDP survey is rooted historically (Matisoff *et al.*, 2013). The second and third largest countries in our sample are France and Germany, respectively. In terms of industry structure, manufacturing firms are predominant, followed by information technology, transportation, as retail firms.

Table 1. Sample generation process

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Publicly-listed CDP firms from Europe	2960	2994	2997	3000	2959	2924	2873	2825	2746	2660	2559
less											
Financial service firms	539	554	557	547	541	532	521	516	505	493	481
Firms with missing values in CDP, LSEG, or Orbis database	2256	2247	2215	2210	2164	2122	2063	1985	1875	1848	1803
Firms without continuous values (Panel without gaps)	39	38	42	36	28	36	54	110	161	151	165
Final sample	126	155	183	207	226	234	235	214	205	168	110

Table 2. Sample composition by country and industry.

Panel A: By Country	**Freq.**	**Percent**
Austria	44	2.13
Belgium	31	1.50
Denmark	59	2.86
Finland	132	6.40
France	287	13.91
Germany	212	10.28
Greece	6	0.29
Hungary	11	0.53
Ireland	54	2.62
Italy	30	1.45
Netherlands	72	3.49
Norway	49	2.38
Portugal	16	0.78
Spain	123	5.96
Sweden	100	4.85
Switzerland	166	8.05
Turkey	20	0.97
United Kingdom	651	31.56
Total	2063	100.00
Panel B: By Industry (NAICS Sector)	**Freq.**	**Percent**
Accommodation and Food Services	19	0.92
Admim. Support, Waste Mgmt. and Remediation Services	77	3.73
Construction	64	3.10
Information	187	9.06
Manufacturing	922	44.69
Mining, Quarrying, and Oil and Gas Extraction	51	2.47
Other Services (except Public Administration)	5	0.24
Professional, Scientific, and Technical Services	127	6.16
Real Estate and Rental and Leasing	127	6.16
Retail Trade	161	7.80
Transportation and Warehousing	137	6.64
Utilities	151	7.32
Wholesale Trade	35	1.70
Total	2063	100.00

3.2. Variables

3.2.1. Dependent variables

First, to test the consequences for FP, we consider return-on-assets (*roa*) and Tobin's Q (*tobinsq*) in line with prior studies (Wagner *et al.*, 2015; Nuber *et al.*, 2020). These have shown that the CP-FP relationship is sensitive to different specifications of performance, with heterogeneous results being observable across accounting-based and market-based FP measures. We consider Tobin's Q as a market-based measure (Velte, 2017; Bendig *et al.*, 2023), more specifically a market-value-based measure in contrast to market-return-based measures like total shareholder return (TSR).

3.2.2. Independent variables

To analyze whether firms that adhere to their emission reduction targets exhibit superior FP (or are more likely to issue sustainable bonds), we employ the variable *adherence to emission reduction targets* (Bergmann *et al.*, 2025). Previous studies have frequently not included target-level data (except, e.g., Ioannou *et al.*, 2016), leaving significant untapped research potential for our analysis. Meanwhile, there are several barriers to target comparability, including differences in emissions scopes or target duration (Dahlmann, 2024). To address these complexities, we use *adherence* as a relative measure of progress made against a given target. We compute this variable for each firm-year based on the delta between time passed and the (partial or full) achievement of this target, both measured in percent. Consequently, adherence can take values in the interval between [-100; 100], with a value of -100 indicating a fully elapsed target with no progress at all, while a value of 100 indicates a target fully achieved in the first reporting year already (both of which represent unlikely extreme cases). The arithmetic to calculate the adherence variable is explained by the following example: If 5 years of an emission reduction with a total duration of 10 years have passed (i.e., 50 % elapsed time), and if the target has been partially achieved 40%, adherence would take the value of -10 percentage

points, thereby indicating a that a given firm is not meeting this target in a time-proportional manner.

3.2.3. Moderator variables

To operationalize *family ownership* in our analysis, we use a dummy variable indicating whether the firm is owned by 'one or more named individuals or families' at the global ultimate ownership level. We consider the 25.01% threshold as given by the Bureau van Dijk Europe database, similar to other studies (Requejo *et al.*, 2018). We have also considered family involvement in management (Block and Wagner, 2014) in our study design, yet only a minority of firms is family managed in our sample. Therefore, we do not further emphasize this perspective. As described in the control variables below, we further test the role of firm age as a proxy for family generations (Comino-Jurado *et al.*, 2021).

3.2.4. Control variables

In line with previous analyses on the CP-FP relationship we consider different control variables (Gomez-Mejia *et al.*, 2025; Bendig *et al.*, 2023). First, we control for several financial characteristics including firm size (*size*) as measured by the logarithm of total assets, year-on-year growth in sales (*salesgrowth*), asset tangibility (*tangibility*), capital expenditures (*capex*) and total debt (*debt*). Larger firms can attribute more resources to climate-related initiatives, such as carbon reporting (Baumann-Pauly *et al.*, 2013; Wickert *et al.*, 2016). Simultaneously, firms that are growing can plausibly be expected to also grow in terms of their emissions, unless they are mainly expanding into low-carbon business. At the same time, a positive connotation of growth is that it could ensure sufficient financial resources to invest in emission reduction initiatives. Also, we control for general firm characteristics such as firm age (*ln_age*), which may serve as a proxy for generational effects in family firms (Richards *et al.*, 2017).

Furthermore, we include emission-related control variables such as emission intensity (*intensity*) to account for differences in high- and low-emitting firms (Aswani *et al.*, 2024;

Lucas and Noordewier, 2016). On the one hand, higher emission intensity could lead firms to engage more in decarbonization as they are more exposed to carbon risk. At the same time, high-emitting firms may also face greater incentives to conceal their emissions. We also test the role of science-based targets (*sbti*), which have been stressed in previous studies, allowing us to control for more ambitious decarbonization targets (Bendig *et al.*, 2023; Ben-Amar *et al.*, 2024). The potential role of science-based targets is twofold: while science-based targets are harder to achieve than conventional targets (Bendig *et al.*, 2023), they may also imply stronger commitments that suggest subsequent actions.

Finally, we include corporate governance variables on a board-level commonly used in previous studies including board gender diversity (*BDG*), board independence (*independence*), the existence of a sustainability committee (*csr_com*) and sustainability-related compensation incentives (*incentive*) (Velte, 2024b; Haque, 2017). As an ownership-related control we include the shares in free float (*float*), as an inverse measure of blockholder effects (Fattoum-Guedri *et al.*, 2018).

In line with common practice, we have treated outliers by winsorizing values at the 1st and 99th percentiles to avoid distortion in our estimates. A full description of all variables used in our analysis can be found in the Appendix.

3.3. Model

In our research design, we consider endogeneity concerns that permeate both the family business and carbon literature (Zhang *et al.*, 2022; Velte, 2024a). While our analysis may be affected by different endogeneity problems, the most likely cause of endogeneity is reverse causality in the CP-FP relationship. That is, only more profitable firms may be able to dedicate appropriate resources to improve CP (Gomez-Mejia *et al.*, 2025), raising the need to consider bidirectional effects (Endrikat *et al.*, 2014). Therefore, in line with the extant literature (García-Meca *et al.*, 2024; Muhammad, 2025; Gull *et al.*, 2023; Wintoki *et al.*, 2012), we introduce

GMM regression models to study the hypothesized positive consequences of the adherence to decarbonization targets for FP. Following the methodological guidance of Gómez-Mejía *et al.* (2025) who recently applied the GMM method to the specific case of the CP-FP relationship, we use the two-step (system) GMM estimator.

