The strategic behavior of family firms

THE STRATEGIC BEHAVIOR OF FAMILY FIRMS

STUDIES ON INNOVATION AND CORPORATE SOCIAL PERFORMANCE

Matthias G. Leute

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1.1 THE PRACTICAL AND THEORETICAL RELEVANCE OF FAMILY FIRMS AS AN ORGANIZATIONAL FORM

1.1.1 Are Family Firms Important?

Family firms represent the most ubiquitous form of business in the majority of economies around our globe (La Porta, Lopez-de-Silanes, & Shleifer, 1999), thereby contributing considerably to wealth creation, technological advancement, and societal development. Family firms are often small and medium-sized, yet some of the largest multinational firms are also controlled and run by families. While the share of family firms varies between countries, institutional settings, and cultural contexts, their economic impact is substantial in any economy. Based on the definition that family members play an active role in the firm and control the business's strategic direction, Pieper and colleagues (2021) estimated that family firms contribute 54 percent of the total private US GDP and employ 59 percent of the entire US workforce[1]. In other countries, such as Germany for example, the economic contribution of family firms is even more significant. According to the most recent census of *Stiftung Familienunternehmen*[2] (2021), 90 percent of all German companies are family-owned accounting for 58 percent of Germany's total employment.

Given the significant impact of family firms on global prosperity, it is surprising that academic interest in family firms as an organizational form has remained rather limited until the mid-1990s (cf., De Massis et al., 2012). The creation of three dedicated journals: *Family Business Review (FBR)* founded in 1988*, Journal of Family Business Strategy (JFBS)* founded in 2010*,* and *Journal of Family Business Management (JFBM)* founded in 2011 has since facilitated growth in the domain. Nevertheless, ambiguity about a universally accepted family firm definition prevails despite increased academic attention.

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[1]Similar estimates were presented by Shanker and Astrachan (1996) and Astrachan and Shanker (2003) for the population of all US businesses. Based on the definition that a family controls the business's strategic direction, family firms contribute 64 percent to the US GDP and employ 62 percent of the US workforce (Astrachan & Shanker, 2003).
[2]Stiftung Familienunternehmen is a German non-profit foundation and one of the largest facilitators of family-related research projects in Germany.

1.1.2 What Constitutes a Family Firm?

At first glance, the question of what constitutes a family firm may appear trivial. Nevertheless, the absence of a clear definition among scholars has far-reaching implications for the development of our know-how. Research shows that the behavior of family firms differs significantly from that of non-family firms (Arredondo & Cruz, 2019) and that these differences hail from the interaction between the family and business system (Frank et al., 2010) resulting in observable firm behaviors that often deviate from the traditional economic logic of financial wealth maximization. Rather, it is today's prevailing view that family firm behavior is largely motivated by non-financial considerations (Gomez-Mejia et al., 2007; Gomez-Mejia et al., 2011; Chrisman et al., 2012).

To understand the impact of the definitional issue surrounding family business research, we must distinguish between the theoretical and operational level. At the theoretical level, scholars largely agree that a family must exert significant influence over corporate affairs (Gomez-Mejia et al., 2011). However, this statement is ambiguous allowing for a wide variety of operational translations. For example, a family can exert significant influence when the firm is wholly owned and managed by family members. However, a family may also exert significant influence in the presence of non-family owners (particularly in public family firms). Likewise, external top managers could be present, or a family firm's CEO position could be occupied by a non-family member. These examples illustrate that scholars have a variety of possibilities to operationalize the family business construct.

Ownership thresholds that are considered sufficient to capture a significant influence on behalf of an owning family may range from 5 percent for public family firms (e.g., McEachern, 1975; Gomez-Mejia, Tosi, & Hinkin, 1987; Salancik & Pfeffer, 1980; Hambrick & Finkelstein, 1995; Gomez-Mejia et al., 2003; Feldman, Amit, & Villalonga, 2016) to more than 50 percent ownership for privately held family firms (Westhead, Cowling, & Howarth, 2001). However, controlling ownership alone may be an individually insufficient criterium to capture typical family firm behavior (Chrisman et al., 2015; Brinkerink & Bammens, 2018). Family members could, for instance, constitute passive shareholders. Hence, operational definitions often also require some form of managerial involvement, board membership, or both (cf., Chua, Chrisman, & Sharma, 1999; Howorth et al., 2010). Here, the spectrum ranges from active board participation to family members' involvement in day-to-day business activities. Alternatively, scholars collecting primary data sometimes collect data from family firm managers on whether the firm is perceived to be a family firm or not (e.g., Brinkerink & Bammens, 2018). As a result

of the flexibility in operational definitions, the proportion of family firms classified as such is to a large degree susceptible to the employed operational criteria. Westhead and Cowling (1998) illustrated this by showing that 81 percent of companies in their sample of privately held firms can be viewed as a family firm when their broadest definition[3] is employed, while only 15 percent of firms qualified as a family firm using their narrowest definition[4]. This example illustrates that the absence of a universally respected family firm definition likely hampers the comparability between studies. Despite this shortcoming, the definitional flexibility surrounding family firms appears to be necessary given that a family's impact on firm behavior is affected by a variety of factors such as the institutional environment, legal setting, business context, and cultural aspects. Therefore, these factors must be considered in choosing an appropriate operational definition for the respective research context. Given the freedom of choice regarding an operational definition, scholars must present a rigorous argumentation for their definition, justifying their decision with respect to the research context (Gomez-Mejia et al., 2011). As such, a family firm definition can also abstain from a binary identification approach and use a continuous measure based on family ownership percentages or multi-dimensional approaches (e.g., Astrachan et al. 2002; Klein et al., 2005; Frank et al., 2010).

This dissertation employs the conceptual definition presented above. Accordingly, a firm qualifies as a family firm if the family exerts significant influence over corporate affairs. At the operational level, the employed criteria in this dissertation vary between chapters to account for differences in the institutional setting (e.g., public versus private domain). For Chapters 2 and 4, a sample was drawn from the population of US public companies (i.e., S&P 1500). In line with comparable work of previous scholars (cf., Gomez-Mejia et al., 2014, 2019; Kotlar et al., 2018), the employed operational definition requires a family to play a key role in board membership and ownership (i.e., at least 20 percent shareholder vote). The board membership criterion prevents the identification of passive shareholdings where an owning family does not play an active role in corporate decision-making and the ownership threshold ensures that a family has significant influence via voting rights. In a public setting, an ownership

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[3] According to the broadest definition employed by the authors, a firm constitutes a family firm if "[m]ore than 50% of ordinary voting shares were owned by members of the largest single family group related by blood or marriage." (p.40)

[4] According to the narrowest definition employed by the authors, a firm constitutes a family firm if "more than 50% of ordinary voting shares were owned by members of the largest single family group related by blood or marriage, the company was perceived by the Chief Executive, Managing Director, or Chairman to be a family business, 51% or more of the management team were drawn from the largest family group who owned the company, and the company was owned by second-generation or more family members." (p.41)

threshold of 20 percent can be considered conservative given that some previous studies considered thresholds as low as 5 percent sufficient to infer a family's ability to exert significant influence over a firm's strategic trajectory (cf., Allen & Panian, 1982; Gomez-Mejia et al., 2003; Chrisman & Patel, 2012). In Chapter 3 the focus lies on private family firms. To this end, I analyzed a sample that is representative of the German private firm population. In line with previous research on family firms in the private sector, the operational definition employed in this chapter requires a family to own at least 50 percent of the company's shares to ensure significant formal control over the business. In addition, the sampled firms explicitly responded to the question of whether their firm constitutes a family firm or not, providing a strong indication of the likelihood that such a firm would engage in behaviors associated with family influence.[5]

1.2 FAMILY FIRMS, INNOVATION, AND CORPORATE SOCIAL PERFORMANCE

1.2.1 The Origin and Evolution of Family Business Theory: A Brief Overview

From the family business literature, it is apparent that the behavior of family and non-family firms differs significantly from each other (Arredondo & Cruz, 2019). In the early stages of the field, scholars suggested an array of paradigms to examine family firm idiosyncrasies primarily by borrowing from the domain of financial economics and strategic management (Berrone et al., 2012). These paradigms included agency theory (e.g., Schulze et al., 2001; Morck & Yeung, 2003), stewardship theory (e.g., Miller & Le Breton- Miller, 2006), and the resource-based view (e.g., Habbershon & Williams, 1999; Habbershon, Williams, & MacMillan, 2003). Despite generating valuable insights, these theoretical frameworks failed to capture the fundamental essence and uniqueness of family firms most of which appears non-financial in nature. Whereas non-family firms are said to follow a profit-maximizing strategy according to the traditional economic theory, family firm behavior appears largely motivated by non-financial considerations (Gomez-Mejia et al., 2007, Chrisman et al., 2012). In response to the need for a

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[5] The data used in this Chapter stems from the Mannheimer Innovation Panel (MIP), which represents the German contribution to the European Commission's Community Innovation Surveys (CIS).

family-tailored theoretical formulation capturing this core differentiating factor, Gomez-Mejia and colleagues (2007) introduced the socioemotional wealth (SEW) model, which has contributed substantially to the development of today's family business research landscape (Brigham & Payne, 2019; Swab et al., 2020). The framework is firmly rooted in the behavioral tradition of management research and was developed as an extension of behavioral agency theory, which integrates elements of prospect theory, the behavioral theory of the firm, and agency theory. Fundamental to the SEW model is the idea that corporate decisions are framed as gains and losses in relation to the reference point of the focal firm's dominant principals. For family firms, Gomez-Mejia et al. (2007) suggested that family principals evaluate the utility of a choice primarily on the prospective gains and losses of their socioemotional endowments rather than following a traditional economic logic (Gomez-Mejia et al., 2007; Zellweger & Dehlen, 2012; Nason, Mazzelli, & Carney, 2019). In other words, the SEW logic suggests that the decision-making process of a family firm is largely affected by non-financial utility considerations. Broadly speaking, socioemotional endowments refer to the affective utility family members derive from holding a controlling position. Such utilities include, among others, reputation benefits, private benefits of control, and the preservation of the family dynasty. The SEW perspective has been applied to a variety of topics in the realm of strategic management research, including corporate innovation (Chrisman & Patel, 2012; Gomez-Mejia et al., 2014), corporate governance (Bammens, Voordeckers, & Van Gils, 2011), internationalization (Pukall & Calabrò, 2014; Alessandri, Cerrato, & Eddleston, 2018), and corporate social responsibility (Berrone et al., 2010; Van Gils et al., 2014; Canavati, 2018; Mariani, Al-Sultan, & De Massis, 2021).

Numerous publications support the general notion that family firm behavior is primarily motivated by objectives tied to SEW preservation. However, as the field has evolved, contradictory empirical findings surfaced corroborating the idea of a more complex underlying decision-making process, potential variations in SEW considerations among family firms (e.g., due to heterogeneity), and the necessity to consider additional contextual factors (Calabrò et al., 2019). Some scholars examined how family firms may balance financial and non-financial considerations in a mixed-gamble fashion (Gomez-Mejia et al., 2014; Alessandri, Cerrato, & Eddleston, 2018; Bammens & Hünermund, 2020), others studies highlighted that family firm heterogeneity considerably affects SEW consideration and prioritization (Dibrell & Memili, 2019; Daspit et al., 2021; Arteaga & Escribá-Esteve, 2021) and that various internal and external contextual factors explain a substantial amount of variation (De Massis, Frattini, &

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Lichtenthaler, 2013; Breton-Miller & Miller, 2016). Considering these theoretical developments, scholars rightly call for discriminating methods of contradiction and disaggregation to uncover and explain overlooked differences, which have likely resulted from oversimplification and overly aggregated samples, relationships, and constructs (Chrisman & Patel, 2012; Le Breton-Miller & Miller, 2022).

This dissertation aims to address some of these problems by studying the strategic behavior of family-influenced firms in two significant strategic domains of the 21st century: innovation and corporate social performance (CSP). To this end, previously overlooked heterogeneity aspects are unveiled, and their impact on a firm's innovation strategy is explicated. In addition, I provide a novel theoretical perspective on the decision-making process in the realm of corporate social performance by integrating insights from the inter-temporal choice literature.

1.2.2 Family Firms and Innovation

While it is generally accepted that a firm's innovation behavior is affected by family involvement (Carnes & Ireland, 2013; Chrisman et al., 2015), our current knowledge about the relationship between family firm status and innovation remains scattered with mixed and contradictory findings (Duran et al., 2016; Calabrò et al., 2019). While some family firm idiosyncrasies are said to have a positive impact, others are said to hamper innovation. Long-term orientation and the involvement of multiple generations are often considered beneficial to innovation (Zahra et al., 2004; Craig & Dibrell, 2006; Llach & Nordquist, 2010). Arguments in favor of a negative impact frequently refer to risk aversion tendencies (La Porta, Lopez-de-Silanes, & Shleifer, 1999), a conservative posture (Habbershon et al., 2003), and a family's desire to retain control over corporate affairs (Gomez-Mejia et al., 2007). The prevalence of mixed empirical findings can, in part, be explained by the impact of family firm heterogeneity, oversimplified decision models, and the negligence of important contextual factors (Le Breton-Miller & Miller, 2022). Furthermore, the mixed evidence attests to the idea that positive and negative aspects associated with family influence and innovation likely co-exist and should be jointly considered. In essence, three major streams of innovation research can be distinguished: output, process, and input.

First, prior research on the effect of family influence on corporate innovation output remains inconclusive and fraught with mixed findings (e.g., Block et al., 2013; Matzler et al., 2015; Duran et al., 2016; Calabrò et al., 2019; Chirico et al., 2020; Hu & Hughes, 2020). While

a recent meta-analysis by Duran et al. (2016) suggested an overall stronger innovation output of family firms compared to non-family firms, authors like Matzler et al. (2015) and Chirico et al. (2020) criticized that most studies disregarded the importance of ownership, management, and governance heterogeneity. In addition to the impact of family firm heterogeneity, it has been established that the type of innovation output (e.g., incremental vs. radical innovation) pursued plays a key role in understanding the innovation behavior of family firms (Block et al., 2013; Carnes & Ireland, 2013; König et al., 2013). Family firms are frequently associated with economically risk-averse behaviors resulting from lower degrees of diversification (Chrisman & Patel, 2012; Gomez-Mejia et al., 2014; Duran et al., 2016). Building on this premise, one stream of the literature suggests that family firms tend to excel in innovation with a comparably lower risk profile (i.e., incremental innovation) but underperform when it comes to breakthrough innovation (i.e., radical innovation), which are characterized by a higher risk and reward profile (Block et al., 2013; König et al., 2013). Nevertheless, this view may suffer from oversimplification. A recent systematic literature analysis of radical innovation among family firms corroborates the idea that many studies suffer from an oversimplification of the underlying decision-making process (Hu & Hughes, 2020). The authors advocate that much of the variance is likely driven by overlooked heterogeneity factors and potential boundary conditions (e.g., the effect of distress on SEW). In line with this view, some scholars took a closer look at the assumed underlying decision-making process of family firms. Building on the mixed-gamble logic, which was previously suggested by Gomez-Mejia et al. (2014), theoretical advancements propagate that innovation-related decision-making models should reflect both a family firm's utility expectations related to SEW and economic gains and losses (Bammens & Hünermund, 2020; Chirico et al., 2020).

Second, the innovation process among family firms has received limited attention in the literature thus far. According to a recent meta-analysis, family firms may have a superior innovation process (i.e., innovation transformation efficiency) compared to non-family firms (Duran et al., 2016). This proposition is to a large extent driven by arguments pertaining to resource and capability advantages associated with family influence. Duran et al. (2016) propose that family owners' high level of control, wealth concentration, and reluctance to give up control renders them particularly suited to monitor innovation processes thereby increasing efficiency. Furthermore, family firms are often described as having strong relationships with both internal and external stakeholders. These relationships can help to facilitate the flow of information, which can in turn lead to greater efficiency in innovation.

Third, while most research on family firms and innovation inputs has focused on internal sourcing, the topic of external innovation inputs is becoming increasingly popular among scholars (Gjergji et al., 2021). The literature on the relationship between family firms and innovation input in the form of formal R&D spending is rather consistently suggesting a negative relationship (Sirmon et al., 2008; Chen & Hsu, 2009; Munari et al., 2010; Muñoz-Bullón & Sanchez-Bueno, 2011; Block, 2012; Chrisman & Patel, 2012; De Massis, Frattini, & Lichtenthaler, 2013; Sciascia et al., 2015; Chrisman et al., 2015). It is argued that R&D endeavors are generally resource-intensive and high in risk, which constitutes a threat to the preservation of SEW (i.e., maintaining control over the firm). Compared to our knowledge about formal R&D spending, less is known about internal innovation inputs in the form of capabilities. On the one hand, studies suggested an advantageous position of family firms owing to superior internal stakeholder relationships (e.g., with employees) resulting in long tenures accompanied by the accumulation of valuable tacit knowledge and superior information flows within the organization across multiple levels (Bammens, Notelaers, & Van Gils, 2015; De Massis et al., 2016). On the other hand, family firms were portrayed to be limited in their diversity of in-house human capital due to difficulties in hiring external experts (Donnelley, 1964; Horton, 1986; Sirmon & Hitt, 2003; Schulze et al., 2003a; Villalonga & Amit, 2006; Gjergji et al., 2019). Over the last decade, the topic of external innovation sourcing (i.e., open innovation) has enjoyed increased attention among family business scholars (De Massis et al., 2012; Block et al., 2013; Duran et al., 2016; Gjergji et al., 2019) because innovation strategies appear to move toward external input sourcing to accommodate today's fast-moving market trends (Larsen & Salter, 2006; Van de Vrande et al., 2009; Spithoven, Vanhaverbeke, & Roijakkers, 2013; Brunswicker & Vanhaverbeke, 2015). Grounded in the resource-based view, one stream of the literature suggested that family firms are more open and rely on a higher number of external partners due to their superior ability to establish and nourish relationships with external stakeholders (Zahra, Hayton, & Salvato, 2004; Arregle et al., 2007; Llach & Nordqvist, 2010), whilst studies drawing on the SEW model argued that control-loss aversion is likely to hinder collaboration activities with external partners (Classen et al., 2012; Kotlar et al., 2013). Recent work increasingly acknowledged the importance of heterogeneity and the impact of contextual factors suggesting that governance structure (e.g., family ownership and involvement), social and human capital endowment, and other contextual factors (e.g., innovation partner type) are likely to play a key role in the discovery of the underlying decision-mechanisms (Feranita et al., 2017, Gjergji et al., 2019).

1.2.3 Family Firms and Corporate Social Performance (CSP)

Whereas innovation has, for the longest time, been considered crucial to firm success and survival (Schumpeter, 1942), corporate responsibility appears to emerge as another substantial pillar of firm success in the 21st century (Canavati, 2018). "Despite the lack of a shared precise definition in the literature, CSP is generally conceived as a broad construct comprised of stakeholder management and social issue management" (Hillman & Keim, 2001, p.126). Prosocial behavior is becoming increasingly important to a variety of stakeholders (Malik, 2015) and family firms play a pivotal role in this domain because of their global prevalence (La Porta, Lopez-de-Silanes, & Shleifer, 1999; Anderson & Reeb, 2003; Morck & Yeung, 2003). Consequently, the topic has enjoyed substantial scholarly attention, particularly over the previous decade (Mariani, Al-Sultan, & De Massis, 2021).

The recent meta-analysis by Canavati (2018) ascribed family firms to have an overall positive impact on CSP. According to the author, most studies drew on the SEW logic to explain the importance of non-financial goals in CSP-related decision-making. Yet, there is neither consensus on the relationship between family influence and CSP nor on the underlying decision mechanisms (Mariani et al., 2021). Building on the central theme that SEW preservation motivates family firm decision-making (cf., Gomez-Mejia et al., 2007), one stream of the literature argued that non-financial goals (e.g., long temporal orientation) enhance the CSP of family firms (Berrone et al., 2010; Dyer & Whetten, 2006) while another stream advocated that socioemotional considerations facilitate family-centric behavior at the expense of CSP (Morck & Yeung, 2004; Kellermanns, Eddleston, & Zellweger, 2012; Cruz et al., 2012). Scholars arguing for a positive effect put forward that family firms seek to improve stakeholder treatment because of their desire to build a legacy and transfer their wealth to the next generation, and this long-term behavior results in prosocial behavior toward internal and external stakeholders. In a similar vein, scholars argued that the reputation of the family firm directly reflects on the owning family members reducing the likelihood of socially irresponsible business practices (Chrisman, Sharma, & Taggar, 2007; Deephouse & Jaskiewicz, 2013). Arguments in favor of a negative relationship between family firms and CSP suggested that prosocial behavior is only pursued if it aligns with a family's non-financial goals (Abeysekera & Fernando; 2020), and an existing power imbalance between the owing family and minority shareholders leads to principal-principal conflicts and the extraction of private benefits of control on behalf of the family when this is not the case (Morck & Yeung, 2003; Morck et al., 2005; Fattoum-Guedri et al., 2018). While previous contributions facilitated our understanding of CSP-related

decision-making among family firms, significant knowledge gaps prevail (Canavati, 2018; Mariani et al., 2021). These gaps can, in part, be explained by the focus on internal factors, overly aggregated CSP constructs, and unknown contextual factors. According to the systematic literature review of Mariani et al. (2021), family firm research on CSP mainly focused on two topics: the impact of family involvement through ownership and through corporate governance. Moving beyond this internal perspective, some scholars started identifying other factors to enhance our understanding of the underlying decision mechanisms. To this end, scholars found that a significant amount of variation in a family firm's CSP can be attributed to differences in the institutional environment (e.g., Van Gils et al., 2014), differences between internal and external stakeholders (e.g., Block, 2010; Cennamo et al., 2012; Cruz et al., 2014), differences between publicly traded and private family firms (cf., Canavati, 2018), and differences owing to the operationalization of the multidimensional CSP construct (i.e., social, environmental, and corporate governance dimension).

1.3 RESEARCH QUESTION AND OUTLINE

This dissertation aims to enhance our understanding of the strategic behavior of family firms in the realm of two important challenges confronting firms in the 21st century: innovation and corporate social performance (CSP). Innovation and CSP represent resource-intensive strategic choices with significant long-term implication, and it is today's prevailing opinion that such choices are largely affected by socioemotional considerations. However, recent theoretical developments suggest significant knowledge gaps raising the question if our current understanding of said decision-making process is oversimplified and in need of theoretical refinement (Le Breton-Miller & Miller, 2022).

To address some of the gaps outlined in Section 1.2, this dissertation considers family firm heterogeneity, contextual factors, and provides novel theoretical perspectives on the decision-making process among family firms. Specifically, this dissertation seeks to clarify the potential impact of the following factors on the decision-making process: ownership heterogeneity (i.e., presence of influential non-family owners), generational stage, top management team involvement by family members, internal financial distress (i.e., bankruptcy risk), and external financial distress (i.e., global financial crisis). Figure 1 provides a graphical overview of the investigated relationships. The chapters in this dissertation address the following research questions:

RQ1: How does family firm status[6], and its interaction with activist hedge funds, influence a firm's strategic inclination to pursue radical innovation outcomes?

RQ2: How does family firm status, and its interaction with generational stage and family managerial involvement, affect a firm's strategic inclination to engage in open innovation collaborations?

RQ3: How does family firm status, and its interaction with firm-level bankruptcy risk and macro-level financial distress, influence a firm's strategic inclination to pursue corporate social performance outcomes?

In Chapter 2 of this dissertation, I investigate how ownership heterogeneity among publicly traded family firms affects their strategic inclination to direct a given R&D budget toward radical innovation outcomes. In recent years, publications investigating the relationship between family firms and innovation output enjoyed increased popularity, yet findings remained fraught with mixed results (e.g., Block et al., 2013; Matzler et al., 2015; Duran et al., 2016; Chirico et al., 2020). Two possible reasons for the prevalence of these mixed findings are that scholars investigated the effect of family ownership in isolation and that potential contingencies were overlooked. Next to family owners, other influential owners may significantly affect strategic choices (cf., Gomez-Mejia et al., 2014) and this, mostly overlooked, ownership heterogeneity effect is likely particularly salient among publicly traded family firms. Whereas the equity distribution of public corporations was characterized by a dispersed ownership structure a few decades ago, today's ownership landscape has changed dramatically and is characterized by the dominance of large institutional blockholders with substantial voting rights and diverging preferences (Hoskisson et al., 2002; Connelly, Tihanyi, Certo, & Hitt, 2010; Connelly, Hoskisson, Tihanyi, & Certo, 2010; Hoskisson et al., 2013). In the context of family firms and radical innovation choices, activist hedge funds represent an ideal context to investigate the effect of ownership heterogeneity on strategic decision-making because the strategic preferences of this institutional investor diverge substantially from that of family blockholders. To this end, Chapter 2 builds on the behavioral agency model (BAM) and

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[6] In this dissertation, family firm status represents a binary variable (i.e., family or non-family firm) according to the criteria outlined in Section 1.1.2.

integrates insights from the prospect theoretic myopic loss aversion model (Benartzi & Thaler, 1995, 1999) with multiple agency theory (Arthurs et al., 2008; Filatotchev et al., 2011; Hoskisson et al., 2013) providing a theoretical rationale for the occurrence of principal-principal conflicts and their potentially harmful effects on radical innovation outputs. In addition, the myopic loss aversion logic is applied to explain why the benefits associated with a long temporal orientation (i.e., increased temporal aggregation) fail to outweigh the disadvantages of a lower diversification (i.e., reduced cross-sectional aggregation).

Chapter 3 provides new insights into the effect of a firm's generational stage and family members' managerial involvement on the likelihood to engage in an open innovation partnership. For many decades, firms could successfully innovate through internal innovation efforts. However, today's innovation landscape is more competitive than ever and moves at an ever-increasing pace, making internal innovation sourcing increasingly costly, risky, and thus unattractive. As a result, open innovation (OI) approaches appear to be a promising avenue for firms to remain competitive (Laursen & Salter, 2006; Van de Vrande et al., 2009; Spithoven, Vanhaverbeke, & Roijakkers, 2013; Brunswicker & Vanhaverbeke, 2015). This innovation avenue may be of particular relevance for family firms, which are said to underinvest in innovation compared to their non-family firm counterparts (Carney et al., 2015; Duran et al., 2016) but have an advantage with regard to relationship building. Building on the SEW logic, Chapter 3 aims at clarifying how family firm idiosyncrasies may affect their likelihood to engage in an OI collaboration and why family firm heterogeneity moderates this relationship. To this end, different levels of managerial involvement and generational stages are considered in a setting of privately owned firms. In addition, a post-hoc analysis revealed that contextual factors in the form of different collaboration partner types (i.e., customer, supplier, competitor, and research institute) affect the aforementioned moderations.

The fourth chapter of this dissertation examines the relationship between family firms and corporate social performance (CSP). Prosocial behavior constitutes an inter-temporal strategic choice typically characterized by immediate costs and deferred gains (Ganesan, 1994; Miller, Le Breton-Miller, & Scholnick, 2008; Lumpkin & Brigham, 2011). Prior literature largely suggests that family firm idiosyncrasies may put them in a favorable position to act more socially responsible than non-family firms due to their long temporal orientation and the non-financial utility gains associated with such behavior (Canavati, 2018). The concept of time (i.e., long-term vs. short-term) has long been utilized among family business scholars to predict family firm behavior, yet the concept itself has hardly received any attention in the domain of

family business research (Lumpkin & Brigham, 2011; Bansal & DesJardine, 2014). Hence, this chapter aims to shed light on the relationship between family firms and their social performance by investigating the effect of two contingencies, which likely affect temporal orientation. Specifically, I adopt a SEW logic and integrate insights from the inter-temporal choice literature (Loewenstein & Thaler, 1989; Lumpkin & Brigham, 2011) to model the impact of internal financial distress (i.e., bankruptcy risk) and external financial distress (i.e., global financial crisis) on a firm's CSP. This study centers its attention on the social dimension of CSP, which allows for a tight connection between the presented theoretical argumentation and the empirical measurements. By doing so, I acknowledge the multidimensionality of CSP (i.e., social, environmental, and corporate governance) and the resulting theoretical and practical distinctiveness between its dimensions (Cruz et al., 2014). While the empirical results initially convey the idea of a positive baseline effect, I find that internal and external financial distress temporarily moderate this relationship. Contrary to the prevailing opinion that internal financial distress has a negative effect by itself, the study corroborates the idea that the negative effect of internal financial distress may be cushioned by social capital, which only diminishes in the simultaneous presence of external financial distress (i.e., financial crisis).
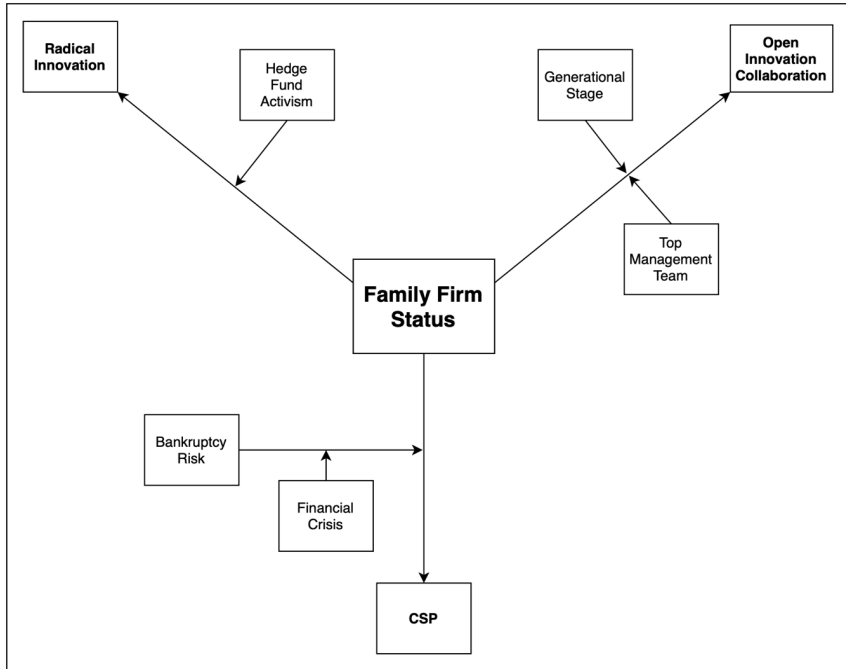
Figure 1. Dissertation Research Model

1.4 DISSEMINATION OF RESEARCH AND DATA COLLECTION

The following three chapters are based on self-contained studies in which I either had the lead role (Chapters 2 & 3)[7] or am the single author (Chapter 4). The data used in the empirical analysis of Chapter 2 and Chapter 4 was retrieved from accredited data vendors customary in academic research (Compustat Capital IQ, CRSP US Stock Databases, FactSet, GMI Ratings, MSCI Social Index[8], United States Patent, and Trademark Office Database). The survey data used in Chapter 3 stems from the *Mannheimer Innovationspanel*, which constitutes the German contribution to the European Commission's *Community Innovation Surveys (CIS)* and was collected and provided to me by the *Leibniz Centre for European Economic Research (ZEW)*.

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[7] My co-authors were Prof. Dr. Yannick Bammens, Prof. Dr. Martin Carree, and Dr. Jolien Huybrechts.
[8] Former KLD and GMI (cf., Dyer & Whetten, 2006; Minichilli et al., 2016).

The studies presented in this dissertation are either published at a peer-reviewed journal or were presented at various international conferences, research seminars, and workshops to advance them with expert feedback at the various stages of their development. Chapter 2 was presented at the *International Family Enterprise Research Academy (IFERA)* in Zadar, Croatia (2017), the *European Academy of Management Annual Conference (EURAM)* in Reykjavik, Iceland (2018), the *Academy of Management Annual Conference (AoM)* in Chicago, Illinois (2018), and is accepted for publication at the *Family Business Review (FBR)* journal. Chapter 3 was presented in seminars in Leuven, Belgium (2017), Maastricht, Netherlands (2018), Windesheim, Netherlands (2019), and a focus session at the *IFERA* conference in Bergamo, Italy (2019). Chapter 4 was presented at seminars in Leuven, Belgium (2017), and Maastricht, Netherlands (2017, 2018, & 2019).

2 OWNERSHIP HETEROGENEITY AND CORPORATE INNOVATION OUTPUT: A STUDY ON FAMILY BLOCKHOLDERS AND ACTIVIST HEDGE FUNDS

Abstract: This study examines the interplay between two influential yet opposing shareholder types – family blockholders and hedge funds – in relation to corporate innovation output. Using panel data on U.S. publicly traded firms listed in the S&P 1500, we find that family blockholders have a negative effect on radical innovation output in the form of citation-weighted patents, and that this negative effect is intensified in the presence of activist hedge funds. Our study advances insight into the implications of ownership heterogeneity for innovation output choices in family-influenced firms.

2.1 INTRODUCTION

Over the past decades, corporate ownership structures have become increasingly heterogeneous with multiple influential shareholder types often coexisting within firms (Connelly et al., 2010a, 2010b; Hoskisson et al., 2013). While several studies have investigated the effect of individual shareholder types – such as family owners – on strategic choices and performance (e.g., Gomez-Mejia et al., 2011; Carney et al., 2015), the topic of ownership heterogeneity received scant attention and constitutes an important research area (Connelly et al., 2010a; Cirillo et al., 2019). This is particularly true for the impact of ownership heterogeneity on corporate innovation. As highlighted by Wright (2017), the question how ownership configurations affect the extent and nature of innovation deserves more research attention since "ownership differences can influence the goals, time horizons, and governance mechanisms relating to innovation", with a manifest need for "research to explore (…) the *interaction* between ownership types" (p. 74, emphasis added). How different shareholder types interact within heterogeneous ownership structures in shaping innovation dynamics warrants more conceptual and empirical research.

Concerning family-influenced firms[9], some prior work suggests that the presence of other significant shareholders indeed influences corporate processes and outcomes (e.g., Sacristán-Navarro et al., 2011, 2015), with mainly private equity receiving heightened interest in recent years (e.g., Croce & Marti, 2016; Cirillo et al., 2019; Michel et al., 2020; Neckebrouck et al., 2021). Among this limited set of studies on the role of other major owners in family firms, however, very few have investigated innovation aspects. Pioneering work by Gomez-Mejia et al. (2014) and Cirillo et al. (2019) suggests that mutual and pension funds, as well as private equity funds, help mitigate the negative effect of family ownership on R&D investments as an innovation input choice. Yet, beyond that very little is known about the association between ownership heterogeneity and innovation in a family firm setting. We advance this line of inquiry by examining the effect of the interplay between family blockholders and activist hedge funds on radical innovation outputs.

The combination of family blockholders and strategic or activist hedge funds is particularly intriguing to study for two main reasons. First, they are quite opposite in terms of

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[9] We employ the term family-influenced firm to refer to firms in which family ties play a key role in both ownership and board membership (i.e., active family ownership; Gomez-Mejia et al., 2014, 2019). This active involvement of the owning-family (vs. mere passive ownership) is relevant for this study as we wish to examine its interplay with other activist investors and how it shapes firm-level strategic choices on innovation.

strategic objectives and tactics. Family blockholders are generally undiversified long-term owners with conservative preferences (Munari et al., 2010), whereas hedge funds are diversified short-term investors who often employ aggressive investment tactics (Klein & Zur, 2011). Second, research suggests that both types of shareholders are highly influential in determining the strategic direction of a company (Gomez-Mejia et al., 2011; Brav et al., 2018). Thus, the coexistence of family blockholders and hedge funds within a single firm's ownership structure presents a theoretically compelling setting to investigate the influence of ownership heterogeneity on corporate innovation.

Regarding the strategic implications of ownership heterogeneity, our study centers on the innovation output choice.[10] Next to addressing the research gap on ownership heterogeneity (cf. Wright, 2017; Cirillo et al., 2019), we aim to shed further light on another gap in the family firm innovation field by examining such innovation output choices. Contrary to research on R&D investments as an innovation input choice, which has produced rather consistent results, prior work on how family influence shapes a firm's innovation output is fraught with mixed findings (e.g., Block et al., 2013; Matzler et al., 2015; Duran et al., 2016; Chirico et al., 2020), leading scholars to call for more research on contingencies and boundary conditions. We frame the presence of strategic hedge funds in a family firm's ownership structure as one such potentially significant contingency variable affecting innovation output choices.