To account for the dynamic nature in the CP-FP relationship, i.e., that past profitability may predict future emission reductions, the system GMM estimator introduces internal instruments based on the lagged model variables rather than external instruments (Wintoki *et al.*, 2012). While we include the lag (t-1) of the dependent variable (FP) already in the explanatory variables, our model further introduces lags from t–2 to t–3 as instruments for the equations in differences and one instrument for the equations in levels. Finally, the GMM method allows us to control for unobserved individual heterogeneity, which helps alleviate omitted variable bias (Muhammad, 2025; Gómez-Mejía *et al.*, 2025). At the same time, GMM models also depend on a number of additional requirements concerning the underlying data such as a panel structure without gaps across the observation period (Gomez-Mejia *et al.*, 2025) that we consider in our design.

Our regression model is specified in equation (1). In line with common practice, we include the lag of the dependent variable as explanatory variable.

$$FP_{i,t} = \beta_0 + \beta_1 * FP_{i,t-1} + \beta_2 * adherence_{i,t} + \beta_3 * famown_{i,t} + \beta 4 * famown_{i,t} \; x \; adherence_{i,t} + Controls_{i,t} + e_{it} \qquad (1)$$

To ensure the validity of our regressions, we compute several statistical tests including the Wald-test to test for joint significance. We also test for second-order serial correlation as well as perform the Hansen test of over-identifying restrictions (Gómez-Mejía *et al.*, 2025).

Despite similar premises, we note that our analysis differs from prior studies in several ways. Most importantly, in contrast to prior analyses we rely on specific target-level data, providing

a unique opportunity to study the link between the intention to reduce emissions and subsequent action, which differs from the prevalent carbon performance metrics (i.e., absolute and intensity-based) used in prior studies (Borsuk *et al.*, 2024; Busch and Lewandowski, 2018). Secondly, our sample differs from the analysis of Gomez-Mejia *et al.* (2025). While they also study European firms, their sample mainly consists of private firms and of firms from energy intensive industries because they derive data from the EU ETS. In contrast, we focus on publicly listed firms, which is an important contingency since public and private family firms have been found to differ significantly in terms of their environmental awareness (Lorenzen *et al.*, 2024). Moreover, our sample composition is more balanced regarding industry representation.

Furthermore, besides general support for a positive CP-FP link, prior research also suggests that there are several contingencies affecting this relationship, including measurement choices regarding emissions (e.g., absolute vs. intensity), FP (e.g., accounting- vs. market-based measures) or considerations of non-linearity (Nuber *et al.*, 2020; Busch and Lewandowski, 2018; Velte *et al.*, 2020; Aswani *et al.*, 2024). We consider these aspects in our empirical design by testing the consequences for different FP measures while also controlling for non-linear dynamics in line with common practice in the literature (Nuber *et al.*, 2020; Gómez-Mejía *et al.*, 2025).

3.4. Descriptive statistics

Tables 3 and 4 present the descriptive statistics as well as pairwise correlation for the model variables. The descriptive statistics indicate that family firms represent 12.5% of all observations, i.e., the prevalence of family firms is lower than the supposed population average among European public firms (Gregorič *et al.*, 2022). Other notable observations indicate that the sample firms on average tend to meet (or exceed) their emission reduction targets. The sample mean of 5.193 indicates that firms on average outperform their emission reduction

targets by about 5 percentage points, which resembles the findings of Feldhütter *et al.* (2024) concerning firms setting rather achievable targets. One striking observation is that firms with SBTs (mean value of adherence equals 7.1) tend to outperform firms without SBTs (mean value of adherence equals -0.13). This is counterintuitive because firms with SBTs set more ambitious targets but still outperform non-SBT firms by roughly 7 percentage points, despite higher target ambitiousness.

Table 3. Descriptive statistics

	N	Mean	Median	Std. Dev.	min	max
roa	2063	5.095	4.633	5.866	-39.322	32.905
tobinsq	2063	1.424	1.113	1.044	.276	9.407
sust_bond	2063	.274	0.000	.446	0	1
adherence	2063	5.193	4.000	29.818	-100	100
famown	2063	.125	0.000	.331	0	1
fam mgmt	2063	.032	0.000	.176	0	1
Size	2063	23.074	23.017	1.37	19.427	25.395
Intensity	2063	274.074	45.880	689.29	.624	7178.04
salesgrowth	2063	.033	0.026	.163	-.727	2.171
tangibility	2063	.651	0.671	.173	.033	.983
capex	2063	.039	0.032	.03	0	.217
debt	2063	.272	0.266	.142	0	.892
sbti	2063	.587	1.000	.492	0	1
BGD	2063	27.531	27.273	12.291	0	57.143
ln age	2063	3.458	3.434	.894	0	4.86
independence	2063	61.22	61.538	22.444	0	100
csr com	2063	.942	1.000	.233	0	1
incentive	2063	.444	0.000	.497	0	1
freefloat	2063	77.198	85.398	23.929	.737	100

The pairwise correlations further suggest that there are no multicollinearity problems in our regression analyses. This notion is also supported by computing variance inflation factors (VIF). The VIF values for all variables lie between 1 and 2.5, i.e., they fall well below established thresholds (Fox and Monette, 1992; O'brien, 2007). This indicates that multicollinearity issues likely do not affect our analyses.

Table 4. Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
(1) roa	1.00																		
(2) tobinsq	0.626*	1.00																	
(3) GB_or_SLB_true	-0.070*	-0.154*	1.00																
(4) adherence	0.00	-0.00	0.103*	1.00															
(5) famown	0.185*	0.299*	-0.098*	-0.066*	1.00														
(6) fam_mgmt	0.148*	0.272*	-0.062*	-0.01	0.481*	1.00													
(7) size	-0.166*	-0.209*	0.307*	0.076*	-0.04	0.02	1.00												
(8) intensity	-0.154*	-0.185*	0.187*	0.02	-0.062*	0.072*	0.198*	1.00											
(9) salesgrowth	0.258*	0.078*	-0.05	-0.03	0.01	0.02	-0.04	-0.03	1.00										
(10) tangibility	-0.086*	-0.125*	0.194*	0.04	-0.198*	-0.112*	0.224*	0.172*	0.00	1.00									
(11) capex	0.070*	0.05	0.114*	-0.04	-0.01	-0.02	0.03	0.106*	0.00	0.147*	1.00								
(12) debt	-0.278*	-0.206*	0.072*	0.03	-0.090*	-0.084*	0.122*	0.05	-0.06	0.381*	0.03	1.00							
(13) sbti	0.04	0.03	0.227*	0.089*	0.04	0.113*	0.396*	0.04	-0.058*	0.057*	0.01	-0.059*	1.00						
(14) BGD	-0.03	0.04	0.103*	0.04	0.05	-0.03	0.198*	-0.094*	-0.04	-0.01	0.02	-0.00	0.232*	1.00					
(15) ln_age	-0.04	-0.02	-0.01	-0.02	0.04	0.01	0.01	0.088*	-0.03	-0.04	-0.04	-0.03	0.02	0.123*	1.00				
(16) independence	0.02	0.02	0.113*	0.00	-0.143*	-0.05	0.184*	0.108*	-0.02	-0.01	-0.06	-0.05	0.099*	0.215*	-0.05	1.00			
(17) csr_com	-0.069*	-0.086*	0.03	-0.04	-0.01	-0.061*	0.166*	0.03	-0.04	0.05	-0.02	0.04	0.05	0.04	-0.03	0.02	1.00		
(18) incentive	-0.02	-0.05	0.106*	0.00	-0.05	0.00	0.206*	0.066*	-0.01	0.03	0.01	0.01	0.151*	0.120*	-0.00	0.095*	0.091*	1.00	
(19) freefloat	0.03	0.02	0.01	0.01	-0.308*	-0.164*	-0.04	-0.099*	0.01	0.03	-0.272*	-0.063*	-0.01	-0.04	-0.01	0.292*	-0.071*	0.062*	1.00

* *p<0.01*

4. Results

4.1. Main analysis

The results of our GMM regressions suggest that adherence (ADH) has a highly significant positive relationship with FP when measured based on ROA ($p<0.01$, see model 1 in Table 5), but it is not significant when measured based on Tobin's Q (see model 2). This needs to be considered critically, as ROA is much more sensitive to managerial discretion, e.g., through different forms of earnings management (Achleitner *et al.*, 2014; Salehi *et al.*, 2020; Prencipe and Bar-Yosef, 2011). However, Tobin's Q is also subject to criticism as to the extent to which it actually measures corporate performance (Bartlett and Partnoy, 2020), e.g., maximizing the market value of equity and maximizing Tobin's Q are not necessarily congruent (Dybvig and Warachka, 2015). Accordingly, Hypothesis 1 concerning the positive link between ADH and FP is partially supported.

Regarding the role of family ownership for FP, several important observations emerge from the GMM regressions. While our research focus lies on the moderating role of family ownership for the ADH-FP relationship, we generally note a positive direct correlation between family ownership and FP, consistent with the prevailing literature concerning a positive FO-FP relationship (Wagner *et al.*, 2015). Our results document a negative moderating effect of family ownership ($p <0.01$) applicable to both ROA and Tobin's Q (see Table 5). Thus, H2 is supported.

Table 5. Base regression results, Generalized method of moments (GMM) regression

	(1) ROA	(2) TobinsQ
L.roa	0.453***	
	(0.00815)	
L.tobinsq		0.935***
		(0.00667)
adherence	0.00575***	0.00000
	(0.00189)	(0.000136)
famown	2.249***	0.171***
	(0.311)	(0.0311)
famown_adherence	-0.00799**	-0.00122***
	(0.00312)	(0.000253)
size	-0.518***	-0.0451***
	(0.0886)	(0.00937)
intensity	-0.000112	0.00000
	(0.00000)	(0.00000)
salesgrowth	7.158***	0.0201
	(0.318)	(0.0215)
tangibility	-0.0820	0.0687
	(0.896)	(0.0896)
capex	19.28***	-1.185***
	(2.412)	(0.223)
debt	-7.934***	-0.128**
	(0.606)	(0.0567)
sbti	0.757**	-0.0143
	(0.298)	(0.0189)
BGD	0.000906	0.00190***
	(0.00885)	(0.000535)
ln_age	0.108	-0.0131
	(0.123)	(0.0113)
independence	0.00469	-0.00175***
	(0.00387)	(0.000350)
csr_com	0.820**	-0.0113
	(0.372)	(0.0308)
incentive	0.172	0.0311***
	(0.114)	(0.01000)
freefloat	0.0267***	-0.000253
	(0.00469)	(0.000510)
z_1	522.54 (17)	3449.25 (17)
m_2 *(AR (2))*	0.93	1.54
Hansen	183.61 (378)	201.19 (378)
n	1,813	1,813

Notes: The z_1 reports the Wald test results concerning the joint significance of the reported coefficients (degrees of freedom in parentheses). The m_2 presents the results of the second-order serial correlation test. *Hansen* reports the results of the Hansen-test of over-identifying restrictions concerning the null of no correlation between the instruments and the error term, (degrees of freedom in parentheses). Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

While our results support our second hypothesis in line with the recent discussions concerning the dual or polar nature of family involvement, our results also deviate from the recent findings of Gomez-Mejia et al. (2025) and Combs et al. (2023). We discuss potential explanations for these discrepancies relating to the measures being used, differences in the research sample as well as their respective theoretical implications from a SEW perspective in Section 5.

4.2. Robustness analysis

To further test the robustness of the base model results, we consider changes in the observation period, the role of target ambitiousness, as well as potential non-linear dynamics in the ADH-FP relationship. First, we test the robustness of our results to the exclusion of the Covid pandemic period (2020 and 2021). This robustness test is needed because many firms have seen a reduction in their production levels during Covid (e.g., due to disrupted supply chains or demand shocks), which may imply non-discretionary 'windfall' emission reductions that skew our results. When excluding the Covid period from our sample, ADH remains highly significantly related to ROA (see Table 6 model 1). Thus, our results remain robust to changes in the observation period to consider the Covid pandemic.

Second, considering the prominent role of SBTs stressed in the literature (Ben-Amar *et al.*, 2024; Bendig *et al.*, 2023; Li *et al.*, 2025), we further test the robustness of our findings in the light of SBTs as a more ambitious subgroup of targets (see model 2 and 4). Our results suggest that the positive effect of ADH on FP (ROA) mainly unfolds through the interaction with SBTs ($\beta = 0.00959$, $p<0.01$). This re-affirms and extends findings from the previous literature also for our novel ADH measure.

Going beyond previous studies, our analysis of target-level data provides new insights into potential explanations for these observations. As discussed in Section 3.4, firms with SBTs counterintuitively have also been found to achieve their targets at a higher rate. This suggests a possible 'double-positive' effect: Firms with SBTs by design set more ambitious targets (Bendig *et al.*, 2023), which, despite their ambitiousness, the firms also achieve at a higher rate as per our analysis. In other words, despite harder-to-achieve targets, firms adhere to these targets more often, being associated with positive FP outcomes.

Third, the prior literature further stresses the need to test potential non-linear (curvilinear) effects in the carbon-FP relationship (Velte *et al.*, 2020; Gómez-Mejía *et al.*, 2025; Nuber *et*

al., 2020). Thus, besides analyzing the direct effects of *adherence* and *famown* and their respective interaction, we also include a quadratic term concerning the interaction effect in our models, similar to Gomez-Mejia *et al.* (2025). Yet, when including the respective quadratic interaction terms in our analysis (see Table 6 models 3 and 5), our results remain similar, consistently indicating negative significant effects at the p<0.01 level.

Table 6. Robustness tests: Pre-Covid period, the role of SBTs, and non-linearity, Generalized method of moments (GMM) regression

	(1) ROA <2020	(2) ROA	(3) ROA	(4) TobinsQ	(5) TobinsQ
L.roa	0.479***	0.470***	0.464***		
	(0.00797)	(0.00773)	(0.00709)		
L.tobinsq				0.935***	0.923***
				(0.00689)	(0.00887)
adherence	0.00857***	0.00315	0.00524***	0.00000	-0.000204
	(0.00186)	(0.00233)	(0.00195)	(0.000210)	(0.000149)
adherence_sbti		0.00959***		-0.000181	
		(0.00347)		(0.000332)	
famown	1.439***	2.264***	2.279***	0.149***	0.159***
	(0.244)	(0.290)	(0.229)	(0.0310)	(0.0206)
famown_adherence	-0.00822**	-0.00881***	-0.00849***	-0.00141***	-0.00116***
	(0.00356)	(0.00272)	(0.00322)	(0.000286)	(0.000256)
famown_adherence_squared			-0.000114***		-0.00003***
			(0.00000)		(0.0000)
size	-0.350***	-0.514***	-0.467***	-0.0289***	-0.0395***
	(0.0874)	(0.0882)	(0.0984)	(0.00934)	(0.00802)
intensity	-0.000156**	-0.000153*	0.00000	0.00000	0.00000
	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
salesgrowth	5.416***	6.291***	6.700***	-0.0179	-0.0177
	(0.373)	(0.375)	(0.289)	(0.0178)	(0.0219)
tangibility	3.342***	-1.340	-0.555	-0.0924	0.216***
	(0.746)	(0.964)	(0.770)	(0.107)	(0.0696)
capex	13.45***	18.24***	19.22***	-1.050***	-1.105***
	(2.029)	(2.276)	(2.615)	(0.237)	(0.202)
debt	-7.043***	-7.849***	-6.941***	-0.149***	-0.166***
	(0.515)	(0.586)	(0.495)	(0.0555)	(0.0431)
sbti	-0.250	0.168	0.367	-0.0148	0.00534
	(0.242)	(0.294)	(0.240)	(0.0251)	(0.0158)
BGD	0.0140	0.00608	0.00930	0.00156***	0.00354***
	(0.00884)	(0.00863)	(0.00679)	(0.000555)	(0.000612)
ln_age	0.0868	-0.115	0.0732	-0.0158	-0.0205**
	(0.102)	(0.142)	(0.123)	(0.0117)	(0.00915)
independence	0.00293	0.00877**	0.00481	-0.00168***	-0.00251***
	(0.00361)	(0.00421)	(0.00324)	(0.000395)	(0.000300)
csr_com	-0.198	0.400	0.407	-0.00710	0.0219
	(0.183)	(0.344)	(0.349)	(0.0332)	(0.0278)
incentive	-0.0356	0.349***	0.356***	0.0409***	0.0204***
	(0.0893)	(0.125)	(0.0764)	(0.00962)	(0.00738)
freefloat	-0.00563	0.0275***	0.0193***	0.00000	0.00000
	(0.00514)	(0.00616)	(0.00490)	(0.000506)	(0.000412)
z_1	568.04 (17)	766.88 (18)	801.80 (18)	3085.60 (18)	4297.68 (18)
m_2 *(AR (2))*	0.65	0.95	0.97	1.54	1.57
Hansen	185.22 (288)	185.75 (402)	185.66 (402)	196.21 (402)	205.54 (402)
n	1,535	1,813	1,813	1,813	1,813