Our study's research question thus reads as follows: within a heterogenous ownership structure consisting of family blockholders and strategic hedge funds with seemingly opposing risk and temporal preferences, what is the effect of the interplay between both shareholder types on the firm's innovation output choice? As previously mentioned, earlier studies on the link between ownership heterogeneity and corporate innovation in family firms have examined the presence of shareholders such as mutual, pension, and private equity funds, which have very

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[10] We frame radical innovation as an output choice, reflecting the nature of innovation outputs being targeted with a given R&D budget. It can be noted that innovation output is not only determined by strategic choices but also by firm-level capabilities. In our argumentation, we will focus on the strategic choice element since we are interested in exploring ownership-induced variance in radical innovation outcomes – where ownership configurations likely affect strategic choices more strongly and directly than capabilities (with possible indirect implications for capabilities often running via strategic choices), especially among large publicly listed corporations where resource constraints should be less influential.

different profiles than those of hedge funds[11], and these studies focused on innovation inputs rather than outputs (Gomez-Mejia et al., 2014; Cirillo et al., 2019). While those studies found that these external investors mitigate the negative effect of family ownership on R&D spending, we develop and test the novel idea that hedge fund activism may actually exacerbate the negative family effect on radical innovation outputs.

To study this research question, we employ a mixed gamble lens. An increasing number of family business scholars adopted a mixed gamble lens (e.g., Gomez-Mejia et al., 2014; Kotlar et al., 2018), for which they refer to the behavioral agency model (BAM; Wiseman & Gomez-Mejia, 1998; Martin et al., 2013) as underlying theoretic anchor. BAM itself is a fusion of prospect theory with agency theory. As we study the combined effect of family ownership and hedge funds, we will integrate prospect theory with insights from multiple agency theory since the latter pays explicit attention to the presence of multiple influential principals with diverging identities, preferences, and time horizons (Hoskisson et al., 2002, 2013; Allcock & Filatotchev, 2010; Filatotchev et al., 2011). Moreover, one of our goals is to develop a better understanding of the mechanisms driving the effect of family ownership and hedge funds on radical innovation output. To this end, we integrate insights from the prospect theoretic myopic loss aversion model, which to date were largely overlooked in BAM, namely on the role of the aggregation of mixed gamble returns in mental accounting (Benartzi & Thaler, 1995). We test our ideas using panel data on ownership and citation-weighted patents from S&P 1500 companies.

Our study makes several contributions. First, we advance knowledge on ownership heterogeneity in family-influenced firms. It is surprising that this topic received so little attention to date given that institutional investors now dominate equity markets in most developed economies (Hoskisson et al., 2002; Connelly et al., 2010b; Fernando et al., 2014). With regard to hedge funds, their activism has been praised in recent literature as an effective sanctioning mechanism for corporate inefficiencies – such as suboptimal innovation strategies – that fail to maximize shareholder value (Gilson & Gordon, 2013; Brav et al., 2018). To the best of our knowledge, we are the first to examine the interplay of family blockholders and activist hedge funds in relation to corporate innovation. We show that in the context of family-

[11] Hedge funds typically have a high-risk and short-term investment profile. Compared to mutual and pension funds which are more heavily regulated, hedge funds tend to embark on riskier strategies, including leverage and short selling, to achieve higher returns over shorter time periods. Compared to private equity firms which usually invest in companies that are not publicly listed or take them private, hedge funds can build up and exit investments more quickly as shares are publicly traded, allowing for a shortened time horizon.

influenced firms, hedge fund activism does not represent an effective governance mechanism but instead aggravates the negative effect of family ownership on radical innovation output. This complements work by Gomez-Mejia et al. (2014) and Cirillo et al. (2019) which painted a more positive picture about the role of influential external investors. We thus reveal that when investigating the implications of ownership heterogeneity in family-influenced firms, the type of institutional investor (in our case, hedge funds) and the type of innovation choice (in our case, the innovation output choice) under consideration matter greatly.

Second, we provide deeper insight into the relationship between family ownership and corporate innovation output (Calabrò et al., 2019; Hu & Hughes, 2020). By describing the underlying mechanisms of cross-sectional and temporal aggregation in the assessment of high-risk, high-mean mixed gambles (Thaler et al., 1997; Bammens et al., 2022), we clarify why among publicly traded firms the drawbacks of family ownership likely dominate potential benefits in relation to radical innovation outputs – i.e., innovations with significant economic and technological value for society (Block et al., 2013). Importantly, we reveal how these innovation output choices are affected by the presence of activist hedge funds who have a bearing on the aggregation rules used by family blockholders.

Third, in relation to theory development, we enrich the BAM perspective on family firms by integrating insights from the prospect theoretic myopic loss aversion model (Benartzi & Thaler, 1995, 1999) with multiple agency theory (Arthurs et al., 2008; Filatotchev et al., 2011; Hoskisson et al., 2013). Specifically, we explain how socioemotional considerations shape the aggregation rules adopted by family blockholders when evaluating mixed gambles dealing with radical innovation outputs, and we clarify how these aggregation rules are influenced by the presence of other influential investors with diverging interests. Combining insights from the myopic loss aversion model with multiple agency theory constitutes a valuable advancement of the BAM-based mixed gamble lens on family firm decision-making.

2.2 THEORY AND HYPOTHESES

2.2.1 Innovation Output Choices as Mixed Gambles

The corporate innovation process involves multiple stages and strategic choices (Röd, 2016). Many family business studies have examined the decision on the amount of money to invest in innovation (innovation input choice; e.g., Chrisman & Patel, 2012; Gomez-Mejia et al., 2014;

Brinkerink & Bammens, 2018; Bammens et al., 2022), but a less understood choice concerns the nature of the innovation outputs being targeted with the invested money (Calabrò et al., 2019). Family business research on innovation output is gaining momentum (e.g., Duran et al., 2016; Carney et al., 2019; Hu & Hughes, 2020), but remains characterized by inconclusive findings. Specifically, while some prior work suggests a positive association between family influence and patented innovation output (Tsao & Lien, 2013; Matzler et al., 2015; Duran et al., 2016)[12], others point to a negative association (Block et al., 2013; Cucculelli et al., 2016; Decker & Günther, 2017) or a nonlinear association (Chirico et al., 2020). Such mixed findings indicate that the institutional setting and other internal and external contingencies play a critical role (cf. Memili et al., 2015; Röd, 2016; Decker & Günther, 2017; Leppäaho & Ritala, 2022), and that the innovation output choice by family firms warrants further inquiry.

Targeted innovation output types vary considerably in their risk and return profile; here, the literature broadly distinguishes between incremental or routine innovations with relatively low risks and potential returns versus radical or breakthrough innovations which are more explorative in nature and involve higher risks and returns (Alexander & Van Knippenberg, 2014; Patel & Chrisman, 2014; Nieto et al., 2015; Hu & Hughes, 2020). As explained by Block and colleagues, "[r]outine innovation that often is not very risky is far less likely to constitute the type of pioneering discovery that leads to new and influential patents" (p. 183), whereas radical innovations have greater economic and technological importance as reflected in patent citations (Block et al., 2013). When accounting for the level of R&D spending, a firm's realized radical innovation output will thus reflect its strategic inclination toward pursuing radical innovations in lieu of more modest and less risky routine innovations.

We aim to model ownership-induced variance in companies' innovation output choice, determining the extent to which radical innovations are pursued with a given R&D budget. This choice concerning the type of innovation output to target with their R&D investments crucially reflects a firm's risk and temporal preferences (Block et al., 2013; Patel & Chrisman, 2014; Bammens et al., 2022). Specifically, this strategic choice on the pursuit of radical innovation outputs can be framed as a *high-risk, high-mean* mixed gamble: high-risk because many radical

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[12] Four out of six innovation output measures that Duran and colleagues (2016) used are patent-based. Noteworthy is also the finding by Soluk and colleagues (2021) who observed a positive association between family influence and digital business model innovation (BMI), thereby revealing that "the pessimistic view of discontinuous or radical innovation in family-influenced firms (…) does not apply to digital BMI" (p. 889); however, their measure of digital BMI is not patent-based.

innovation projects tend to fail, and high-mean because on average (when aggregating across a sufficient number of such projects) returns tend to be substantial (Tversky & Kahneman, 1992; Benartzi & Thaler, 1995; Bromiley, 2010). Hence, if decision-makers find high-risk, high-mean gambles more attractive, we expect a stronger emphasis on the pursuit of radical innovation outcomes with a given R&D budget (Block et al., 2013).

The notion of mixed gambles hails from prospect theory. A key feature of prospect theory is the asymmetry in the experience of losses versus gains; individuals tend to dislike losses from gambles much more than they like equally sized gains (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992). This loss aversion, where losses weigh more heavily than gains, has a profound negative effect on the pursuit of projects with high-risk, high-mean returns (Benartzi & Thaler, 1995; Bammens et al., 2022). Grounded in prospect theory, the myopic loss aversion model clarifies how the negative impact of loss aversion on the pursuit of high-risk, high-mean mixed gambles (in our case, radical innovation projects) is curtailed as more cross-sectional or temporal *aggregation* occurs in decision-makers' mental accounting (Benartzi & Thaler, 1995, 1999; Thaler et al., 1997). When multiple high-risk, high-mean gambles are aggregated at the same time or over time, then prospective losses incurred in one gamble can be compensated in other gambles, or "distributions of these gambles are more favorable due to statistical aggregation, which offsets the negative effect of loss aversion" (Bammens et al., 2022, p. 1499).

Cross-sectional aggregation in mental accounting takes place when multiple gambles are considered at the same time (Thaler et al., 1997). Many investors on the stock market reduce their risk position by having a large portfolio of different stocks instead of one large equity position in a single company, evaluating their securities as portfolios rather than one at a time. Cross-sectional aggregation of high-risk, high-mean bets reduces the likelihood of experiencing a sizeable loss, thereby curbing the negative effect of loss aversion in the mixed gamble calculus (Benartzi & Thaler, 1999). Temporal aggregation takes place when there is a series of prospective gambles spread out over time (as is the case when considering current and future innovation projects), and the investor only assesses the overall outcome at the end – i.e., uses a long evaluation period – without intermediate gamble outcome evaluations (Benartzi & Thaler, 1995). Akin to cross-sectional aggregation, when decision-makers operate under extended time horizons with longer gamble evaluation periods, losses incurred in initial gambles can be made up for by gains in later gambles (Thaler et al., 1997; Bammens et al., 2022). By implication,

the pursuit of radical innovation outcomes – as high-risk, high-mean gambles – represents a less attractive strategic option when cross-sectional or temporal aggregation is limited.

2.2.2 Family Blockholders and Innovation Gamble Aggregation

We know from prior conceptual and empirical research that family ownership is associated with socioemotional considerations in decision-making (Gomez-Mejia et al., 2011; Brinkerink & Bammens, 2018). Here we see potential benefits and drawbacks of actively involved family owners in relation to the pursuit of high-risk, high-mean radical innovations gambles.

On the one hand, an important part of families' socioemotional wealth concerns their desire to maintain a substantial degree of *family control* over corporate affairs (Gomez-Mejia et al., 2007; König et al., 2013). This harms their capacity for cross-sectional aggregation of prospective gamble returns (Thaler et al., 1997). Indeed, keeping a major ownership stake (particularly in publicly traded firms) requires that the family concentrates a significant portion of its wealth in that particular firm (Duran et al., 2016). As a result, family blockholders hold relatively undiversified portfolios (Munari et al., 2010; Patel & Chrisman, 2014), and are not able to aggregate prospective returns from high-risk, high-mean radical innovation gambles across a portfolio of firms to the same extent as other investors. In comparison, institutional investors hold stock in hundreds or even thousands of firms (Porter, 1992), which allows for sizeable cross-sectional aggregation of firm-specific risky gambles; for these diversified investors, their equity stake in any particular firm is unlikely to have an overriding influence on their gamble calculus as is the case with family blockholders.

On the other hand, family blockholders typically have a longer time window than other investors, in large part because of their socioemotional desire to continue the *family dynasty* by passing on their stake to future family generations (Le Breton-Miller & Miller, 2006; Lumpkin & Brigham, 2011; König et al., 2013). Family-influenced firms operating under a lengthened time horizon can, in principle, employ extended evaluation periods when assessing prospective gamble returns (Chrisman & Patel, 2012; Bammens et al., 2022). This implies that they can aggregate a longer series of high-risk, high-mean gambles (i.e., radical innovation projects) into more favorable long-term distributions, which increases the attractiveness of playing such gambles (Benartzi & Thaler, 1999). That is, instead of evaluating radical innovation projects in isolation one at a time, family blockholders could consider, in aggregated form, the prospective returns from multiple radical innovation projects spread out over time. Their transgenerational

time horizon may thus, in principle, lead to greater temporal aggregation of prospective returns with corresponding benefits in the pursuit of radical innovation outcomes.

We expect that family-based disadvantages in cross-sectional aggregation (due to family control concerns) outweigh temporal aggregation advantages (due to family dynasty concerns) because of two main reasons. First, although families' dynastic outlook can make them more long-term minded (König et al., 2013), the associated temporal aggregation benefits may be restricted in relation to radical innovation due to dynastic families' inherent conservative nature. As such, family dynasty also has a dark side which may partly suppress temporal aggregation benefits. Since dynastic family owners are concerned with preserving the family legacy across generations, the "worst-case scenario" – in which accumulated failed radical innovation projects would threaten the survival of the business – may be salient in their gamble calculus.[13] In the words of Bammens and colleagues (2022, p. 1504), "when the realization of (…) losses from failed innovation projects would cause a family firm to default on its credit obligations and to file for bankruptcy, families with [transgenerational intentions] experience a substantially larger SEW loss since bankruptcy also erases the possibility of a desired dynastic transfer". The above-discussed temporal aggregation benefit, anchored in family dynasty, may thus be rather limited. This aligns with the idea that family influence is generally negatively associated with the pursuit of discontinuous technologies and radical innovations (e.g., König et al., 2013; Patel & Chrisman, 2014; Nieto et al., 2015).

Second, we claim that family-based benefits in temporal aggregation are even less likely to materialize in our setting – namely that of publicly traded corporations – compared to the setting of, for instance, privately-held firms (cf. Miller et al., 2008; Le Breton-Miller et al., 2011). While family blockholders in publicly traded firms tend to hold their stock for a long time (often across generations), their gamble evaluation period – i.e., the time over which they actually aggregate prospective gamble returns (Benartzi & Thaler, 1995) – will be restricted by external pressures for short-term performance from transient investors, market analysts, and reporting requirements. Many publicly listed corporations operate under a logic of short-termism (Graves & Waddock, 1990; Jacobs, 1991; Porter, 1992; Bushee, 1998) and this severely lowers (though not necessarily fully erases) family-influenced firms' ability to act in

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[13] We thank the *FBR* associate editor for suggesting this worst-case scenario argument. While a threat of bankruptcy involves a true worst-case scenario, the need to attract additional external financing to compensate for financial losses may constitute a sufficient deterrent for many dynastic business families.

line with their inherently longer transgenerational time horizon through greater temporal aggregation.[14]

In sum, we drew on the prospect theoretic myopic loss aversion model (Benartzi & Thaler, 1995) to uncover two key mechanisms – cross-sectional aggregation and temporal aggregation (also referred to as "broad framing"; Bammens et al., 2022) in mental accounting – that help explain choices on radical innovation gambles. We argue that family-based benefits in temporal aggregation are probably rather modest, and that family blockholders' drawbacks in cross-sectional aggregation likely prevail. This results in our first baseline hypothesis, which can be read as a replication of prior work sampling similar firms (Block et al., 2013):

Hypothesis 1: Accounting for R&D spending, the presence of family blockholders in a U.S. listed firm's ownership structure is negatively associated with radical innovation output.

2.2.3 The Moderating Effect of Hedge Fund Activism

Strategic (activist) hedge funds represent, just like family blockholders, a shareholder type with substantial influence, yet with very different preferences in relation to diversification and time horizon. According to Brav (2009), the most common hedge fund tactics are concerned with realizing efficiency gains, reducing excess cash, increasing leverage and shareholder payouts, selling business units, and imposing changes in corporate governance. While there appears to be consensus on the relationship between hedge fund activism and performance increases, the impact of hedge funds on corporate innovation is less conclusive. Challenging public opinion and critical voices among scholars (Klein & Zur, 2009, 2011), most empirical research suggests a positive association between the involvement of hedge funds and more radical (patent-based) innovation output measures due to improvements in innovation efficiency (cf. Wang & Zhao, 2015; Brav et al., 2018).

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[14] Relatedly, prior research on innovation output in family firms is fraught with inconsistent findings and consideration of the institutional governance setting may partly account for some of these inconsistencies. Indeed, earlier work sampling publicly listed firms observed a negative effect of family influence on patented innovation output (e.g., Block et al., 2013), whereas others sampling (also) private firms found the opposite (e.g., see Duran et al., 2016 with their table C2 revealing that the positive effect is mainly driven by private family firms). Some work suggests that the story is even more nuanced than this; not all stock markets are subject to similar pressures for short-termism and family firms listed on, for instance, a European stock exchange may be better able to act in line with their long-term horizon than their counterparts in the U.S. where stock markets are notoriously short-term oriented (cf. Matzler et al., 2015 observing a positive effect of family influence on patented innovation output using a sample of German listed firms). The aforesaid does not account for all observed inconsistencies in this literature (cf. Decker & Günther, 2017).

Brav and colleagues (2018) discuss several efficiency-enhancing mechanisms through which target firms may experience higher innovation outputs after hedge fund activism. For instance, by selling inefficient business units (that do not belong to a firm's core competency; Brav, 2009), target firms can refocus on their core competencies, leading to efficiency gains in innovation output. Also, post-intervention, target firms hire and fire a significantly higher number of innovators compared to their matched peers; after "redeployment", retained and new innovators tend to exhibit a higher efficiency in both patents filed and citations received as "personnel are matched or re-matched to work environments where they can be more productive" (Brav et al., 2018, p. 239). Furthermore, post-intervention, CEOs' share ownership increases and more directors are added to the board, "showing that general improvement in management and governance makes firms more innovative" (p. 239). Yet, the significant goal incongruence between hedge funds and family blockholders, in terms of diversification and time horizon, gives us reason to believe that hedge fund activism will interact with family blockholder involvement in shaping the focal firm's radical innovation choices.