Notes: The z_1 reports the Wald test results concerning the joint significance of the reported coefficients (degrees of freedom in parentheses). The m_2 presents the results of the second-order serial correlation test. *Hansen* reports the results of the Hansen-test of over-identifying restrictions concerning the null of no correlation between the instruments and the error term, (degrees of freedom in parentheses). Robust

standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

4.3. Channel analysis: Sustainable bond issuance as source of financial advantage

Considering the positive evidence on the CP-FP link, the use of sustainable finance instruments can provide novel insights into potential sources of financial advantage from corporate decarbonization. Sustainable finance instruments promise cost of capital advantages, representing a potential channel for firms to benefit financially from their decarbonization efforts. With a particular climate-focus, two types of sustainable bonds have emerged, namely *green bonds* (GBs) and *sustainability-linked bonds* (SLBs) (Flammer, 2021; Feldhütter *et al.*, 2024). GBs are defined as "*any type of bond instrument where the proceeds […] will be exclusively applied to finance or re-finance […] eligible Green Projects*" (ICMA, 2021, p. 3). In contrast, SLBs "*complement the use-of-proceed model of green bonds by tying general purpose debt finance to issuers' sustainability performance against predefined targets*" (Vulturius *et al.*, 2024, p. 116). For the purpose of the channel analysis, we therefore employ the variable *sust_bond*, which is defined as a dummy variable that equals 1 if a given firm has issued a GB or a SLB, as documented in the ICMA sustainable bond issuers database (ICMA, 2025).

Overall, prior research suggests cost of capital advantages among GBs and SLBs (Löffler *et al.*, 2021; Hachenberg and Schiereck, 2018; MacAskill *et al.*, 2021; Dorfleitner *et al.*, 2022; Feldhütter *et al.*, 2024), although still being discussed controversially (Larcker and Watts, 2020). Yet, while GBs and SLBs are associated with positive consequences for firm-level decarbonization after issuance (Berrada *et al.*, 2024; Flammer, 2021; Demski *et al.*, 2025), less is known about *who is accessing these sustainable finance markets*. Thus, as a potential channel to explain superior FP among 'good decarbonizers', in our additional analysis we pose the question whether firms with a successful track record in managing their carbon emissions are more likely to issue GBs and SLBs.

To date, the sustainable finance and family business literatures remain mostly fragmented. Financing decisions among family firms are commonly discussed in light of family-specific objectives to retain family control while also preventing excessive risk, i.e., avoiding both the dilution of control rights via equity financing and excessive risks implied in leveraged capital structures (Croci *et al.*, 2011; Mishra and McConaughy, 1999). The family firm preference for non-control-diluting securities (Croci *et al.*, 2011) tends to be at odds with prevailing sustainable finance instruments. In fact, GBs restrict the use of proceeds (ICMA, 2021; Löffler *et al.*, 2021), contradicting the owning families' supposed desire to retain control and exercise their entrepreneurial freedom to allocate the proceeds from the GB issuance. Furthermore, substantial efforts are associated with establishing a mandatory sustainable financing framework, as well as subsequent allocation reporting on the use of proceeds (Anderson and Kish, 2024; Vulturius *et al.*, 2024).

While the issuance of SLBs per se does not limit the use of proceeds, the KPI structure and the bond's corresponding margin step-up mechanism also indirectly affect the ability to freely allocate funds by redirecting capital to specific projects that benefit the SLB's objectives (Vulturius *et al.*, 2024). Furthermore, the bond's margin step-up mechanism introduces additional SEW threats in family firms. By design, SLBs pose the risk of a coupon step-up if the predefined sustainability target is not met (Feldhütter *et al.*, 2024). The implied financial penalty represents a novel dimension of risk to family owners not included in more common financial products. Prior research shows that when SEW is threatened, loss aversion tends to inform family firm financing decisions (Michiels and Molly, 2017). Therefore, considering both the 'control-diluting' bond characteristics well as the potential threat posed to family firms' SEW, we expect that family firms are less likely to issue sustainable bonds (Croci *et al.*, 2011).

To test the role for sustainable bond issuance in our additional analysis, we introduce logit models, which are commonly used in family firm finance research (Michiels and Molly, 2017). The results of our additional analysis suggest that adherence to decarbonization targets is positively related to the issuance of sustainable bonds (see Table 7, models 1 and 2). Specifically, adherence has a significant positive relationship with sustainable bond issuance ($\beta = 0.00617$) at the $p<0.01$ level, indicating a highly significant link. The results suggest that firms that meet (or outperform) their decarbonization targets are more likely to engage in sustainable finance markets by issuing GBs or SLBs. We interpret this as evidence that firms with a positive track record in managing their carbon emissions also more frequently access sustainable finance markets. On a higher level, this suggests that the sustainable bond markets on average attract 'green' issuers with superior decarbonization profiles based on substantive prior decarbonization efforts, which adds to the credibility of this market segment overall.

Regarding the role of family ownership for sustainable bond issuance, in line with our expectations the results indicate a significant negative relationship. Accordingly, family ownership has a highly significant negative relationship with sustainable bond issuance ($\beta = -0.556$, $p<0.01$). Consistent with our theoretical considerations regarding the SEW threats imposed by these novel forms of financing, the results show that family firms are less likely to issue sustainable bonds. The interaction between the adherence to targets and family ownership does not add significant insights beyond the direct effects.

Table 7. Logit regression concerning sustainable bond issuance

	(1) sust_bond	(2) sust_bond
adherence	0.00617***	0.00653***
	(0.00203)	(0.00238)
famown	-0.556***	-0.649***
	(0.193)	(0.245)
famown_adherence	0.00112	0.0103*
	(0.00482)	(0.00616)
size	0.370***	0.279***
	(0.0481)	(0.0648)
intensity	0.000350***	0.000191**
	(0.00000)	(0.00000)
salesgrowth	-0.509	-0.752*
	(0.351)	(0.446)
tangibility	1.954***	3.618***
	(0.402)	(0.569)
capex	7.167***	9.055***
	(1.710)	(2.511)
debt	-0.172	-1.945***
	(0.423)	(0.525)
sbti	0.702***	0.911***
	(0.132)	(0.151)
BGD	0.0109**	-0.0164**
	(0.00506)	(0.00789)
ln_age	-0.0838	-0.257***
	(0.0600)	(0.0694)
independence	0.00444	0.00642*
	(0.00270)	(0.00358)
csr_com	-0.258	-0.464
	(0.244)	(0.296)
incentive	0.119	0.276**
	(0.110)	(0.139)
Constant	-11.81***	-10.42***
	(1.057)	(1.541)
Observations	2,063	1,914
Year	NO	YES
Industry	NO	YES
Country	NO	YES
Pseudo R2	0.150	0.268

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5. Discussion

5.1. Overall findings

Overall, the results of our empirical models support our hypotheses, albeit with some limitations. In terms of FP, while adherence to targets is associated with higher FP, this positive effect holds only for accounting-based FP measures (i.e., ROA) but not for market-value based FP (Tobin's Q). Thus, our first hypothesis has been partially supported. Considering these limitations, the results align with prior evidence in favor of the 'business case for sustainability' (Busch and Lewandowski, 2018; Velte *et al.*, 2020). In this regard, our study stresses a

predominant role of SBTs in the carbon-FP relationship. Going beyond previous research, we provide new insights into potential reasons for this observation, that is, a "double-positive" effect in which more ambitious targets are achieved more frequently among SBT firms.

Furthermore, our results indicate a negative moderating effect of family ownership for the adherence-FP relationship. Thus, our second hypothesis has been supported. Given lively discourse on the dual/polar nature of family involvement in climate matters (Li *et al.*, 2023; Hsueh *et al.*, 2023; Miller and Le Breton-Miller, 2021), our results support the negative view of family ownership in terms of its moderating role for the adherence-FP relationship among publicly listed family firms in Europe. Notably, in our hypothesis development, we had also incorporated previous SEW theoretical considerations as well as respective empirical findings that provide a more optimistic account of the role of family ownership (Gomez-Mejia *et al.*, 2025; Combs *et al.*, 2023).

There are several potential explanations to reconcile these differences, e.g., the specific measures as well as the research sample of our study. While Combs *et al.* (2023) have relied on a larger set of CSR measures, the analysis of Gómez-Mejía *et al.* (2025) is more comparable both in terms of its European sample and the applied measures. However, while our focus has been on large *publicly listed* firms from different industries in Europe, their sample mainly consists of *private* firms from energy intensive industries. Generally, prior results tend to suggest a potential divide between public and private family firms in which public family firms tend to underperform across several environmental domains, including carbon emissions (Lorenzen *et al.*, 2024; Gomez-Mejia *et al.*, 2025; Bergmann *et al.*, 2025).

We argue that this may be directly related to the SEW considerations that are underpinning the more positive evidence concerning family firm's emissions. Specifically, we argue that the SEW arguments in favor of superior environmental conduct among family firms tend to become less salient in large publicly listed firms, where more formal governance structures tend to

prevail. The differences between private and public firms potentially invalidate important SEW arguments applicable to private family firms in favor of better-than-usual environmental performance, including carbon outcomes (Lorenzen *et al.*, 2024; Gómez-Mejía *et al.*, 2025)

Furthermore, the findings of our additional analysis reveal that adherence to targets is linked to a higher probability of firms issuing sustainable bonds. This aligns with prior evidence on successful decarbonization after issuance of sustainable bonds (Flammer, 2021; Berrada *et al.*, 2024). We interpret our results as evidence that firms with a successful track record of managing their emissions have profound advantages which they leverage to access sustainable finance markets.

In order to achieve organizational readiness to issue sustainable bonds, considerable preparatory work as well as upfront investments are needed, e.g., for establishing the necessary internal carbon reporting systems and infrastructure, defining the firm's climate ambition (Elsayih *et al.*, 2023) and developing a sustainable financing framework (Dorfleitner *et al.*, 2022). These arguments suggest that firms that have previously emphasized carbon emissions as a material corporate issue and that dispose of a *holistic* carbon strategy are better prepared to take part in sustainable finance markets. Although our study design is not suited to directly establish causal claims about the mutual interrelationship between sustainable bond issuance and FP, our results indicate that both are positively related to the adherence to decarbonization targets. For a timely overview concerning the direct relationship between GB issuance and FP, we refer to Khan and Vismara (2025).

Meanwhile, our analysis also revealed that family firms issue sustainable bonds less often. In our additional analysis, we have addressed prior calls for research to look into alternative firms of financing as well as the role of SEW in family business financing decisions (Michiels and Molly, 2017). Our results suggest that the control-diluting properties of sustainable bonds and

the potential SEW threats imposed by the structure of these novel financial products lead family firms to engage less in these sustainable finance markets.

5.2. Limitations and opportunities for further research

The results of our study are subject to some limitations, which give rise to opportunities for future research. As with other studies relying on CDP data, we face selection issues that relate to the voluntary nature of the CDP (Qian and Schaltegger, 2017). Combined with the additional data requirements to employ the GMM method estimator (e.g., consistent disclosure without gaps), this may suggest that our sample comprises firms that are more conscious of their climate impacts on average. Future research could circumvent these issues of selection by exploiting the mandatory reporting duties established by the CSRD/ESRS. Methodologically, future studies may further introduce additional advanced methods that further strengthen causal inference, namely quasi-natural experiments such as the difference-in-differences approach.

Meanwhile, our adherence variable is also subject to limitations. As described in section 3.2.2., the variable measures the target-related progress versus the target's duration. Thereby, we assume a linear pathway to target completion, i.e., a time-proportional trajectory to achieve the emission reduction target.

With regards to the use of sustainable finance instruments, we presume a positive contribution to the firm's bottom line (either through a supposed greenium for GBs or potential margin step-down for SLBs), but do not empirically test this relationship. Given the extensive discussions in prior literature (Flammer, 2021; Larcker and Watts, 2020; Feldhütter *et al.*, 2024), we focus on the subsequent question whether firms are more likely to engage in these sustainable bond markets, contingent on their adherence to emission reduction targets. Future studies may further test and substantiate this causal link beyond the scope of our analysis. In this regard we note that these markets are constantly transforming, observable through higher regulatory scrutiny and increasing extents of standardization (Zhou *et al.*, 2024) like the European Green Bond

Standard, effective since December 2024. This may affect future issuance behavior, which is a promising avenue for further research.

In terms of the granularity of family ownership information, we are limited to address family business heterogeneity (Bergmann, 2023). While we control for firm age as a proxy for generations, more sophisticated inquiries into heterogeneity are not feasible based on the available data. Although we have also considered family involvement in management in our research design, only a small fraction of our sample of publicly listed firms is family-managed, reducing the validity of such considerations. Therefore, future research should investigate the role of heterogeneity among family firms (Gomez-Mejia et al. 2025).

6. Conclusion

The financial consequences of CP have gained increasing research attention, with most studies documenting a positive link between CP and FP (Busch and Lewandowski, 2018). This particular relationship has been gaining increasing attention among family business researchers, respectively (Gómez-Mejía *et al.*, 2025; Gangi *et al.*, 2025). Generally, extant studies have also emphasized the role of emission reduction targets (Bendig *et al.*, 2023; Ben-Amar *et al.*, 2024; Li *et al.*, 2025). However, previous research has not yet addressed the actual achievement on a target-level. This research gap is puzzling because emission reduction targets entail several complexities not sufficiently captured by more prevalent CP measures. Amongst others, targets are generally more diverse in nature, allow for additional insights into the firm's carbon ambitions, but may also be more easily adapted along the way (Malen, 2022; Callery and Kim, 2024).

Our results indicate that the adherence to emission reduction targets is positively related to (accounting-based) FP. We find that this relationship is moderated negatively by FO. While this is in line with our hypotheses, it also deviates from some previous findings in the literature. We elaborate on potential explanations for these diverging results, which may originate from

the specific research samples (e.g., private vs. public family firms and industry composition of samples) but also the specific measures being used.