Compared to family blockholders, hedge funds hold much more diversified portfolios and employ shorter investment horizons (Klein & Zur, 2011; Berrone et al., 2012). The associated differences in strategic preferences create an agency setting with high potential for *principal-principal* conflicts. When analyzing conflicts among principals, multiple agency theory (Hoskisson et al., 2013) offers a useful theoretic lens. Multiple agency theory pays explicit attention to ownership heterogeneity and the involvement of multiple (large) principals with diverging identities, preferences, and time horizons (Hoskisson et al., 2002, 2013; Allcock & Filatotchev, 2010; Filatotchev et al., 2011). As pointed out by Hoskisson and colleagues (2013), some principals can even hold a dual identity in the sense that next to being a shareholder of the focal firm, they serve as agents to other principals beyond the focal situation; and "[t]his dual identity creates an implicit tension for the actor and can generate conflicting interests" (p. 9). Hedge fund managers, for instance, serve as principals in the focal firm, but as agents to their clients who invested in the fund. This dual identity can create goal incongruence between hedge fund managers, who aggressively seek to maximize short-term returns for their clients (Klein & Zur, 2011), and other shareholders of the firm such as family blockholders. Anchored in multiple agency theory, we propose that when hedge funds intervene in family-influenced firms, their divergent preferences cause the interaction of family ownership and hedge fund activism in relation to radical innovation outcomes to be negative.

Multiple agency theory offers a useful general framework for analyzing principal-principal conflicts (Hoskisson et al., 2013), but it does not detail the specific conflicts and interactions between our focal principals, hedge funds and family blockholders, regarding the firm's radical innovation output. To flesh out these behavioral micro-processes, and their implications for innovation output choices, we complement multiple agency theory with the earlier described prospect theoretic insights on temporal and cross-sectional aggregation (Thaler et al, 1997). As such, multiple agency theory can be viewed as overarching framework for studying ownership heterogeneity issues, and the prospect theoretic myopic loss aversion model as a behavioral theoretic "plug-in" to work out the particular principal-principal dynamics under consideration. Based on this myopic loss aversion model (Benatrzi & Thaler, 1995), we previously clarified how greater aggregation of prospective gamble returns increases the attractiveness of pursuing more radical high-risk, high-mean innovation projects.

First, most hedge funds are relatively short-term oriented, seeking to obtain returns on their investments rather quickly (Klein & Zur, 2011). This implies that only limited temporal aggregation of prospective innovation gamble returns is possible for these hedge funds, who will actively try to enforce their efficiency-oriented short-term preferences on their target firms. By doing so, they further undermine any potential temporal aggregation advantage of family-influenced firms, which originates from family blockholders' inherent longer time horizon (Le Breton-Miller & Miller, 2006). While we already argued that temporal aggregation benefits of family ownership are not likely to fully materialize (especially in the setting of publicly listed corporations), we claim that this is even less the case when hedge funds are active in the family firm's ownership structure and aggressively push for short evaluation periods (Benartzi & Thaler, 1995; Klein & Zur, 2011). That is, the evaluation period used by family blockholders in their mental accounting of gamble returns, is expected to be further shortened when they have to consider, and partly accommodate, the preferences of short-term minded activist hedge funds. As per the myopic loss aversion model, shorter evaluation periods lead to fewer high-risk, high-mean gambles being aggregated over time (Thaler et al., 1997), thereby further lowering the attractiveness of pursuing such radical innovation outputs.

Second, as institutional investors, hedge funds tend to diversify their investments and thus benefit from greater cross-sectional aggregation. Yet, hedge funds' heightened cross-sectional aggregation is unlikely to mitigate the negative effect of a family blockholders' undiversified holdings on their cross-sectional (i.e., *cross-firm*) aggregation of gamble returns (Duran et al., 2016). Indeed, to uphold family control, family blockholders face limitations in

the extent to which they can diversify their stockholdings (Gomez-Mejia et al., 2011; Duran et al., 2016), and the presence of an activist hedge fund does not affect this structural limitation in cross-firm aggregation from the family blockholders' perspective.[15] In contrast, to the extent that hedge funds push for efficiency-oriented actions such as divestitures of non-core business assets and units (Lerner, 1994; Brav et al., 2009; Pastor & Veronesi, 2009), they may even increase unsystematic firm risk and limit *within-firm* cross-sectional aggregation possibilities (i.e., across different business lines) for family owners. This would harm their ability to cross-sectionally aggregate prospective returns across radical innovation projects, and thus the overall attractiveness of pursuing such projects (Thaler et al., 1997). Likewise, families' concern for reputation, tradition and identity likely leads them to oppose efficiency-oriented actions by hedge funds involving divestitures and personnel lay-offs, thereby undermining some of the innovation efficiency benefits ascribed to hedge fund activism (Brav et al., 2018).

In short, earlier we explained how active family ownership in listed corporations may have a negative impact on firm-level engagement in radical innovation due to drawbacks in cross-sectional aggregation, which are unlikely to be compensated by (limited) family-based benefits in temporal aggregation. Based on the above, we propose that this negative effect of family ownership is exacerbated in the presence of activist hedge funds who have substantially different strategic preferences, leading to severe principal-principal conflicts. Hedge funds are expected to further undermine family blockholders' (already limited) benefits in temporal aggregation and to potentially worsen their drawbacks in cross-sectional aggregation. This results in our second hypothesis on the combined effect of active family blockholders and hedge funds on the pursuit of radical high-risk, high-mean innovation projects:

Hypothesis 2: Accounting for R&D spending, the negative association between family blockholders and radical innovation output intensifies as hedge fund activism in the focal firm increases.

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[15] There is thus an asymmetry in how hedge fund activism is expected to affect family blockholders' temporal vs. cross-sectional aggregation. In line with the myopic loss aversion model, external pressures (e.g., from hedge funds) can lead one to adopt a gamble evaluation period in mental accounting that is shorter than one's inherent time horizon. However, it is unlikely that a hedge fund's broader portfolio would increase cross-firm gamble aggregation in the family coalition's mental accounting beyond the company shares the family itself holds.

2.3 SAMPLE AND METHODS

The final sample used in this study covers 772 firms representing 2,601 firm-year observations, and it was obtained after merging several secondary data sources (e.g., Compustat, FactSet, GMI ratings, USPTO) covering U.S. firms listed in the S&P 1500. The covered time period is limited by the availability of the family firm variable and patent data, and ranges from 2002 to 2009. Yet, the designated time period covers both the beginning and more recent developments in the hedge fund activism era (Zenner et al., 2010, 2015). We use a time lag of 4 years to account for the time difference between our dependent and independent variables; the rationale behind this time lag is presented in the data analysis section. The S&P 1500 index represents a solid basis for our research for several reasons: First, the frequency of hedge fund activism campaigns per year is limited, which may constrain the ability to make robust statistical inferences. Previous research identified between 50 (Klein & Zur, 2009) and 176 (Brav et al., 2008) hedge fund activism campaigns per year between 2003 to 2005 and 2001 to 2006, respectively. In order to identify the majority of hedge fund activism events, an index that covers 90% of the U.S. stock market capitalization appears reasonable. Second, although family firms represent the dominant organizational form globally, they are mostly small or medium in terms of size. Among public corporations, family firms make up around 10% of all firms based on the strict definition employed in this study (cf. Gomez-Mejia et al., 2014, 2019). Again, the broad focus facilitates the aggregation of a solid sample size, especially in light of the fact that we also need to identify firms that do not only qualify as a family firm but that are targeted by hedge funds, too. Third, focusing on listed U.S. firms allows for comparability with the majority of other studies on the impact of activism (cf. Brav et al., 2008; Clifford, 2008; Klein & Zur, 2009).

Accounting firm data was retrieved from Compustat and data on hedge fund activism from SharkRepellent, which is part of FactSet's comprehensive database with a focus on corporate activism, takeover defense, and proxy-related issues. GMI Ratings provided the identification of family-influenced firms (Gomez-Mejia et al., 2014, 2019), and the necessary records on patents were retrieved from the publicly available dataset by Kogan et al. (2017).

To ensure comparability and consistency with prior literature on hedge funds, family firms and innovation, several industry sectors have been excluded from the sample (cf. Anderson et al., 2012; Matzler et al., 2015): enterprises from the financial sector (SIC 60 & 61), brokers (SIC 62), insurance firms (SIC 63 & 64), real estate firms (SIC 65), holdings and

investment offices (SIC 67) as well as utilities (SIC 46, 48 & 49). In a similar vein, foreign subsidiaries were excluded as "their accounting and their regulation standards are different from other sectors, and government regulations may potentially affect firms' investment choices and equity ownership structure" (Matzler et al., 2015, p. 324). This procedure resulted in the removal of 320 firms on average.[16]

After performing all necessary data cleaning steps, which are described in more detail below, the datasets were merged, which resulted in a sample of 957 distinct firms for the time period between 2002 and 2009, of which 99 firms comply with our family firm definition. As a result of missing data points, the final model estimates are based on a sample of 772 firms, including 72 family firms, representing 2,601 firm-year observations.

2.3.1 Dependent Variable

In this study, patenting activity serves as a proxy for innovation output. Despite some criticism in the past, the use of this proxy has become a best practice in the literature (cf. Acharya & Subramanian, 2009; Aghion et al., 2013). Specifically, we employ a citation-weighted patent measure rather than relying on a simple patent count variable. Patents, in the traditional sense, are used to protect know how, yet patenting activity may also result from other motives such as blocking competitors or entering cross-licensing agreements. Defensive patenting or exchange motivated patenting does not adequately capture the radical nature of innovation outcomes and hence may lead to distorted results given the focus of our study(Grabowski & Vernon, 1990; Jaffe et al., 1993; Dahlin & Behrens, 2005). As these patents carry less economic and technological importance, they receive significantly fewer forward citations (Blind et al., 2009). To ensure that our measure captures strategic motives toward more radical innovation outputs, we combine patent stock data with the number of forward citations received per patent, which is a common practice to assess the economic and technological importance of innovations and helps alleviate the majority of shortcomings mentioned above (e.g., Harhoff et al., 1999; Katila, 2000; Brav et al., 2018).

The patent data used in our analysis was compiled by Kogan et al. (2017). The data covers patents issued by the USPTO between the year 1926 and February 2010, which extends the commonly used NBER patent citation data set (Hall et al., 2001) by covering 11 more years

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[16] Due to regular adjustments of the companies listed in the S&P 1500, the number of firms across sectors varies slightly per year.

in the new millennium while maintaining matching accuracy. Since hedge fund activism saw its main surge from the year 2000 onwards (Zenner et al., 2015), it is reasonable to focus on this time frame to make sound inferences about the underlying principal-principal conflict between family owners and hedge funds. The citation-weighted patent metric was constructed as follows,

$$\Theta_{f,t}^{cw} = \sum_{j \epsilon P_{f,t}} \left(1 + \frac{C_j}{\overline{C}_j}\right) \div B_{ft} \tag{1}$$

where $P_{f,t}$ is the set of patents issued to firm f in year t, C_j denotes the number of forward citations that patent j received, and $\overline{C}_j$ the average number of forward citations received by patents granted in the same year as patent j. B_{ft} denotes the book assets of firm f in year t (cf., Kogan et al., 2017). Since firm size is said to have a significant positive impact on the number of filed patents, the metric is scaled by the book value of assets to avoid that variations in firm size lead to a bias in our proxy.

2.3.2 Independent Variable and Moderator

Family Firm. To date, there is no consensus on the operational criteria used to identify family firms (Gomez-Mejia et al., 2011). Most scholars agree, however, that the family should be the dominant coalition within the firm, with an active voice in determining the firm's vision (Chua et al., 1999), for example, by holding board positions to exercise their influence (Bammens et al., 2011). In line with the core motive of this study to investigate the effect of active ownership positions, we follow the recent work by Gomez-Mejia and colleagues (2014, 2019) and adopt the family firm categorization by Governance Metrics International (GMI), which includes the Corporate Library. GMI defines a family-controlled firm as "a company where family ties, most often going back a generation or two to the founder, *play a key role in both ownership and board membership*. Family members may not have full control of the shareholder vote (greater than 50%), but will generally hold *at least 20%*"[17] (cf. Gomez-Mejia et al., 2014, 2019).

Whereas measures based on a family's ownership ratio may carry a certain advantage in gauging voting power, they do not account for the direct control family members have via board positions. GMI's definition, in contrast, precludes passive family ownership which caters to our focus on active ownership. Moreover, in recent years, there has been an increasing effort to distinguish founder firms from true family firms, which involve family members from later generations (Le Breton-Miller, et al., 2011). The literature suggests that family and founder firms differ in their strategic objectives due to divergent socioemotional preferences and agency issues affecting firm-level corporate innovation (Block, 2013; Miller et al., 2013; Kotlar et al., 2018). As a result, founder firms are not part of our family firm measure[18]. Our family firm dummy equals 1 if a firm is identified as a family firm in more than 75% of its observations.[19]

Hedge Fund Activism. Most prior studies exploited 13D filings to identify activism events. The 1934 Security Exchange Act requires investors holding more than 5% beneficial ownership in any given public firm with the intent to influence corporate control to disclose their identity and the intention behind the investment. To date, the majority of hedge fund research in the U.S. makes use of these 13D filing dates to identify the start of an activism event (Brav et al., 2008, 2018; Clifford, 2008; Klein & Zur, 2009; Boyson & Mooradian, 2011). However, this identification method has shortcomings since the majority of activism tools utilized by hedge funds do not require a 5% ownership. For a hedge fund, it is neither necessary nor desirable to accumulate a 5% ownership stake to exercise activism as this constitutes a major investment of capital and time. Rather, prior research reveals that informal activism is a cost- and time-effective alternative that precedes formal activism, which is only pursued if informal activism attempts fail (Bauer et al., 2015). Informal activism takes place behind closed doors by directly engaging in communication with the management and/or board or by exerting pressure through critical public letters or public media campaigns. Should these informal activism attempts fail, hedge funds may acquire additional shares to have all formal activism tools at their disposal (e.g., initiate a proxy fight to replace management and board members).

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[18] In the reported analyses, founder firms are part of the base category (i.e., nonfamily firms). Additional analyses reveal that, when we separate founder firms from other nonfamily firms, the effect of the founder firm dummy is nonsignificant and does not alter the hypothesized effects. Results are available upon request.

[19] This 75% threshold is used to prevent that small fluctuations around the shareholder vote threshold of 20% would lead to misidentifications of family firms as non-family firms in a given year; it also accounts for potential misidentifications by GMI Ratings in the years 2004 and 2005, for which we noticed an unusually high number of changes in family firm status based on the GMI indicator, that we could not confirm based on a manual check of the 14A filings retrieved from the Securities and Exchange Commission EDGAR database. For the years 2006-2009, the GMI-based family firm indicator again appeared much more stable.

Following this logic, the classical identification method (via 13D filings) fails to accurately capture the beginning of activism, leading to temporal deferrals in the data which distort panel data estimates. To address these identification issues, we build on the proposition that cost-efficient informal activism generally precedes formal activism events (cf. Becht et al., 2009; Bauer et al., 2015). This approach is also in line with the study of McCahery et al. (2016) and with the findings of Becht et al., (2009) in their study on private activists, demonstrating that the majority of activism is informal in nature. Hence, it is reasonable to assume that hedge funds that frequently engaged in formal activism in their recent past (13D filings) also frequently engage in informal activism. Therefore, we classify a firm as a target if a hedge fund holds a position of any given size and has engaged in significant formal activism in the past year. Toward this end, we investigated activists listed in the *SharkWatch50* hedge fund database, which covers the 50 most active hedge funds. To account for the increased pressure on management in the focal firm by multiple activists, we calculate the number of hedge funds that have simultaneously invested in a given firm. This identification procedure resulted in the identification of 1525 hedge fund activism (HFA) events between the years 2002 to 2009.

Control Variables. Research and development (R&D) expenses are associated with increased innovation output, and hence should be controlled for (Block et al., 2013). Prior work also indicates that innovation output is dependent on the life-cycle stage of the firm (Craig & Moores, 2006) and on their size due to the availability of resources (Baysinger & Hoskisson, 1989; Chen & Hsu, 2009). We measure age by years since establishment (Lee & O'Neill, 2003) and size by sales (Chen & Hsu, 2009). Due to the skewness of R&D expenses, firm age, and firm sales, we used log-transformations for these variables (David et al., 2008). Moreover, the variables R&D expenses and sales have been winsorized at the 1% level to prevent significant outliers from driving our model estimates. In line with SEC rules, Compustat data does not include very small R&D amounts that are not material to a firm's decision-making. Because of that, about 30 percent of the R&D expenses on Compustat are missing. Since they are not missing at random, omitting these observations would introduce a bias. Hence, we follow previous studies and imputed a zero for firms with negligibly low R&D expenses (cf. Coles et al., 2006; Chang & Dasgupta, 2009; Gomez-Mejia et al., 2014).[20] We also control for other factors such as performance and liquidity, which have been identified by prior literature to

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[20] The inclusion of a dummy for firms with missing R&D expenses had very limited effects on the estimated results, and a robustness test where R&D spending is not winsorized is reported in Table 5.

impact corporate innovation. Firm performance controls for the influence of the firm's performance on innovation-related strategic choices (Chaney & Devinney, 1992; Barker & Mueller, 2002). We proxy for this with two different measures: Tobin's Q represents a forward-looking performance measure (Anderson & Reeb, 2003) and return on assets (ROA) measures prior firm performance (Barker & Mueller, 2002). The current ratio is a commonly used proxy for the liquidity of a company, which allows firms to readily seize new strategic innovation opportunities (Baysinger & Hoskisson, 1989). Lastly, we account for inter-industry differences and yearly effects by including dummies for two-digit SIC codes and for years. This is necessary since patenting strategies and activities vary not only across industries but also across years due to macro-economic developments (e.g., financial crisis).