As a potential channel to explain financial gain from corporate decarbonization efforts, we have also considered the implications for the issuance of sustainable bonds. To the best of our knowledge, no prior study has addressed the relationship between family involvement and sustainable finance outcomes yet, leaving significant untapped research potential. Our results show that adherence to targets is related positively with FP and sustainable bond issuance, this supports our conceptual reasoning that sustainable bond issuance may represent a particular source of financial advantage from corporate decarbonization. Our results also show that family firms are less likely to issue sustainable bonds, consistent with the hypothesized SEW threats imposed by these novel financing instruments.

Overall, our results contribute to the carbon and family business literature in several ways. First, we support and extend prior evidence on the financial consequences of corporate decarbonization, indicating that firms meeting their carbon commitments benefit financially. Second, from an SEW perspective we provide novel insights into how family firms may be less able to exploit these financial advantages in the context of emission targets and among large public firms. Adding to the literature on financing in family firms more generally, our results also suggest that family firms are more reluctant to engage in sustainable finance markets. This marks a relevant first step to bridge the family firms and sustainable finance literature; a research area that has not yet been explored comprehensively.

Besides these contributions to academic research, our results also provide important managerial and regulatory implications. In this regard, our results shed light on the historic merit of emission reduction targets prior to the CSRD implementation period. These insights are of high relevance as the CSRD/ESRS requirements and scope are being reviewed in line with the pending Omnibus discussions at the EU-level. Simultaneously, given a more general ‘backlash

on ESG', several capital market participants are reconsidering their climate ambitions (Sætra, 2024). With regards to sustainable bond issuance, most notably this relates to several banks withdrawing from the net zero banking alliance recently, which may negatively affect future sustainable bond issuance (Mundy, 2025). In this regard, our results provide a more optimistic account of this market segment, indicating that the sustainable bond market attracts issuers with better sustainability profiles, as measured by their ability to set and adhere to emission reduction targets.

References

Achleitner, A.-K., Günther, N., Kaserer, C. and Siciliano, G. (2014), "Real Earnings Management and Accrual-based Earnings Management in Family Firms", *European Accounting Review*, Vol. 23 No. 3, pp. 431–461.

Ambec, S. and Lanoie, P. (2008), "Does It Pay to Be Green? A Systematic Overview", *Academy of Management Perspectives*, Vol. 22 No. 4, pp. 45–62.

Anderson, A.-M. and Kish, R. (2024), "Rewarding performance through sustainability-linked bonds", *Economic Affairs*, Vol. 44 No. 2, pp. 294–319.

Aswani, J., Raghunandan, A. and Rajgopal, S. (2024), "Are Carbon Emissions Associated with Stock Returns?", *Review of Finance*, Vol. 28 No. 1, pp. 75–106.

Bartlett, R. and Partnoy, F. (2020), "The Misuse of Tobin's q", *Vanderbilt Law Review No.* 2, pp. 353–424.

Baumann-Pauly, D., Wickert, C., Spence, L.J. and Scherer, A.G. (2013), "Organizing Corporate Social Responsibility in Small and Large Firms: Size Matters", *Journal of Business Ethics*, Vol. 115 No. 4, pp. 693–705.

Ben-Amar, W., Comyns, B. and Martinez, I. (2024), "Firm commitments on climate change: Effects of science-based targets on financial outcomes during the COVID-19 crisis", *Business Strategy and the Environment*.

Bendig, D., Wagner, A. and Lau, K. (2023), "Does it pay to be science-based green? The impact of science-based emission-reduction targets on corporate financial performance", *Journal of Industrial Ecology*, Vol. 27 No. 1, pp. 125–140.

Bergmann, N. (2023), "Heterogeneity in family firm finance, accounting and tax policies: dimensions, effects and implications for future research", *Journal of Business Economics*.

Bergmann, N., Velte, P. and Requejo, I. (2025), "Female Directors, Family Firms, Climate Talk and Climate Walk: European Evidence", *Business Strategy and the Environment*.

Berrada, T., Engelhardt, L., Gibson, R. and Krueger, P. (2024), "The Economics of Sustainability-Linked Bonds", *ECGI Working Paper Series in Finance*.

Bhutta, U.S., Tariq, A., Farrukh, M., Raza, A. and Iqbal, M.K. (2022), "Green bonds for sustainable development: Review of literature on development and impact of green bonds", *Technological Forecasting and Social Change*, Vol. 175, p. 121378.

Block, J. and Wagner, M. (2014), "Ownership versus management effects on corporate social responsibility concerns in large family and founder firms", *Journal of Family Business Strategy*, Vol. 5 No. 4, pp. 339–346.

Block, J.H., Sharma, P. and Benz, L. (2023), "Stakeholder Pressures and Decarbonization Strategies in Mittelstand Firms", *Journal of Business Ethics*.

Borsuk, M., Eugster, N., Klein, P.-O. and Kowalewski, O. (2024), "Family firms and carbon emissions", *Journal of Corporate Finance*, Vol. 89, p. 102672.

Busch, T. and Lewandowski, S. (2018), "Corporate Carbon and Financial Performance: A Meta-analysis", *Journal of Industrial Ecology*, Vol. 22 No. 4, pp. 745–759.

Caccialanza, A. (2025), "Sustainability performance disclosure and family businesses: a perspective article", *Journal of Family Business Management*, Vol. 15 No. 1, pp. 48–56.

Callery, P.J. and Kim, E.-H. (2024), "Set & Done? Trade-offs between Stakeholder Expectation and Attainment Pressures in Corporate Carbon Target Management", *Journal of Management Studies*.

Combs, J.G., Jaskiewicz, P., Ravi, R. and Walls, J.L. (2023), "More Bang for Their Buck: Why (and When) Family Firms Better Leverage Corporate Social Responsibility", *Journal of Management*, Vol. 49 No. 2, pp. 575–605.

Comino-Jurado, M., Sánchez-Andújar, S. and Parrado-Martínez, P. (2021), "Reassessing debt-financing decisions in family firms: Family involvement on the board of directors and generational stage", *Journal of Business Research*, Vol. 135, pp. 426–435.

Croci, E., Doukas, J.A. and Gonenc, H. (2011), "Family Control and Financing Decisions", *European Financial Management*, Vol. 17 No. 5, pp. 860–897.
Dahlmann, F. (2024), "Corporate Carbon Targets: The Role of Goal Setting in Driving Organisational Change for Climate Action", in MacKie, D. (Ed.), *The handbook of climate change leadership in organisations: Developing leadership for the age of sustainability*, Routledge Taylor & Francis Group, New York, London.
Deegan, C. (2002), "Introduction: The legitimising effect of social and environmental disclosures - a theoretical foundation", *Accounting, Auditing & Accountability Journal*, Vol. 15 No. 3, pp. 282–311.
Demski, J., Dong, Y., McGuire, P. and Mojon, B. (2025), "Growth of the green bond market and greenhouse gas emissions", *BIS Quarterly Review* March 2025.
Dorfleitner, G., Utz, S. and Zhang, R. (2022), "The pricing of green bonds: external reviews and the shades of green", *Review of Managerial Science*, Vol. 16 No. 3, pp. 797–834.
Dybvig, P.H. and Warachka, M. (2015), "Tobin's q Does Not Measure Firm Performance: Theory, Empirics, and Alternatives".
Elsayih, J., Datt, R., Tang, Q., Hamid, A. and Varua, M.E. (2023), "Exploring the determinants of carbon management system quality: The role of corporate governance and climate risks and opportunities", *Accounting & Finance*, Vol. 63 No. 4, pp. 4065–4091.
Endrikat, J., Guenther, E. and Hoppe, H. (2014), "Making sense of conflicting empirical findings: A meta-analytic review of the relationship between corporate environmental and financial performance", *European Management Journal*, Vol. 32 No. 5, pp. 735–751.
Fattoum-Guedri, A., Guedri, Z. and Delmar, F. (2018), "Multiple Blockholder Structures and Family Firm Performance", *Entrepreneurship Theory and Practice*, Vol. 42 No. 2, pp. 231–251.
Feldhütter, P., Halskov, K. and Krebbers, A. (2024), "Pricing of sustainability-linked bonds", *Journal of Financial Economics*, Vol. 162, p. 103944.
Flammer, C. (2021), "Corporate green bonds", *Journal of Financial Economics*, Vol. 142 No. 2, pp. 499–516.
Fox, J. and Monette, G. (1992), "Generalized Collinearity Diagnostics", *Journal of the American Statistical Association*, Vol. 87 No. 417, pp. 178–183.
Gangi, F., Varrone, N., Daniele, L.M., D'Angelo, E. and Coscia, M. (2025), "Does It Pay for Family Firms to Go Green? The Moderating Role of Familiness", *Corporate Social Responsibility and Environmental Management*.
García-Meca, E., Ramón-Llorens, M.C. and Martínez-Ferrero, J. (2024), "Feminine expertise on board and environmental innovation: the role of critical mass", *Review of Managerial Science*, Vol. 18 No. 8, pp. 2255–2286.
Gomez-Mejia, L., Muñoz-Bullón, F., Requejo, I. and Sanchez-Bueno, M. (2025), "Ethical Correlates of Family Control: Socioemotional Wealth, Environmental Performance, and Financial Returns", *Journal of Business Ethics*.
Gómez-Mejía, L.R., Muñoz-Bullón, F., Requejo, I. and Sanchez-Bueno, M.J. (2025), "Ethical Correlates of Family Control: Socioemotional Wealth, Environmental Performance, and Financial Returns", *Journal of Business Ethics*.
Gregorič, A., Rapp, M.S. and Requejo, I. (2022), *Listed family firms in Europe: Relevance, characteristics and performance*, Stiftung Familienunternehmen, Munich.
Gull, A.A., Sarang, A.A.A., Shakri, I.H. and Atif, M. (2023), "Co-opted directors and greenhouse gas emissions: Does ESG compensation matter?", *Journal of Cleaner Production*, Vol. 411, p. 137192.
Hachenberg, B. and Schiereck, D. (2018), "Are green bonds priced differently from conventional bonds?", *Journal of Asset Management*, Vol. 19 No. 6, pp. 371–383.

Haque, F. (2017), "The effects of board characteristics and sustainable compensation policy on carbon performance of UK firms", *The British Accounting Review*, Vol. 49 No. 3, pp. 347–364.
Hsueh, Josh Wei-Jun, Massis, A. de and Gomez-Mejia, L.R. (2023), "Examining Heterogeneous Configurations of Socioemotional Wealth in Family Firms Through the Formalization of Corporate Social Responsibility Strategy", *Family Business Review*, Vol. 36 No. 2, pp. 172–198.
ICMA (2021), "Green Bond Principles. Voluntary Process Guidelines for Issuing Green Bonds".
ICMA (2025), "Sustainable Bond Issuers Database", available at: https://www.icmagroup.org/sustainable-finance/sustainable-bonds-database/.
Ioannou, I., Li, S.X. and Serafeim, G. (2016), "The Effect of Target Difficulty on Target Completion: The Case of Reducing Carbon Emissions", *The Accounting Review*, Vol. 91 No. 5, pp. 1467–1492.
Jacobs, B.W. (2014), "Shareholder Value Effects of Voluntary Emissions Reduction", *Production and Operations Management*, Vol. 23 No. 11, pp. 1859–1874.
Khan, M.A. and Vismara, S. (2025), "Green bond issuance and corporate environmental and financial performance: A meta-analysis", *International Review of Economics & Finance*, Vol. 102, p. 104313.
Larcker, D.F. and Watts, E.M. (2020), "Where's the greenium?", *Journal of Accounting and Economics*, Vol. 69 2-3, p. 101312.
Li, J., Peng, X. and Zhang, H. (2025), "The role of science-based targets on carbon mitigation: Addressing the tension between net zero anxiety and economic growth", *The British Accounting Review*, Vol. 57 No. 2, p. 101491.
Li, J., Wang, Y., Yao, N. and Cui, X. (2023), "Exploring the effects of socioemotional wealth on environmental strategies of family firms in China: An integrative perspective", *Business Strategy and the Environment*, Vol. 32 No. 8, pp. 5368–5381.
Liu, X., Tang, X., Xiong, Y., Chen, Y. and Wu, Y. (2023), "The effect of carbon emission policy on financial performance of target companies in China", *Journal of Cleaner Production*, Vol. 412, p. 137437.
Löffler, K.U., Petreski, A. and Stephan, A. (2021), "Drivers of green bond issuance and new evidence on the "greenium"", *Eurasian Economic Review*, Vol. 11 No. 1, pp. 1–24.
Lorenzen, S., Gerken, M., Steinmetz, H., Block, J., Hülsbeck, M. and Lux, F.S. (2024), "Environmental Sustainability of Family Firms: A Meta-Analysis of Handprint and Footprint", *Entrepreneurship Theory and Practice*, Vol. 48 No. 5, pp. 1266–1284.
Lucas, M.T. and Noordewier, T.G. (2016), "Environmental management practices and firm financial performance: The moderating effect of industry pollution-related factors", *International Journal of Production Economics*, Vol. 175, pp. 24–34.
MacAskill, S., Roca, E., Liu, B., Stewart, R.A. and Sahin, O. (2021), "Is there a green premium in the green bond market? Systematic literature review revealing premium determinants", *Journal of Cleaner Production*, Vol. 280, p. 124491.
Malen, J. (2022), "Moving the Goalposts: Aspiration Reoperationalization in Response to Failure to Achieve Environmental Performance Targets", *Academy of Management Discoveries*, Vol. 8 No. 3, pp. 357–383.
Matisoff, D.C., Noonan, D.S. and O'Brien, J.J. (2013), "Convergence in Environmental Reporting: Assessing the Carbon Disclosure Project", *Business Strategy and the Environment*, Vol. 22 No. 5, pp. 285–305.
Meier, O. and Schier, G. (2021), "CSR and Family CEO: The Moderating Role of CEO's Age", *Journal of Business Ethics*, Vol. 174 No. 3, pp. 595–612.