2.3.3 Data Analysis

To test our hypotheses, we exploit both time-series and cross-sectional information contained in our panel dataset by estimating a random-effects model (Greene, 2012). Whereas a fixed-effects model assumes that individual effects are time-invariant variables possibly correlated with other independent and control variables, the underlying assumption of a random-effects model is that individual effects are part of the error term structure and are independently drawn from a normal distribution. Our choice for a random-effects model is also driven by the need to estimate the effect of our time-invariant family firm variable, which is at the heart of our theoretical argumentation. Hence, we adopted a random-effects model to test how family firm status affects innovation output, and how the presence of activist hedge funds moderates this relationship. The random-effects estimations are based on the following models:

$$CWP_{i,t} = \alpha_0 + \beta_1 FF_i + \beta_2 HFA_{i,t-4} + \gamma' Controls_{i,t-4} + \delta' Year_t + \theta' Industry_i + v_i + \varepsilon_{i,t} \qquad (2)$$

$$CWP_{i,t} = \alpha_0 + \beta_1 FF_i + \beta_2 HFA_{i,t-4} + \beta_3 HFA_{i,t-4} \times FF_i + \gamma' Controls_{i,t-4} + \delta' Year_t + \theta' Industry_i + v_i + \varepsilon_{i,t} \quad (3)$$

where $CWP_{i,t}$ represents the citation-weighted patents for firm i in year t calculated based on formula (1). The Variable FF, which is time-invariant, stands for the family firm status of firm

i. The variable *HFA* indicates the level of hedge fund activism in firm *i* lagged by t-4 periods.[21] For ease of notation *Controls* summarizes the control variables for firm *i* lagged by t-4 periods. Finally, *Year$_t$* and *Industry$_i$* summarize the dummies for the respective year and two-digit SIC code. The usual composite error term, $v_i + \varepsilon_{i,t}$, is added.

After testing for both serial correlation and heteroscedasticity with the Breusch-Godfrey test and the Breusch-Pagan test, we estimated our model with a robust covariance matrix. Variance inflation factors (VIF) are low for all variables, with 3.7 being the highest value. This is well below the proposed threshold of 10, and hence multicollinearity should not be an issue (Kutner et al., 2005).

2.4 RESULTS

Table 2.1 presents the means, standard deviations, and correlations of the variables used in our model. Bold formatting indicates significance at the 5% level. Citation-weighted patents have been calculated according to formula (1). The hedge fund activism variable is a discrete variable measuring the number of highly active hedge funds in a given period. The family firm dummy equals one if a firm was identified as a family firm in at least 75% of its observations and zero otherwise. The variable R&D represents the log-transformed R&D expenditure. Age represents the number of years a firm is in existence, which was also log-transformed. The size was

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[21] In our analysis, we opt for a time lag of four periods to account for the time difference between hedge fund investment and the grant of a patent. First, we account for the time between the initial hedge fund investment and the exertion of influence over strategic choices. This can range from a few months in the case of informal activism to more than one year in the case of formal activism since shareholders are only eligible to submit a formal proposal if they hold their stake for at least one calendar year (Loss & Seligman, 2004; Bauer et al., 2015). Next, a time lag of a few months likely occurs between the first exertion of influence and subsequent R&D activity in the target firm. Regarding the development of patentable technology, it was found that "the total lag associated with the innovation process varied between 1.17 and 2.62 years" (Goel, 1999). Thereafter, the legal patent application has to be crafted and submitted, which may take one to two months. Finally, the mean lag between a patent application at the USPTO and its grant is 28 months (Popp et al., 2004, p.15). It is important to note that this figure is skewed with a median grant lag of 23 months. Taken together, we propose a minimum lag of four years for this study. To assess the robustness of our results, we also estimate the model with a lag of five years, which yields similar results for our hypothesized effects (Table 4).

measured by the log-transformed and mean-centered firm sales. The two performance measures Tobin's Q and return on assets were not transformed, and neither was the current ratio.

TABLE 2.1 Means, Standard Deviations, and Pearson Correlation Matrix

		Mean	STD	A	B	C	D	E	F	G	H
Citation-weighted patents	A	1.538	2.064								
Hedge fund activism$_{t-4}$	B	0.111	0.354	− 0.089							
Family firm	C	0.103	0.303	− 0.162	− 0.004						
R&D$_{t-4}$	D	3.419	2.189	0.775	− 0.103	− 0.098					
Age	E	3.501	0.946	0.108	− 0.093	0.131	0.134				
Size$_{t-4}$	F	0.000	0.185	− 0.004	0.030	0.000	0.043	0.006			
Tobin's Q$_{t-4}$	G	3.807	0.342	− 0.275	− 0.058	0.006	− 0.42	− 0.165	− 0.082		
Current ratio$_{t-4}$	H	1.156	0.145	− 0.019	− 0.012	− 0.004	− 0.151	− 0.185	− 0.045	0.561	
Return on assets$_{t-4}$	I	39.624	107.707	0.302	− 0.043	− 0.037	0.364	0.132	0.098	− 0.435	− 0.175

Table 2.2 contains the empirical results of our random-effects estimation in two model specifications. Model 1 includes all controls as well as the variables hedge fund activism and family firm status. In line with Hypothesis 1 we find that family firm status has a strong negative and significant effect (coefficient = -0.530; p = 0.003) on citation-weighted patents. We also find that hedge fund activism has a positive and significant effect (coefficient = 0.079; p<0.001) on innovation output after four years. This positive effect on innovation may appear surprising at first glance given the short-term oriented nature of hedge funds. Yet, given the high market visibility of patents and the suggested positive effect of hedge funds on innovation outputs proclaimed by previous scholars (cf. Wang & Zhao, 2015; Brav et al, 2018), our data supports the notion of achieved innovation efficiency gains. This is in line with previous empirical findings demonstrating a positive effect of hedge fund activism on innovation output proxied by patent quantity and quality (He et al., 2014; Wang & Zhao, 2015; Brav et al., 2018).

Model 2 includes the interaction term FF x HFA in addition to the variables mentioned above for Model 1. In support of Hypothesis 2, we find a strong negative and significant interaction effect (coefficient = -0.116; p = 0.003) four periods post hedge fund intervention. As illustrated in Figure 1, while hedge funds have a positive effect on the innovation output in nonfamily firms, their effort to increase innovation does not materialize among family-influenced firms. This finding suggests the presence of additional principal-principal costs post intervention.[22] Both models (Model 1 and Model 2) were also estimated with standard errors

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[22] We also assessed the combined effect of HFA and HFA x FF by using a linear restricted model where $\beta_2 HFA_{i,t-4} + \beta_3 HFA_{i,t-4} \times FF_i = 0$. The estimate was insignificant (p=0.52), hence we fail to reject the null hypothesis that the effect of hedge fund activism in family firms does not differ from zero.

clustered over years and industries. The unreported results are very similar to the reported results and do not qualitatively affect any conclusion.

TABLE 2.2 Panel Data Random Effects Estimates

	Model 1				Model 2			
	Estimate	Std. Error	t-Statistic	p-Value	Estimate	Std. Error	t-Statistic	p-Value
Citation Weighted Patents								
Intercept	0.818	0.499	1.641	0.101	0.820	0.503	1.630	0.103
Family Firm	-0.530	0.176	-3.009	0.003 **	-0.518	0.181	-2.867	0.004 **
Hedge Fund Activism$_{t-4}$	0.079	0.014	5.557	< 0.001 ***	0.086	0.013	6.883	< 0.001 ***
Hedge Fund Activism$_{t-4}$ × Family Firm					-0.116	0.039	-2.987	0.003 **
R&D$_{t-4}$	0.438	0.024	18.116	< 0.001 ***	0.438	0.024	18.077	< 0.001 ***
Age$_{t-4}$	0.077	0.015	5.266	< 0.001 ***	0.077	0.015	5.304	< 0.001 ***
Sales$_{t-4}$	0.283	0.030	9.332	< 0.001 ***	0.283	0.031	9.279	< 0.001 ***
Tobin's Q$_{t-4}$	-0.028	0.040	-0.692	0.489	-0.028	0.039	-0.705	0.481
Return on assets$_{t-4}$	0.000	0.000	0.654	0.513	0.000	0.000	0.658	0.511
Current ratio$_{t-4}$	0.411	0.117	3.512	< 0.001 ***	0.410	0.118	3.484	< 0.001 ***
Year Dummies			Yes				Yes	
Industry Dummies (SIC Code)			Yes				Yes	
Observations			N=2601				N=2601	
Adjusted R^2			0.35				0.35	
† p < 0.10; * p< 0.05; ** p< 0.01; *** p< 0.001								

Figure 2. Interaction of Family Blockholders and Hedge Fund Activism on Innovation Output

2.4.1 Adjusting for Possible Reversed Causality

Whereas Model 1 and Model 2 reveal that family firm status and hedge fund activism have a significant impact on innovation output, the estimates might suffer from endogeneity due to reverse causality. This is especially true for the variable hedge fund activism since their target choice may depend on our patent-related proxy. In case our dependent variable shows persistency, this form of reverse causality will lead to an asymptotic bias of our estimates. To account for this possibility of reverse causality, we estimated Model 3 and Model 4, including the lagged dependent variable (t-4) in addition to the variables contained in Model 1 and Model 2. The inclusion of previous values of the dependent variable is characteristic of a Granger causality procedure. A mathematical demonstration of how the inclusion of a lagged dependent variable functions as a first-order correction to potential reversed causality can be found in Carree et al. (2019). As can be seen in *Table 2.3*, the lagged dependent variable has a substantial impact and is highly significant (coefficient = 0.514; p<0.001). When accounting for reverse causality, the coefficients presented in support of Hypothesis 1 remain similar in Model 3 (coefficient = -0.259; p = 0.090). Moreover, the interaction term between family firm status and hedge fund activism remains significantly negative (coefficient -0.117; p = 0.024), providing additional support for Hypothesis 2.

2.4.2 Additional Robustness Checks

First, in our main analyses we relied on the binary GMI indicator for family firm status (cf., Gomez-Mejia et al., 2014, 2019). As a robustness check, we manually collected data on the voting power (as a percentage) of the owning family for each of these family firms and respective firm-year observation. This data is based on the SEC proxy statements and complementary online sources when needed[23]. Using these family voting percentages as a continuous measure, we reran our random-effects model, which gave very similar results to those of our main analyses (see *Table A1* panel a in Appendix A)[24]. Next, recent research based on investors' reactions to traded stocks in France proposes that threshold effects of family

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[23] To uncover the family name (of family blockholders) we used the company home page, press reports, and/or analyst reports.

[24] There is very little variation in family voting percentages over time such that running a fixed-effects model is sensitive to outliers (the mean voting share variation of the family firms in our sample is 2.16% from one year to the next and the median only 1.51%). Considering this caveat, in unreported results (available upon request), we find that the effect of the family voting share (hyp. 1) is negative but fails to reach significance and that the interaction term (hyp. 2) is negative and significant when using a fixed-effects model.

TABLE 2.3 Robustness Test: Panel Data Random Effects Estimates (Lagged DV)

	Model 3				Model 4			
	Estimate	Std. Error	t-Statistic	p-Value	Estimate	Std. Error	t-Statistic	p-Value
Citation Weighted Patents								
Intercept	0.518	0.263	1.970	0.049 *	0.519	0.262	1.979	0.048 *
Citation Weighted Patents$_{t-4}$	0.514	0.043	12.094	<0.001 ***	0.514	0.043	12.070	<0.001 ***
Family Firm	-0.259	0.153	-1.697	0.090 †	-0.246	0.160	-1.536	0.125
Hedge Fund Activism$_{t-4}$	0.044	0.025	1.739	0.082 †	0.052	0.027	1.892	0.059 †
Hedge Fund Activism$_{t-4}$ × Family Firm					-0.117	0.052	-2.265	0.024 *
R&D$_{t-4}$	0.276	0.039	7.038	<0.001 ***	0.276	0.039	7.040	<0.001 ***
Age$_{t-4}$	-0.002	0.018	-0.140	0.889	-0.002	0.017	-0.118	0.906
Sales$_{t-4}$	0.143	0.022	6.569	<0.001 ***	0.143	0.022	6.518	<0.001 ***
Tobin's Q$_{t-4}$	-0.079	0.022	-3.598	<0.001 ***	-0.080	0.022	-3.581	<0.001 ***
Return on assets$_{t-4}$	0.000	0.000	1.337	0.181	0.000	0.000	1.340	0.180
Current ratio$_{t-4}$	0.539	0.065	8.287	<0.001 ***	0.539	0.064	8.424	<0.001 ***
Year Dummies		Yes				Yes		
Industry Dummies (SIC Code)		Yes				Yes		
Observations		N=2601				N=2601		
Adjusted R^2		0.69				0.69		

† p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001

ownership exist (Sekerci et al., 2022). As a result, we also created new family voting share dummies where, instead of the 20% threshold used in the GMI indicator, we worked with a 30%, 40%, and 50% threshold. When working with the 40% and 50% threshold, the number of family firms became too small to run reliable analyses (only 34 and 19 family firms, resp.)[25]; when working with the 30% threshold (48 family firms), results were again similar to those reported earlier using the GMI indicator (see *Table A1* panel b in Appendix A).

Second, many of the firm-year combinations had no patenting activity. About half of the observations are left-censored at zero. Therefore, it could be argued that an estimation technique that takes this into account could improve upon the linear panel regression results. Using the *censReg* package in R we have estimated a Tobit random effects panel data model. The Tobit model can deal with (left-)censoring and results are presented in *Table A2* in Appendix A, panel a for the family firm dummy and panel b for the family ownership percentage. The presented results for both effects, direct and interaction, are in line with the previously reported estimates using linear panel regression techniques.

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[25] In unreported results (available upon request), we find that the effect of the family firm dummy (hyp. 1) remains negative but fails to reach significance (p-values are 0.1 and 0.09 for the 40% and 50% threshold levels respectively) and that the interaction term (hyp. 2) is negative and significant when using the 40% and 50% thresholds with few remaining family firms in the sample.

Last, we reran our analyses on a subsample of firms considering the sector's R&D intensity. Radical innovation may be less of a strategic issue in very traditional low-tech sectors, such that principal-principal conflicts in relation to radical innovation choices may be less relevant. Toward this end, we adopted the industry-based R&D ranking proposed by the OECD (2015). This classification is representative of Western economies and the sample is largely based on US and EU data. We introduced five dummy variables: high R&D intensive sectors, medium-high R&D intensive sectors, medium R&D intensive sectors, medium-low R&D intensive sectors, and low R&D intensive sectors. We then created a subsample containing only high R&D-intensive sectors; this sample contained no family firms. Subsequentially, we added medium-high, medium, and medium-low R&D-intensive sectors in consecutive steps to see how many family firms are present in each subsample. The respective sample sizes were as follows: 16, 23, and 66. Accordingly, we assessed that reliable estimates are only viable if low R&D-intensive sectors are excluded, and the other sectors are retained. When using this subsample of high to medium-low R&D intensive sectors, results are again very similar to those obtained previously (see *Table A3* panel a using the GMI family firm dummy, and *Table A3* panel b using the family's voting percentage in Appendix A).

2.5 DISCUSSION

Building on multiple agency theory and the prospect theoretic myopic loss aversion model (Benartzi & Thaler, 1995; Hoskisson et al., 2013), our study advances knowledge on the interrelationship between ownership heterogeneity and radical innovation output choices. Our empirical findings reveal that publicly traded firms with active family ownership, on average, put significantly less strategic emphasis on radical high-risk, high-mean innovation outcomes, which tend to be of greater technological and economic importance for society (cf. Block et al., 2013). Importantly, our findings highlight the value of considering ownership heterogeneity in this setting by demonstrating that hedge fund activism aggravates the negative effect of family ownership. Hence, our study reveals that it is not sufficient to model strategy-related outcomes based on the analysis of a single (dominant) ownership group but that the broader ownership configuration should be considered in strategic and innovation management research.

Family-influenced firms demonstrate lower radical innovation output levels as reflected in citation-weighted patents; yet, among publicly traded corporations, firms pursuing high-risk, high-mean innovation strategies would offer their investors greater potential for maximizing

shareholder value since unsystematic risk can be eliminated through diversification according to modern portfolio theory (Markowitz, 1952). From this perspective, family firms' strategic innovation behavior and resulting below-average radical innovation output levels represent a form of wealth expropriation from diversified investors. Ownership structures of most publicly traded firms are dominated by influential institutional investors, who may increase monitoring and reduce private wealth expropriation (Maury & Pajuste, 2005) – and this role has also been ascribed to activist hedge funds (Brav, 2009; Brav et al., 2018). It appears, however, that more effective tools are necessary to alleviate the problems associated with family blockholders. We therefore provide nuance to the idea of institutional shareholder activism – in particular hedge fund activism – as a panacea for corporate governance problems (Briggs, 2007; Brav et al., 2008). Indeed, our study reveals that the presumptive positive effect of hedge fund activism on innovation outcomes does not materialize among family-influenced firms.

2.5.1 Academic Implications

Our study contributes to the literature on the effect of family ownership on corporate innovation output (e.g., Chrisman et al., 2015; Duran et al., 2016; Calabro et al., 2019). We explained how the family-based socioemotional considerations of family control and family dynasty can be tied to cross-sectional and temporal aggregation, respectively, in decision-makers' mental accounting of radical innovation gambles. We clarified how, particularly in the setting of publicly listed corporations facing short-term market pressures, family-based disadvantages in cross-sectional aggregation likely outweigh any potential temporal aggregation benefit. As such, ours is a contextualized approach which aligns with calls made by scholars like De Massis et al. (2013) who pointed out that "potential differences between small and private versus large and public family firms may provide major challenges to our ability to generate cumulative knowledge in this area" (p. 21). We also modelled hedge fund activism as a moderator in the relation between family ownership and radical innovation, which advances prior work on the heterogeneity of family firm innovation behavior (e.g., Patel & Chrisman, 2014; Memili et al., 2015; Decker & Günther, 2017). In short, by detailing aggregation decision mechanisms and considering the institutional context as well as the hitherto overlooked contingency of hedge fund activism, we advance understanding of family firms' innovation output behavior.

Our study also contributes to the research stream on ownership heterogeneity in family-influenced firms (e.g., Sacristan-Navarro et al., 2011; Fernando et al., 2014; Cirillo et al., 2019). To date, most family business studies examined the effect of family ownership in isolation, and

those few studies that considered the role of other influential shareholders mainly found a positive moderation effect (e.g., Gomez-Mejia et al. 2014 and Cirillo et al. 2019 who looked at R&D intensity). Our study highlights the importance of differentiating between investor types and points to the possibility of negative interaction effects. To the best of our knowledge, we are the first to analyze the interplay between family blockholders and hedge funds in relation to firm-level innovation output. To advance our understanding of this topic, we complemented the myopic loss aversion model with insights from multiple agency theory on principal-principal conflicts (Arthurs et al., 2008; Hoskisson et al., 2013). By investigating family blockholders and hedge funds, which represent "perfect anti-poles", we were able to show that hedge fund activism is not universally positive in its effect and may aggravate the innovation weaknesses associated with family blockholders. As such, our study answers to calls for more research on strategic decision-making and innovation processes in today's changed ownership landscape (Connelly et al., 2010a; Wright, 2017).

Lastly, we enrich the behavioral agency lens on family firm decision-making, and in particular the mixed gamble approach which recently gained in popularity (e.g., Gomez-Mejia et al., 2018, 2019; Kotlar et al., 2018). Specifically, in this study we connect insights on mixed gamble aggregation rules from the prospect theoretic myopic loss aversion model (Benartzi & Thaler, 1995, 1999; Thaler et al., 1997) to ideas on principal-principal agency problems from the multiple agency model (Arthurs et al., 2008; Hoskisson et al., 2013). Thus far, mental accounting aggregation rules received little attention among family business scholars (for exceptions, see Chrisman & Patel, 2012; Bammens et al., 2022), and principal-principal problems among influential shareholders remained largely overlooked in behavioral agency studies on family firms. We clarified how family-based socioemotional considerations affect the temporal and cross-sectional aggregation of prospective innovation gamble returns in divergent ways, and how the involvement of hedge funds undercuts the aggregation rules adopted by family blockholders. By integrating myopic loss aversion and multiple agency concepts, we were able to develop a deeper understanding of innovation output choices and, in doing so, enriched the behavioral agency lens on family firm decision-making.

2.5.2 Practical Implications

Our results provide valuable insights for practice. We investigated ownership-induced variance in innovation output in the form of citation-weighted patents. From a societal perspective, as well as for most (diversified) investors, the pursuit of radical innovation outcomes is generally

desirable given their technological and economic impact (Block et al., 2013). In view of our finding on the negative effect of family ownership on this innovation output measure, policy-makers concerned with spurring radical innovation in the business sector may consider putting limits on the power and influence of family blockholders in listed firms; for instance, the use of dual class shares by family blockholders, which is quite common, may be restricted or made contingent on innovation-relevant provisions.

Furthermore, prior work highlights that external governance in the form of hedge fund activism sanctions corporate misbehavior and renders companies more efficient and shareholder-value minded (Brav et al., 2008; Gilson & Gordon, 2013). Interestingly, our study reveals that – in the setting of corporations with active family ownership – such hedge fund activism is largely ineffective in boosting radical innovation due to the offsetting principal-principal conflicts it engenders. This implies that family firm stakeholders interested in raising innovation performance cannot rely on this external governance vehicle, and need to resort to other governance tools such as, for example, appointing influential external board members affiliated with leading innovative firms (Bammens et al., 2011; Cannella et al., 2015).

2.5.3 Limitations and Future Research

Our model employs several behavioral concepts and mechanisms without measuring these. These refer to family-based socioemotional considerations (family control and family dynasty) and the associated aggregation rules applied in mental accounting (cross-sectional and temporal aggregation). While family influence is commonly used as a proxy for socioemotional decision considerations when analyzing panel data on publicly traded firms (e.g., Gomez-Mejia et al., 2014, 2018; Kotlar et al., 2018), we encourage future work to include direct measures of these explanatory behavioral constructs. One promising route for these types of firms would be to perform a text analysis on documents that are disclosed across time, such as annual reports with CEO letters, to verify the relative frequency of words that correspond with particular socioemotional and aggregation mechanisms or to use more sophisticated machine learning techniques for such text analysis.

The inferences drawn from our study are based on a sample of U.S. publicly traded firms, which has an impact on the generalizability of our findings since the regulatory standards in the U.S. are favorable for hedge fund activists (Clifford, 2008). Although this was desirable to analyze the impact of ownership heterogeneity in our study, future research would benefit from studying the impact of ownership heterogeneity in other institutional contexts. A

comparative study between the U.S. and the European Union, for example, would inform the debate regarding the impact of legislation. Moreover, the short-term market pressures that are so characteristic for U.S. listed firms may influence our empirical findings; indeed, firms listed on a stock exchange in another institutional setting may be less subject to short-term pressures.

In addition, our study focused on activism exercised by hedge funds, with strategic objectives and incentive structures that are quite different from those of other (institutional) investors. We provide evidence that the impact of ownership cannot be adequately modeled in isolation, and more work is needed to develop a holistic framework capable of accounting for the complex distribution of power among multiple influential shareholder types (e.g., pension funds, mutual funds, corporate investors, state ownership), which characterizes the ownership landscape in many economies. Especially for studying the impact of family ownership on radical innovation choices, it is important to have a clearer understanding of how behavioral decision mechanisms are affected by the broader ownership configuration beyond hedge funds. This promises to be a fruitful avenue for future research.

We employed a binary indicator of active family ownership and did not assess the family's involvement in the management team. The adopted operational GMI definition of family firms (which also covers board membership of family owners; cf. supra) aligns well with our prime interest in analyzing how the presence of large and active family blockholders, in combination with other active investors, shapes the innovation output choice, and various prior family business studies have used a similar binary approach (e.g., Gomez-Mejia et al., 2003, 2014, 2019; Cannella et al., 2015; Keasey et al., 2015; Kotlar et al., 2018). Our reported robustness test using family voting percentages were reassuring, but we did not measure family vote shares for those firms that were identified as non-family firms by GMI (zero values were imputed for those firms), resulting in measurement error. It would also be interesting to be able to differentiate between the role of family ownership (our main interest) and that of family management. We therefore encourage future work, with more sophisticated measures of family ownership and management, to perform such robustness and follow-up tests.

Similarly, it would be interesting to account for the business family's investment portfolio beyond the focal firm. In this piece, we argued that families typically have disadvantages in cross-sectional aggregation due to their concentrated ownership position, but potential benefits in temporal aggregation due to their long holding period and dynastic ambitions. This suggests that, in relation to radical innovation outputs, there may be an optimal balance – one in which the family can aggregate innovation gambles across a sufficiently large

number of firms while maintaining adequate control and involvement in these firms to be able to pursue a meaningful dynastic agenda (i.e., without becoming a transient retail investor). This requires future research to look beyond the level of a single firm and instead to analyze the broader investment portfolio of business families.

Citation-weighted patents have become a best practice measure among scholars studying innovation output (Acharya & Subramanian, 2009; Aghion et al., 2013), yet the measure comes with limitations. Although this measure addresses many of the shortcomings of mere patent counts as a proxy for economically and technologically important innovation output, it fails to cover radical innovations that are protected by other means than patenting such as secrecy or first-mover advantage. For family firms, socioemotional considerations may affect the use of intellectual property as a protection mechanism (Chirico et al., 2020). If family firms are more inclined to protect their innovations by means of secrecy, for example, we likely underestimate their impact on radical innovation output. Thus, we believe that future research would benefit from the use of complementary measures of radical innovation output.

Lastly, we aimed to investigate variance in firm-level strategic choices (*intentions*) to pursue radical high-risk, high-mean innovations while accounting for R&D budgets; i.e., the extent to which R&D investments are targeted at radical innovation outputs with greater economic and technological importance (Block et al., 2013). This strategic choice perspective is anchored in our BAM theoretic lens, combining insights from prospect theory and multiple agency theory. However, we cannot rule out that our results partly capture differences in firms' *abilities* to attain radical innovation outputs. When controlling for R&D spending, realized radical innovation outcomes (or lack thereof) can reflect both a firm's strategic choice to pursue high-risk, high-return projects and its in-house capabilities to achieve those outcomes with the allocated budget. Past choices (e.g., on hiring particular R&D profiles) also shape current capabilities. We call for future research, for example using a resource-based or dynamic capabilities lens (Barney, 1991; Teece, 2014), to extend our study by untangling these choice versus capability processes.

3 FAMILY FIRMS AND OPEN INNOVATION: THE MODERATING EFFECT OF GENERATIONAL STAGE AND TOP MANAGEMENT TEAM

Abstract: This study examines the relationship between family firms and their likelihood to engage in open innovation partnerships. In addition, the influence of a firm's generational stage, family members' top management team involvement, and their contingency on the respective partner type are investigated. The empirical analysis is based on a sample of private German family firms and generally confirms the suggested hypotheses based on socioemotional wealth theory. The results suggest a lower likelihood of family firms to engage in an open innovation partnership and a positive moderation in the presence of non-family top managers. Moreover, the findings illustrate how the influence of generational stage and family involvement in top management is significantly affected by four partner types— customer, supplier, competitor, and research institute.

3.1 INTRODUCTION

Due to the importance of innovation for economic growth and prosperity, scholars are increasingly interested in the effect family firms have on innovation management (De Massis, Frattini, & Lichtenthaler, 2013; Block et al., 2013; Duran et al., 2016). Innovation strategies have been suggested to move toward more openness during the innovation process rather than relying on internal resources exclusively (Laursen & Salter, 2006; Van de Vrande et al., 2009; Spithoven, Vanhaverbeke, & Roijakkers, 2013; Brunswicker & Vanhaverbeke, 2015). Open innovation (OI) represents a fast way to access external resources and refers to "the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively" (Chesbrough, Vanhaverbeke, & West 2006, p.1). Scholars in the domain of OI have identified that both the external sourcing of knowledge (Chesbrough et al., 2006) and a firm's absorptive capacity (Cohen & Levinthal, 1990; Dahlander & Gann, 2010) are critical to the success of a firm's OI endeavors. A substantial number of studies found that family characteristics negatively affect the internal resources allocated toward innovation efforts (i.e., R&D investment) as a result of a family firms' control loss aversion and risk aversion (Chen & Hsu, 2009; Chrisman & Patel, 2012; Czarnitzki & Kraft, 2009; Munari, Oriani, & Sobrero, 2010; Kotlar et al., 2013). Hence, the innovation trend toward more external sourcing may be of particular importance to family firms, and scholars have called for more research on how family firms' idiosyncrasies affect their behavior with regard to OI collaborations (Kellermanns & Hoy, 2016). As OI collaborations could be an effective means to overcoming the innovation input gap associated with family firms, this topic warrants further investigation (Hitt et al., 2000; Zahra, Hayton, & Salvato, 2004; Chrisman et al., 2015). Despite the predominance of family firms as an ownership group and the resulting economic relevance of their innovation efforts, research on OI in family firms is still in its infancy (Feranita, Kotlar, & De Massis, 2017). In their recent literature review, Feranita and colleagues (2017) demonstrate that one stream of prior literature is concerned with the antecedents of family firms to form collaborations. Most of these studies found that family firms demonstrate a lower willingness to engage in OI than non-family firms (Pittino & Visintin, 2011; Nieto, Santamaria, & Fernandez, 2015). Building on the socioemotional wealth framework (Gomez-Mejia et al., 2007), it is argued that this unwillingness is mainly driven by two family idiosyncrasies: control loss aversion and risk aversion. The associated preservation of socioemotional wealth (SEW) has been demonstrated

to often dominate financially beneficial considerations in family firm decision-making (cf., Gomez-Mejia et al., 2007). Similarly, scholars suggest that SEW preferences render family firms less willing to engage in OI than non-family firms (Cassia, De Massis, & Pizzurno, 2012; Classen, Van Gils, Bammens, & Carree, 2012; Alberti et al., 2014). Classen et al. (2012) found that family firms exhibit a smaller search breadth[26] than their non-family firm counterparts. In a similar vein, Nieto and colleagues (2015, p.382) found that family firms "are less inclined to turn to external sources of innovation." According to Classen et al. (2012), the lower willingness to engage in OI partnerships is mitigated by the presence of external top managers. Another stream of literature focused primarily on the ability of a family firm to form collaborations. In this context, prior work postulates that a family firm's network ties may be superior to that of non-family firms and that a firm's absorptive capacity plays a dominant role in facilitating OI collaborations (Casprini et al., 2017). Family firms are postulated to have an inferior absorptive capacity restricting their ability to engage in OI collaborations, and an external CEO and external top managers can help mitigate this limitation by enhancing cognitive diversity (Classen et al., 2012; Yeoh, 2014).

Despite recent advancements in the domain, our current knowledge of OI among family firms remains scarce and fragmented (De Massis et al., 2012; Lazzarotti & Pellegrini, 2015; Kellermanns & Hoy, 2016; Lambrechts et al., 2017; Feranita et al., 2017). Whereas one stream of prior studies has provided important insights into the effect of family firm status on their willingness to engage in OI, another stream has focused on the ability of family firms to do so. As De Massis, Kotlar, Chua, and Chrisman (2014) point out, willingness and ability both represent necessary conditions but are individually insufficient to draw theoretical inferences about strategic action. Consequently, the theoretical consideration of both conditions can help to improve our understanding of the relationship between family firms and their strategic decision to engage in OI partnerships. In the context of OI, more research is also needed to improve our understanding of factors related to family firm heterogeneity. Finally, previous studies have mainly focused on internal factors of heterogeneity potentially affecting a family firm's willingness or ability to engage in OI, and potential boundary conditions have been largely neglected in the debate.

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[26] Search breadth is defined as the number of different external collaborators a firm engages with simultaneously.

Embedded in the socioemotional wealth theory (Gomez-Mejia et al., 2007) and the ability-willingness framework (De Massis et al., 2014), this study strives to provide a theoretical rationale explaining why family firm characteristics affect their probability to engage with an OI partner (i.e., customer, supplier, competitor, or research institute) and why the generation in control and a firm's top management team (TMT) composition may moderate a family firm's willingness and ability to collaborate. Building on De Massis and colleagues' (2014) definition of ability, we define ability "as the discretion of the family to direct, allocate, add to, or dispose of a firm's resources" (p.346) in addition to being equipped with the resources or capabilities required to pursue a particular objective. Furthermore, our post-hoc analysis demonstrates how the above-described moderators may be affected by external boundary conditions (collaborating partner type). In this study, we use the Mannheimer Innovationspanel (MIP) to empirically demonstrate that family firms have a lower probability of engaging with an external partner than non-family firms. The empirical results did not support the notion that an increase in the generational stage mitigates the negative effect of family firm status. However, we found strong support for the hypothesis that the negative effect of family firm status diminishes in the presence of non-family top managers. In addition, our post-hoc analysis revealed that the OI partner type represents a critical boundary condition that significantly affects all of the above-proposed relationships in terms of magnitude and significance.

With this study, we make several contributions to the literature. First, we add to the broader family business literature by acknowledging and framing our theoretical development considering how family firm characteristics pertaining to SEW preservation simultaneously affect their willingness and ability (cf., De Massis et al., 2014). Second, we add to the current stock of knowledge in the domain of family business innovation by concentrating on external innovation sources. Prior literature primarily focused on internal aspects of the innovation process, such as R&D spending, while external sources of innovation still represent an understudied avenue of research (Lazzarotti & Pellegrini, 2015; Lambrechts et al., 2017). Third, we contribute to the literature on family firm heterogeneity by providing empirical evidence and explaining why the generational stage and the presence of non-family managers may affect a family firm's willingness and ability concerning innovation-related decisions. While the topic of family firm heterogeneity is enjoying increased popularity, scholars have primarily focused on internal factors of heterogeneity to explain differences in the behavior among family firms. We provide empirical evidence that external factors may act as boundary conditions to said heterogeneity and propose that behavioral differences among family firms are not unilaterally

dependent on internal factors. Specifically, we show that the impact of the generational stage and the presence of non-family managers is significantly affected by the type of external collaborator partner.

3.2 THEORY AND HYPOTHESES

Traditionally, the source of innovation was proposed to reside within a firm's boundaries (Schumpeter, 1942), resulting from a closed-end process. However, scholars increasingly recognize that open innovation (OI) processes may be advantageous in today's increasingly complex and knowledge-intensive environment, which is characterized by shortened product lifecycles (Chesbrough, 2003; Laursen & Salter, 2006). OI refers to the active participation of other independent firms or institutions in innovation activities (MIP, 2015). We construe such collaborations as temporary arrangements involving the voluntary sharing of resources owned by the respective collaboration partner to achieve a common innovation goal. For that reason, mergers and acquisitions are excluded from our theoretical considerations. Grounded in the resource-based view (Barney, 1991), we center our attention on OI as a means of attaining external sources of know-how leading to a competitive advantage. Organizational knowledge represents a key competitive advantage, and the capability to source external knowledge is a quick way to acquire new know-how (Kogut & Zander, 1992; Grant, 1996). This capability is labeled absorptive capacity (Cohen & Levinthal; 1990), and the concept's prominence in academic research attests to its importance (cf., Chen, 2004; Faems, Janssens, & Van Looy, 2007; Mention, 2011). Cohen and Levinthal (1990) postulated that "the ability of a firm to recognize the value of new, external information, assimilate it and apply it to commercial ends is critical to its innovative capabilities" (p.128). Their work suggests that knowledge sharing and knowledge diversity across individuals are prerequisites for the absorptive capacity within an organization. The antecedents of absorptive capacity have been picked up by Andersén (2015), who suggested that a high level of absorptive capacity requires a firm to be externally oriented (Harrington & Guimaraes, 2005), to possess adequate managerial knowledge diversity (Cohen & Levinthal, 1990; Lane, Koka, & Pathak, 2006), and to be able to combine newly attained knowledge with internally existing knowledge. This conveys the idea that a firm's willingness by itself constitutes an insufficient condition for OI cooperation to materialize. Rather, the firm's capabilities (i.e., absorptive capacity) to exploit the potential benefits must also be present.