Michiels, A. and Molly, V. (2017), "Financing Decisions in Family Businesses: A Review and Suggestions for Developing the Field", *Family Business Review*, Vol. 30 No. 4, pp. 369–399.
Miller, D. and Le Breton-Miller, I. (2021), "Family Firms: A Breed of Extremes?", *Entrepreneurship Theory and Practice*, Vol. 45 No. 4, pp. 663–681.
Miroshnychenko, I., Massis, A. de, Barontini, R. and Testa, F. (2022), "Family Firms and Environmental Performance: A Meta-Analytic Review", *Family Business Review*, Vol. 35 No. 1, pp. 68–90.
Miroshnychenko, I., Miller, D., Massis, A. de and Le Breton-Miller, I. (2024), "Are family firms green?", *Small Business Economics*.
Mishra, C.S. and McConaughy, D.L. (1999), "Founding Family Control and Capital Structure: The Risk of Loss of Control and the Aversion to Debt", *Entrepreneurship Theory and Practice*, Vol. 23 No. 4, pp. 53–64.
Muhammad, H. (2025), "CEO Gender and ESG Controversies", *Economic Papers: A journal of applied economics and policy*, Vol. 44 No. 1, pp. 91–100.
Mundy, S. (2025), "The Net Zero Banking Alliance is worth saving", available at: https://www.ft.com/content/29084f27-0d33-4a16-9ebb-750ff968eb57 (accessed 28 March 2025).
Nuber, C., Velte, P. and Hörisch, J. (2020), "The curvilinear and time-lagging impact of sustainability performance on financial performance: Evidence from Germany", *Corporate Social Responsibility and Environmental Management*, Vol. 27 No. 1, pp. 232–243.
O'brien, R.M. (2007), "A Caution Regarding Rules of Thumb for Variance Inflation Factors", *Quality & Quantity*, Vol. 41 No. 5, pp. 673–690.
Oussii, A.A. and Jeriji, M. (2024), "Female directors' representation and firm carbon emissions performance: does family control matter?", *Journal of Family Business Management*.
Prencipe, A. and Bar-Yosef, S. (2011), "Corporate Governance and Earnings Management in Family-Controlled Companies", *Journal of Accounting, Auditing & Finance*, Vol. 26 No. 2, pp. 199–227.
Qian, W. and Schaltegger, S. (2017), "Revisiting carbon disclosure and performance: Legitimacy and management views", *The British Accounting Review*, Vol. 49 No. 4, pp. 365–379.
Requejo, I., Reyes-Reina, F., Sanchez-Bueno, M.J. and Suárez-González, I. (2018), "European family firms and acquisition propensity: A comprehensive analysis of the legal system's role", *Journal of Family Business Strategy*, Vol. 9 No. 1, pp. 44–58.
Richards, M., Zellweger, T. and Gond, J.-P. (2017), "Maintaining Moral Legitimacy through Worlds and Words: An Explanation of Firms' Investment in Sustainability Certification", *Journal of Management Studies*, Vol. 54 No. 5, pp. 676–710.
Sætra, H.S. (2024), "The ESG Backlash: Politics, Ideology, and the Future of Sustainable Business", in Choi, J.J. and Kim, J. (Eds.), *Responsible Firms: CSR, ESG, and Global Sustainability*, *International Finance Review*, Emerald Publishing Limited, pp. 161–167.
Salehi, M., Hoshmand, M. and Rezaei Ranjbar, H. (2020), "The effect of earnings management on the reputation of family and non-family firms", *Journal of Family Business Management*, Vol. 10 No. 2, pp. 128–143.
Schaltegger, S., Hörisch, J. and Freeman, R.E. (2019), "Business Cases for Sustainability: A Stakeholder Theory Perspective", *Organization & Environment*, Vol. 32 No. 3, pp. 191–212.
Secinaro, S., Brescia, V., Calandra, D. and Saiti, B. (2020), "Impact of climate change mitigation policies on corporate financial performance: Evidence-based on European

publicly listed firms", *Corporate Social Responsibility and Environmental Management*, Vol. 27 No. 6, pp. 2491–2501.
Tang, D.Y. and Zhang, Y. (2020), "Do shareholders benefit from green bonds?", *Journal of Corporate Finance*, Vol. 61, p. 101427.
Thiele, F.K. and Wendt, M. (2017), "Family firm identity and capital structure decisions", *Journal of Family Business Management*, Vol. 7 No. 2, pp. 221–239.
Velte, P. (2017), "Does ESG performance have an impact on financial performance? Evidence from Germany", *Journal of Global Responsibility*, Vol. 8 No. 2, pp. 169–178.
Velte, P. (2024a), "Archival research on carbon reporting quality. A review of determinants and consequences for firm value", *ZfU No.* 1, pp. 110–148.
Velte, P. (2024b), "Sustainable board governance and environmental performance: European evidence", *Business Strategy and the Environment*, Vol. 33 No. 4, pp. 3397–3421.
Velte, P., Stawinoga, M. and Lueg, R. (2020), "Carbon performance and disclosure: A systematic review of governance-related determinants and financial consequences", *Journal of Cleaner Production*, Vol. 254, p. 120063.
Venturelli, A., Fasan, M. and Pizzi, S. (2022), "Guest editorial Rethinking non-financial reporting in Europe: challenges and opportunities in revising Directive 2014/95/EU", *Journal of Applied Accounting Research*, Vol. 23 No. 1, pp. 1–7.
Vulturius, G., Maltais, A. and Forsbacka, K. (2024), "Sustainability-linked bonds – their potential to promote issuers' transition to net-zero emissions and future research directions", *Journal of Sustainable Finance & Investment*, Vol. 14 No. 1, pp. 116–127.
Wagner, D., Block, J.H., Miller, D., Schwens, C. and Xi, G. (2015), "A meta-analysis of the financial performance of family firms: Another attempt", *Journal of Family Business Strategy*, Vol. 6 No. 1, pp. 3–13.
Wickert, C., Scherer, A.G. and Spence, L.J. (2016), "Walking and Talking Corporate Social Responsibility: Implications of Firm Size and Organizational Cost", *Journal of Management Studies*, Vol. 53 No. 7, pp. 1169–1196.
Wintoki, M.B., Linck, J.S. and Netter, J.M. (2012), "Endogeneity and the dynamics of internal corporate governance", *Journal of Financial Economics*, Vol. 105 No. 3, pp. 581–606.
Zhang, X., Fang, H., Dou, J. and Chrisman, J.J. (2022), "Endogeneity Issues in Family Business Research: Current Status and Future Recommendations", *Family Business Review*, Vol. 35 No. 1, pp. 91–116.
Zhou, P., Jin, S., Mazouz, K. and Ding, W. (2024), "Choices and Effects of Different Green Labels in the EU Bond Market", *Journal of Business Ethics*.
Zhu, C., Villar, A.S. and Ge, B. (2025), "Environmental, Social, and Governance in Family Firms: A Bibliometric Review and Agenda for Future Research", *Business Ethics, the Environment & Responsibility*.

Appendix

Variable definitions

Variable name	Definition	Data source
Dependent variables		
roa	Return on assets (%)	LSEG
tobinsq	Ratio of market value of the firm divided by replacement cost of its assets	LSEG
sust_bond	Dummy variable equal to 1 if the company has issued at least one green bond (GB) or sustainability-linked bond (SLB)	ICMA
Independent variables		
adherence	Variable indicating whether a firm adheres to its decarbonization target in a given year. The variable is computed based on the time passed from start to target year (%) versus the progress made to achieve the respective target (%). The variable takes values in the range [-100; 100] for a given year. In the case of more than one target per firm-year, the mean value is used, similar to Ioannou et al. (2016). For a detailed discussion, see section 3.2.	CDP
Moderator variables		
famown	Dummy variable equal to 1 if the global ultimate owner at the 25.01% level is "one or more named individuals or families".	BvD Orbis
fam_mgmt	Dummy variable equal to 1 if the family owner (global ultimate owner) is also involved in management.	BvD Orbis
Control variables		
size	Natural logarithm of total assets	LSEG
intensity	Total estimated CO2e emissions by revenues (tCO2/EUR mn)	LSEG
salesgrowth	Increase in revenue in year t divided by revenue in year t-1	LSEG
tangibility	Fixed assets scaled by total assets	LSEG
capex	Capex scaled by total assets	LSEG
debt	Total debt scaled by total assets	LSEG
sbti	Dummy variable indicating if at least one emission reduction target has been validated by the science-based targets initiative (SBTi). 1 = at least one science-based target has been approved by SBTi in any year, 0 otherwise.	CDP
ln age	Natural logarithm of firm age	LSEG
bgd	Ratio of female board members in %	LSEG
independence	Ratio of independent board members in %	LSEG
csr com	Existence of CSR/sustainability committee (dummy)	LSEG
incentive	Senior executive compensation is linked to sustainability or CSR related incentives (dummy)	LSEG
freefloat	Free float of shares (%)	LSEG