Although the literature suggests that OI is desirable due to its positive effect on firm performance (Singh et al., 2021), there is reason to believe that the willingness to engage in OI varies across firm types. In this context, family firms represent a particularly interesting shareholder type. It is today's prevailing view that the presence of a controlling family, and their active engagement in governance and management, results in strategic firm behavior that differs significantly from that of a non-family firm (Miller et al., 2007; De Massis et al., 2012, 2014). Whereas non-family firms follow a profit maximization strategy according to the classic economic theory, family firms strive to balance financial and non-financial objectives (Gomez-Mejia et al., 2007; Gomez-Mejia et al., 2011; Gomez-Mejia et al., 2014). Socio-emotional wealth (SEW) refers to the "non-financial aspects of the firm to meet the family's affective needs, such as identity, the ability to exercise family influence, and the perpetuation of the family dynasty" (Gomez-Mejia et al., 2007, p.106). In the context of OI, the idiosyncrasies arising from the combination of financial and non-financial goals are likely to affect both a family firm's willingness and ability to engage with an external partner.

In the past, scholars either took a behavioral perspective to draw inferences about firm behavior from a willingness perspective, or they took a resource-based view to draw inferences about firm behavior on the basis of a firm's ability. De Massis et al. (2014) pointed to the necessity for an explicit theoretical distinction between the two dimensions within the domain of family business research. The authors put forward that both conditions must be met to draw inferences about the strategic choices resulting from family firm idiosyncrasies as both "ability and willingness are necessary but individually insufficient conditions" (p.345). We intend to explain family firm decision-making in the context of OI using this framework to better understand the direct effect of family firm status on OI partnership formation and to elucidate why factors of family firm heterogeneity may affect this relationship. Acknowledging the heterogeneity among family firms and the accompanying differences in socioemotional wealth (SEW) preferences, previous scholars suggested that a firm's TMT may affect the relationship between family firms and OI (Classen et al., 2012). We want to extend this knowledge by considering another factor of family firm heterogeneity. Therefore, we investigate the generation in control, which has also been demonstrated to affect SEW-related preferences (Davis & Harveston, 2001; Gomez-Mejia et al., 2007; Stockmans, Lybaert, & Voordeckers, 2010; Kellermanns et al., 2012; Pittino et al., 2013; Le Breton-Miller & Miller, 2013; Miller, 2015). Furthermore, we expand the current knowledge horizon by performing an ex-post

analysis of external factors, which may act as boundary conditions to the above-proposed direct effect of family firm status and internal factors of family firm heterogeneity.

Grounded in the ability-willingness rationale (De Massis et al., 2014), the next section of this paper will establish why family firm idiosyncrasies resulting from SEW considerations affect both their willingness and their ability to engage with an OI partner. For this purpose, we theorize that SEW preservation serves as an antecedent limiting the willingness and ability of family firms to engage in an OI collaboration. In a consecutive step, we expand on this theoretical basis by explaining why the generational stage may affect a firm's willingness and ability to engage in OI. In a similar vein, we provide a rationale as to why external managers may facilitate OI in family firms by increasing a firm's willingness and ability to engage in such a collaboration.

3.2.1 Family Firms and Open Innovation

In line with recent related research, we suggest that a family firm's probability of engaging with a collaborative partner is, to a large extent, affected by their urge to maintain control over the firm (cf., Gomez-Mejia et al., 2007; Classen et al., 2012) since a "cooperation decision is accompanied by a restriction of individual discretion in decision making" (Roessl, 2005, p.206). Gomez-Mejia et al. (2007) empirically demonstrated that family firms likely refrain from engaging in economically beneficial collaborations if it accompanies a diminution of their decision autonomy. The dominance of socioemotional considerations over pure financial ones has since found broad acceptance and empirical support throughout the family business literature (Gomez-Mejia et al., 2011). Analogous to the relationships investigated by other authors (Roessl, 2005; Gomez-Mejia et al., 2007; Gomez-Mejia, Makri, & Kintana, 2010; Classen et al., 2012), an engagement in OI with an external partner entails a reduction of control on behalf of the family owners, as the innovation trajectory and financial future is, at least in part, determined by an external party thereby limiting the family's decision autonomy. Since this poses a threat to the SEW preservation goal of family firms, we propose that the family members' desire to maintain control over the business curtails their willingness to engage in OI with an external partner.

Next to a limited willingness, the ability of a family firm to engage in an OI collaboration is likely curtailed by their affective needs for identity, status, ability to exercise influence, and perpetuation of the family dynasty (Gomez-Mejia et al., 2007). As mentioned earlier, absorptive capacity is an essential capability in the innovation process, facilitating the

recognition, assimilation, and integration of external know-how (Cohen & Levinthal, 1990) and hence constitutes a prerequisite of OI. As such, a deficit in absorptive capacity manifests in a diminished ability to recognize and appropriate returns from innovations that may arise from external knowledge sources (Zahra, 2012). Family firms have been demonstrated to exhibit lower levels of absorptive capacity than their non-family firm counterparts as a result of a lower cognitive diversity of human capital (Sirmon & Hitt, 2003) and lower investment in R&D (Chrisman & Patel, 2012; De Massis et al., 2012) of which absorptive capacity is a known byproduct (Cohen & Levinthal; 1990). Firstly, prior literature suggests that a family firm's ability to hire outside professionals is limited due to a perceived lack of professionalism, exclusive succession, and limited potential for professional development in addition to altruism in the hiring of senior executives (Donnelley, 1964; Horton, 1986; Sirmon & Hitt, 2003; Villalonga & Amit, 2006; Schulze et al., 2003b). As a result, family firms often suffer from limited cognitive diversity, especially regarding top management employees. Secondly, family business scholars have consistently advocated that family firms tend to invest significantly less in R&D (De Massis et al., 2012), thereby curtailing the firm's ability to nurture absorptive capacity within the firm (Cohen & Levinthal; 1990).

From the argumentation above, we propose that family firms have a lower probability of engaging with an external innovation partner[27] as their willingness and ability are likely inferior to that of non-family firms.

Hypothesis 1: Compared to non-family firms, family firms have a lower probability of engaging in an OI collaboration.

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[27]Scholars arguing from a social capital perspective may put forward that family firms have a superior ability to nurture long-term trust-based relationships, as a result of their SEW considerations. This, in turn, may act in favor of OI partnerships. Whereas superior social capital endowments may indeed benefit the effectiveness of an already established relationship by reducing the risk of opportunistic behavior (Bunduchi, 2013) and by enhancing communication flows, the willingness to initialize a collaboration likely suffers from the excessive trust requirements that come along with the informal governance mechanisms favored by family firms (Steier, 2001; Classen et al., 2012).

3.2.2 The Moderating Effect of the Generation in Control

The generational stage has been suggested as a key factor influencing a family firm's desire to preserve SEW (Davis & Harveston, 2001; Gomez-Mejia et al., 2007; Stockmans, Lybaert, & Voordeckers, 2010; Kellermanns et al., 2012; Pittino et al., 2013; Le Breton-Miller & Miller, 2013; Miller, 2015). Whereas early generations are characterized by a strong identification and a strong emotional attachment to the firm, SEW considerations likely diminish with an increase in generational stage (Westhead, 2003; Van Gils, Voordeckers, & Van den Heuvel, 2004; Gomez-Mejia et al., 2007). In a similar vein, Gersick et al. (1997) portrayed the ownership dispersion associated with later generational stages to affect the goals and strategies of family firms. In line with previous research, we suggest that the generation in control affects the importance attributed to SEW preservation, which shapes a family firm's willingness and ability to collaborate with an external partner. Specifically, we propose that the ownership dispersion in later-generation family firms materializes in a lower emphasis on SEW preservation due to a lower identification with and emotional attachment of passive family members to the firm. This, in turn, likely leads to an elevated probability of later-generation family firms engaging in OI collaborations with an external partner compared to earlier-generation family firms. As family firms find themselves in later generational stages, the identification with the firm weakens as family branches emerge (Le Breton-Miller & Miller, 2013). While some family owners remain actively involved in the firm's management, others remove themselves and become passive owners (Beckhard & Dyer, 1983). The SEW preservation preferences of family members who remain actively involved in the family business likely diverge from those of passive family members (Dyer, 1994). Passive family owners become more distant and family bonds weaken, leading to a lower emotional attachment of family members and a lower identification of these passive family members with the business (Sciascia, Mazzola, & Kellermanns, 2014). Family branches that are more distant from the nucleus family are less committed and favor pursuing their own individual agendas. As such, they behave more like diversified investors (Schulze, Lubatkin, & Dino, 2003a), emphasizing economic objectives rather than pursuing family-centric SEW preservation (Lubatkin et al., 2005; Miller, Minichilli, & Corbetta, 2013).

In line with previous family business studies on the effect of generational involvement on conflict (Davis & Harveston; 2001) and board composition (Le Breton-Miller & Miller, 2013), we want to distinguish three generational phases of involvement that have been demonstrated to differ significantly from each other.

A founder firm (first-generation family firm) that is considered a family firm by the owner suggests a strong identification and emotional attachment to the firm, and the founder generally holds a substantial share of ownership, equipping him/her with the necessary decision discretion to assert his/her agenda (Le Breton-Miller & Miller, 2013). This suggests that SEW preservation is an important priority for first-generation family owners, making them hesitant to engage in an OI partnership with an external partner. The concentration of ownership equips the owners with the ability to enforce their agenda. Moreover, SEW preservation regarding control loss is a particularly pronounced objective for first-generation family firms. Thus, first-generation family firms are likely to have the lowest willingness to engage with an external partner compared to second or later-generation family firms.

In second-generation family firms, the founder has left his/her formal position within the corporation, and "there are typically multiple family members, often siblings, involved in the business" (Le Breton-Miller & Miller, 2013, p.1394) occupying key administrative positions (Gersick et al., 1997). In this generational stage, Le Breton-Miller and Miller (2013) propose that the "[e]motional attachment of the family to the firm and its desire to preserve ownership will likely remain high" (p.1394). Yet, some family members may not be actively involved in the family business and hence have a lower emotional attachment to the family firm compared to founder firms, where affective kinship bonds are strongest.

Later-generational stages characterize family firms from the third generation and onwards. In this stage, SEW preservation goals concerned with autonomy and control tend to diminish further. This is because the emotional attachment of family members to the firm is reduced, family ties weaken, managerial involvement in firm affairs diverges, and ownership shares become dispersed across multiple generations (Davis & Harveston, 2001). In this generational stage, ownership and hence decision-making rights are dispersed, and SEW preferences of highly involved and active family members have to be balanced with the financial preferences of passive family members who behave more like diversified investors (Gomez-Mejia et al., 2011; Miller et al., 2013; Sciascia et al., 2014). In addition to a potentially greater willingness resulting from increases in the generational stage, a family firm's ability may also be affected. First, the cognitive diversity of family firms increases as more generations become involved in the family firm's top management (Sciascia, Mazzola, & Chirico, 2013), fostering the firm's absorptive capacity. Second, with an increase in the generational stage, the restricting SEW preservation desires of family members with a stronger identification and emotional attachment to the firm (actively involved in the firm's management) have to be

balanced with more economically motivated desires of passive family members (Gomez-Mejia et al., 2011; Miller et al., 2013; Sciascia et al., 2014). Hence, the decision autonomy of family members in favor of SEW preservation dilutes as more generations become involved in the decision-making process facilitating the firm's ability to engage in OI.

Grounded in the rationale of SEW preservation (family identification, emotional attachment, and control loss aversion), we suggest that family firms are more willing and able to engage in OI collaborations as the generational stage increases. This is because the role of SEW in reference to the accompanying control loss aversion plays a smaller role (Sciascia et al., 2014) and because financial considerations of passive family shareholders restrict the ability of active family members to preserve SEW (Gomez-Mejia et al., 2007).

Hypothesis 2: The generational stage moderates the probability of a family firm engaging in OI such that an increase in the generational stage mitigates the negative effect of family firm status on the probability of engaging in an OI collaboration.

3.2.3 The Moderating Effect of TMT Composition

Following previous scholars, we postulate that different degrees of socioemotional attachment and cognitive background potentially affect the focal firm's willingness and ability and hence their strategic decisions (De Massis et al., 2014; Chrisman et al., 2015). Upper-echelon scholars have repeatedly demonstrated that the composition of a firm's top management team (TMT) has a significant impact on firm strategy (Finkelstein & Hambrick, 1990; Wiersema & Bantel, 1992; Finkelstein, Hambrick, & Cannella, 1996) and that family firms differ significantly from each other with regard to the involvement of external top managers (Kellermanns et al., 2012).

Whereas family firms exclusively run by family managers are associated with a greater emphasis on SEW preservation, research suggests that this focus is less pronounced as external managers occupy TMT positions (Gomez-Mejia et al., 2007, Martin & Gomez, 2016). Unlike family members, external managers do not derive socioemotional benefits from running the business and are less affected by the control loss concerns accompanying an OI partnership. Instead, external managers focus on making economically beneficial decisions, and OI has been shown to positively affect firm performance (Parida, Westerberg, & Frishammar, 2012; Ahn, Minshall, & Mortara, 2015). As the presence of external managers in family firms' top management positions is associated with a lower emphasis on SEW preservation, they may positively affect the willingness to engage in OI. In other words, compared to family firms

exclusively run by family members, family firms with external managers may have a higher willingness to engage in an OI collaboration. Following this logic, it is likely that the greater the number of external managers occupying family firms' TMT positions, the greater the probability that an OI partnership is formed. Moreover, family firms willing to hire external managers may have undergone a shift in preferences and derive fewer personal benefits of control than family firms favoring an internal occupation of top management positions. In the words of Stockmans et al. (2010), "external managers […] are ultimately brought in to provide objectivity and more rationality and to generate superior business performance" (p.284). In both scenarios, the presence of external managers is indicative of an increased willingness to engage with an external collaborator.

Regarding the ability to engage in OI, the presence of external top managers is also likely beneficial because it increases cognitive diversity, which fosters the absorptive capacity (Cohen & Levinthal, 1990). A higher cognitive diversity enhances the firm's ability to recognize and exploit opportunities resulting from an OI engagement (Zahra, 2012). This is in line with empirical evidence offered by Sonfield and Lussier (2009), who found that the presence of external managers is associated with increased exploitation of external information. Moreover, the involvement of external managers limits the centralization of decision authority, which increases a firm's ability to engage in OI by curtailing family managers' ability to extract private benefits of control at the expense of economic benefits. As Martin and Gomez-Mejia (2016) point out, "an unwillingness to rely on professional managers […] might lead to overly centralized decisions, lack of fresh ideas and a limited skill set, all of which may lead to the foregoing of growth opportunities" (p.223).

In line with the proposed sufficiency condition by De Massis et al. (2014), we propose that the presence of external managers within a family firm is associated with an attenuation of the proposed negative direct effect of family firm status on OI due to a heightened willingness and ability.

Hypothesis 3: The presence of external managers occupying TMT positions moderates the probability of a family firm engaging in OI such that an increased presence of external managers leads to a higher probability to engage in an OI collaboration.

3.3 SAMPLE AND METHODS

3.3.1 Sample

For our empirical analysis, we used the Mannheimer Innovationspanel (MIP) from 2015, which is representative of the German firm population and constitutes the German contribution to the European Commission's Community Innovation Surveys (CIS). The year 2015 was chosen since it is currently the most recent survey requiring firms to report on family firm-related questions such as ownership status, management team composition, and generation in control. Moreover, it provides information on the firm's distinct external innovation partners. As a result, the data set presents an excellent basis to test our model allowing for a tight connection between our theorized relationships and measured variables.

The initial sample consisted of 5,445 distinct German firms. We implemented several restrictions on the data set to account for our underlying assumptions and data prerequisites. First, we dropped the observations pertaining to firms that did not respond to the family firm questions (minus 312 firms). As the purpose of this study is to enhance our understanding of innovation-related strategic decision-making, we dropped 2177 firms of non-innovators. Non-innovators are firms that "report that they have not offered any new or improved services within the last three years and have not introduced any new or improved processes (including changes in progress), they count as non-innovators" (MIP, 2015). We also excluded firms from the banking and insurance industry due to different accounting and regulatory standards (minus 137 firms). As a result of the above-presented restrictions, our final sample covered 2,819 unique German firms in 2015.

3.3.2 Measures

To test our three hypotheses, we estimated logistic regression models to account for the binary distribution of our outcome variables.

Dependent Variables. We coded our dependent variable to equal one if a focal firm engaged with any OI partner type (customers, suppliers, competitors, or research institutes) during 2012-2014 and zero otherwise. Based on the theoretical foundation of our hypotheses, we acknowledge that characteristics associated with different external partner types may affect a family firm's willingness and ability to engage with distinct external collaborators. Hence, we performed a post-hoc analysis estimating our models for each external innovation partner type

separately (customers, suppliers, competitors, and research institutes)[28]. For this purpose, our binary outcome variables were coded to equal one if a focal firm engaged with the respective innovation partner during 2012-2014 and zero otherwise.

Family Firm Status. A family firm is considered as such if the question "Is your enterprise controlled by a family - or part of an enterprise group controlled by a family?" was answered with yes. That is, the family owns at least 50% of the company's shares. Although there are no generally accepted family firm operationalization criteria, most scholars agree that the family has to be the dominant coalition within the firm, which requires the family to own a significant proportion of the company's shares (Chua, Chrisman, & Sharma, 1999). This single criterion has been frequently used in the literature (Ang, Cole, & Lin, 2000; Maury, 2006). We coded the dummy to equal one if a firm qualifies for this criterion and zero otherwise. In our sample, a total of 1768 firms qualify with our family firm operationalization (59.81%).

Family Firm Generation. As part of the 2015 *MIP* survey, family firms had to indicate how many generations the firm has been family-owned. Owing to differences in the perceived value attributed to SEW considerations (e.g., control loss aversion and emotional attachment), prior work suggests that differences can be observed between first-generation, second-generation, and later-generation family firms (Schulze et al., 2001; Schulze, Lubatkin, & Dino, 2003a; Le-Berton Miller & Miller; 2013). We followed previous scholars and coded dummy variables for the three generational stages[29].

Top Management Team. To assess the moderation effect of a firm's top management composition, we employed three dummy variables indicating whether a family firm's TMT is

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[28] Previous research on OI regularly used search breadth (Leiponen & Helfat, 2010; Classen et al., 2012; Alberti et al., 2014; Lazzarotti & Pellegrini, 2015) as the dependent variable (i.e., the number of different innovation partners a firm engages with simultaneously) because it has been demonstrated that engaging with multiple innovation partners has a positive effect of the innovative performance of a firm (Laursen & Salter, 2006; Ebersberger et al., 2012). In this study, we are interested in a family firm's probability to engage with an innovation partner rather than the performance impact or number of external partners a family firm engages with simultaneously. Our theoretical developments are grounded in the ability-willingness framework, which corroborates the idea that the ability and willingness to engage with an external partner may vary as a function of a family firm's willingness and ability to engage with the respective collaborator and the partner's type. A partnership with a supplier, for example, probably entails a lower perceived loss of control on behalf of a family firm compared to a partnership with a competitor (Miotti & Sachwald, 2003; Fey & Birkinshaw, 2005). Similarly, collaborating with a research institute likely requires a higher absorptive capacity than with a customer. Hence, estimating our model for each partner type individually allows for the consideration of distinct partnership characteristics in our post-hoc discussion.

[29] Although our theoretical work is more closely connected to the regressor's categorization in three generational phases, we also estimated the models with the discrete values provided in the data set. The unreported results are very similar to our reported results and do not qualitatively affect any conclusion.

composed of internal managers (i.e., family members exclusively), a mixed management team (i.e., family managers and external managers), or external managers (i.e., no family managers).[30]

Control Variables. We control for various exogenous influences on a firm's OI strategy. Firm size is accounted for by taking the natural logarithm of the number of employees. We control for 21 economic sectors based on the ZEW-Indicator Reports of the Mannheimer Innovation Panel (MIP, 2015). To account for the economic differences between eastern and western Germany, a dummy variable is included. Moreover, we control for significant product and process innovations that happened in the past three years and for a firm's innovation intensity (R&D spending) to account for some reverse causality. Past research suggested that the possession of resources associated with innovation intensity and technological innovation renders a firm to be perceived as more attractive by potential external collaborators (De Mattos, Burgess, & Shaw, 2013; Fontana, Geuna, & Matt, 2006). The dummy variable for significant product and process innovations indicates if a firm introduced new or significantly improved products or processes (new to the firm). Innovation intensity is measured by the total innovation expenditure (R&D) scaled by the total turnover. The export ratio is calculated as the turnover abroad divided by the total turnover, and geolocation dummies indicate to which regions goods and services have been sold. Modern trade and growth theories (Grossman & Helpman, 1991; Aghion et al., 2018) suggest that exports positively affect innovation efforts as they indicate superior access to a larger market that successful innovators can appropriate. We also control for M&A activity and the sale or closure of business units. M&A activity is indicative of the acquisition of external knowledge through ownership transfer. We interpret OI as a temporary collaboration involving the voluntary sharing of resources owned by the respective collaboration partner to achieve a common innovation goal. As such, our theoretical work does not address strategic decision-making related to acquisitions of external resources through the transfer of ownership. Business unit sales or closures control for additional resources available for innovative efforts.

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[30] Whereas internal TMT teams are likely to exhibit a greater emphasis on SEW preservation, this effect likely weakens as external managers are added to the TMT. Due to data limitations, we do not have information on the percentage of external managers within a focal firm's TMT. This may cause some distorted results with regard to the mixed TMT variable in cases where the family leadership is very dominant and there is only one or very few external managers present. In these situations, external TMT members may be hesitant to oppose the dominant family coalition leading to family-imposed groupthink (Ensley & Pearson, 2005).

3.3.3 Data Analysis

The models presented in this study are estimated utilizing logistic regression analysis to account for the binary distribution of our dependent variable. To test our hypotheses, we first estimated the direct effect of family firm status on the probability that a focal firm engages with any open innovation partner (Model 1). We estimated Model 2 and Model 3 in conjunction with a linear restricted model to test the moderation hypotheses. The regressions were estimated on the following models:

$$Oi_i^{any} = \alpha_0 + \beta_1 FF_i + \gamma' Controls_i + \theta' Industry_i + \varepsilon_i \tag{4}$$

$$Oi_i^{any} = \alpha_0 + \beta_2 FirstGeneration_i + \beta_3 SecondGeneration_i + \beta_4 LaterGeneration_i + \gamma' Controls_i \\ + \theta' Industry_i + \varepsilon_i \tag{5}$$

$$Oi_i^{any} = \alpha_0 + \beta_5 InternalTMT_i + \beta_6 MixedTMT_i + \beta_7 ExternalTMT_i + +\gamma' Controls_i + \theta' Industry_i \\ + \varepsilon_i \tag{6}$$

Where Oi_i^{any} represents a binary variable indicating the presence (1) or absence (0) of an open innovation partnership with any of the four types (customer, supplier, competitor, or research institute) for firm i. FF_i is a dummy variable indicating whether firm i is a family firm (1) or not (0), as reported in the questionnaire. The term $\gamma' Controls$ represents a vector of control variables as outlined in section 3.3.2 of this dissertation, which includes various firm-level characteristics such as size, age, R&D activity, among others. $\theta' Industry_i$ represents a vector of industry-level control variables that account for differences in the external environment across different industries. ε_i represents the error term that captures the unobserved or unmeasured factors that affect the dependent variable for firm i. Naturally, the variables indicating the generation in control and top management composition (TMT) only exist for family firms. Thus, $FF_i = FirstGeneration_i + SecondGeneration_i + LaterGeneration_i$ and $FF_i = InternalTMT_{i0} + MixedTMT_i + ExternalTMT_i$. Our post-hoc analysis estimates the direct and moderation effects for each OI partner type individually (Model 4 to 15).

3.4 RESULTS

TABLE 3.1 Means, Standard Deviations, and Pearson Correlation Matrix

		Mean	STD	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
OI (any partner type)	A	0.22	0.36																								
OI Customer	B	0.10	0.30	**0.62**																							
OI Supplier	C	0.09	0.28	**0.58**	**0.30**																						
OI Competitor	D	0.04	0.19	**0.38**	**0.28**	**0.15**																					
OI Research Institute	E	0.14	0.35	**0.75**	**0.44**	**0.27**	**0.31**																				
Family Firm	F	0.62	0.48	**-0.10**	**-0.08**	-0.02	**-0.12**	**-0.10**																			
First Generation	G	0.25	0.43	-0.04	-0.04	-0.01	**-0.05**	**-0.05**	**0.45**																		
Second Generation	H	0.16	0.37	-0.03	-0.02	-0.02	**-0.05**	-0.03	**0.34**	**-0.26**																	
Third or Later-Generation	I	0.16	0.37	**-0.05**	**-0.05**	0.01	-0.03	**-0.05**	**0.34**	**-0.26**	**-0.19**																
Internal TMT	J	0.38	0.49	**-0.15**	**-0.12**	**-0.07**	**-0.09**	**-0.14**	**0.59**	**0.32**	**0.19**	**0.19**															
Mixed TMT	K	0.19	0.39	0.04	0.01	0.02	-0.03	0.03	**0.35**	**0.14**	**0.16**	**0.11**	**-0.37**														
External TMT	L	0.06	0.23	**0.07**	**0.05**	**0.07**	0.00	0.04	**0.14**	-0.01	**0.05**	**0.10**	**-0.19**	**-0.12**													
Size (log1p)	M	3.69	1.46	**0.11**	0.04	**0.14**	**0.06**	**0.10**	**-0.09**	**-0.23**	0.02	**0.12**	**-0.27**	**0.17**	**0.10**												
East West	N	0.67	0.47	**-0.11**	**-0.09**	-0.02	**-0.07**	**-0.14**	**0.15**	**-0.06**	**0.09**	**0.18**	**0.09**	0.06	0.03	**0.15**											
Product Innovation	O	0.67	0.47	**0.18**	**0.11**	**0.12**	**0.05**	**0.12**	**0.05**	**0.05**	0.00	0.01	0.02	0.01	**0.05**	**0.08**	-0.01										
Process Innovation	P	0.50	0.50	**0.08**	**0.07**	**0.06**	0.04	**0.07**	-0.02	-0.04	0.00	0.01	**-0.06**	0.02	**0.06**	**0.14**	0.00	0.04									
Innovation Intensity	Q	0.02	0.04	**0.09**	**0.09**	0.02	**0.06**	**0.11**	-0.02	0.02	0.01	**-0.07**	0.00	-0.01	0.01	**-0.11**	**-0.06**	**0.08**	**0.12**								
Export Ratio	R	0.20	0.27	**0.18**	**0.07**	**0.12**	0.00	**0.17**	-0.04	**-0.06**	0.02	0.02	**-0.14**	**0.05**	**0.11**	**0.31**	**0.12**	**0.13**	0.04	0.01							
Geolocation Sales (local)	S	0.56	0.50	0.04	**0.05**	0.00	**0.08**	**0.05**	-0.02	**-0.05**	0.01	0.03	0.04	-0.02	**-0.07**	-0.02	-0.04	**-0.07**	0.03	-0.02	**-0.13**						
Geolocation Sales (national)	T	0.78	0.41	**0.14**	**0.10**	**0.06**	0.04	**0.11**	0.04	0.03	0.04	-0.02	**-0.06**	**0.10**	0.04	**0.17**	-0.01	**0.15**	0.03	0.02	**0.20**	**-0.21**					
Geolocation Sales (EU)	U	0.60	0.49	**0.18**	**0.10**	**0.09**	**0.06**	**0.17**	0.03	**-0.05**	0.04	**0.08**	**-0.12**	**0.13**	**0.08**	**0.31**	**0.08**	**0.19**	**0.05**	0.00	**0.50**	**-0.13**	**0.42**				
Geolocation Sales (other)	V	0.42	0.49	**0.18**	**0.08**	**0.10**	0.03	**0.17**	-0.03	**-0.09**	0.01	**0.06**	**-0.13**	**0.07**	**0.10**	**0.35**	**0.10**	**0.18**	**0.10**	-0.01	**0.60**	-0.02	**0.33**	**0.58**			
M&A Activity	W	0.09	0.28	**0.07**	**0.05**	**0.07**	0.01	**0.05**	**-0.07**	**-0.05**	-0.01	-0.04	**-0.10**	0.01	**0.06**	**0.17**	0.04	**0.05**	0.04	-0.02	**0.11**	-0.01	**0.06**	**0.08**	**0.12**		
Sale or Closure	X	0.07	0.25	**0.05**	0.02	0.04	**0.05**	0.04	-0.03	0.02	-0.04	-0.01	**-0.06**	0.03	0.02	**0.12**	**0.05**	0.00	-0.02	-0.02	0.03	0.02	0.02	0.04	0.04	**0.21**	**0.21**

Bold indicates p < 0.05

In *Table 3.2* we display the main results for our hypotheses testing. Model 1 provides support for Hypothesis 1, indicating a significant negative effect of family firm status on the probability of engaging in an OI partnership (coeff. -.361, p < .006). In Model 2, we test the first interaction term *generation in control*. Overall, the results suggest a negative and significant moderation effect for all three dummy variables. As expected, the effect size and significance levels indicate that the observed moderation is stronger for first-generation family firms (coeff. -.410, p = .011) compared to second-, (coeff. -.393, p = .034) and later-generation (coeff. -.362, p = .071) family firms providing some support for Hypothesis 2. However, testing the difference in effects by comparing the models revealed no statistically significant differences between the different generational stages. The impact of exclusive internal family management tested in Model 3 suggests a strong negative moderation effect (coeff. -.599, p < .001) on the probability of a family firm engaging with an OI partner. Comparing the restricted to the unrestricted model revealed that the difference between internal and mixed or external TMT is significant (p = .007) providing support for Hypothesis 3. Interestingly, there appears to be no statistically

TABLE 3.2 Logit Estimates

	Model 1		Model 2		Model 3	
	Estimate	p-Value	Estimate	p-Value	Estimate	p-Value
Open Innovation (any partner type)						
Intercept	-2.461	<0.001 ***	-2.460	<0.001 ***	-2.363	<0.001 ***
Family Firm	-0.361	0.006 ***				
First Generation			-0.410	0.011 **		
Second Generation			-0.393	0.034 **		
Third or Later-Generation			-0.362	0.071 *		
Internal TMT					-0.599	<0.001 ***
Mixed TMT					-0.138	0.425
External TMT					0.095	0.698
Size	0.143	0.005 ***	0.140	0.007 ***	0.107	0.042 **
East West	-0.620	<0.001 ***	-0.615	<0.001 ***	-0.598	<0.001 ***
Product Innovation	0.873	<0.001 ***	0.875	<0.001 ***	0.878	<0.001 ***
Process Innovation	0.260	0.038 **	0.261	0.038 **	0.253	0.044 **
Innovation Intensity	3.653	0.005 ***	3.671	0.004 ***	3.612	0.005 ***
Export Ratio	0.754	0.007 ***	0.757	0.007 ***	0.710	0.012 **
Geolocation Sales (local)	0.393	0.003 ***	0.399	0.002 ***	0.417	0.002 ***
Geolocation Sales (national)	0.457	0.025 **	0.460	0.024 **	0.452	0.027 **
Geolocation Sales (EU)	0.274	0.130	0.281	0.123	0.249	0.170
Geolocation Sales (other)	-0.106	0.559	-0.113	0.535	-0.095	0.600
M&A Activity	0.144	0.481	0.133	0.515	0.136	0.504
Sale or Closure	0.480	0.063 *	0.484	0.062	0.474	0.064
Industry Dummies	Yes		Yes		Yes	
Observations	N=1874		N=1874		N=1874	
AIC	1749.30		1751.50		1744.40	
* p < 0.10; ** p < 0.05; *** p < 0.01						

significant difference between family firms that are managed by mixed or external TMTs (p = .385).

3.5 POST-HOC ANALYSIS

After establishing the direct and moderation effects of family firm status on the probability of engaging with an external partner, we take a closer look at how our predictions are affected by individual partner types, which may act as boundary conditions. As discussed earlier, family firms are heterogeneous with varying degrees of socioemotional attachment and cognitive backgrounds of their TMTs (Westhead & Howorth, 2007). Grounded in our theoretical development, we have thus reason to believe that a family firm's willingness and ability to engage with a particular partner type may vary depending on the characteristics associated with the respective collaborator. Whereas a family firm's willingness to partner up with a particular external partner type may be affected by the degree of control loss associated with said partnership, their ability to recognize, assimilate, and integrate external know-how likely varies across partner types, too.

In *Table 3.3*, we present our model estimates on the full sample for each of the four partner types investigated in this study. The majority of coefficients (Models 4, 10, and 13) provide strong support for our predicted negative direct effect of family firm status on the probability of engaging with an external partner. Interestingly, this negative effect does not materialize for collaborations with suppliers (coeff: -.017, p = .927). Moreover, the negative effect size is considerably higher for competitors (coeff: -.964, p < .001) compared to customers (coeff: -.355, p = .044), suppliers (coeff: -.017, p = .927), and research institutes (coeff: -.400, p = .010). Prior research suggests that collaborations with suppliers mainly aim at incremental product and process innovation by improving input quality and reducing cost (Hagedoorn, 1993; Primo & Amundson, 2002; Hoegl & Wagner, 2005; Song & Thieme, 2009). By nature, incremental innovations do not radically alter the innovation trajectory but represent smaller product adaptations. Hence, family firms may not perceive supplier collaboration as a threat to family control. In the context of willingness, it could also be argued that process-oriented innovation associated with supplier collaboration poses a smaller risk of intellectual property protection. Process innovations are often tailored toward firm-specific needs and involve a high degree of tacit knowledge (Teece, 2003; Nieto & Pérez-Cano, 2004), rendering this innovation type hard to imitate. The lower threat of imitation may diminish the unwillingness of family

firms to engage in OI with a supplier. In support of this proposition, Model 8 displays that potential changes in the level of control-loss aversion associated with generational differences are insignificant. Regarding a firm's ability to engage in a supplier collaboration, Model 9 corroborate the idea that changes in a family firm's TMT composition, associated with a change in absorptive capacity, do not affect the probability of supplier collaboration. This suggests that process or incremental innovations resulting from supplier collaborations may not benefit from a heightened level of absorptive capacity. Hence, the inferior level of absorptive capacity associated with family firms would not represent an obstacle to supplier collaboration.

Another interesting observation can be made about competitor collaborations. Here, the negative effect size is by far the largest in magnitude among the four partner types insinuating a pronounced reluctance of family firms to cooperate with rivals. Competitor collaborations often require firms to give up substantial decision autonomy in a joint effort to innovate, and the risk related to involuntary outgoing knowledge spillovers is stronger (Cassiman & Veugelers, 2002) as the firms compete on the same stage of the value chain (Miotti & Sachwald, 2003; Fey & Birkinshaw, 2005) compared to a customers, suppliers, and research institutes. Taken together, this suggests that family firms exhibit a lower willingness to engage in an OI partnership with competitors compared to other OI partner types. Some support for this proposition can be inferred from Model 11, which indicates that first-generation (coeff: -1.065, $p = .004$) and second-generation family firms (coeff: -1.194, $p = .017$) exhibit a strong negative effect while later-generation family firms, which are associated with a lower level of socioemotional attachment show no significant difference (coeff: -.443, $p = .310$) compared to non-family firms. Regarding the ability to engage in OI with a competitor, the restricted absorptive capacity and the decision autonomy of family managers associated with internal TMTs appears to amplify the negative effect significantly (coeff: -1.065, $p = .004$). A similar observation can be made for mixed TMTs (coeff: -1.194, $p = .017$) but not for family firms where external managers run the business (coeff: -.443, $p = .310$) providing additional support for our proposition.

Lastly, the estimates pertaining to collaborations between family firms and research institutes are negative. Whereas collaborations with the other three partner types are concerned with applied innovation, research institutes generally aim at more fundamental or basic research projects involving "new" science (Hall, Link, & Scott, 2003). Basic research outcomes are often hard to predict, and potential commercialization routes are uncertain in timing and magnitude. It is well established that family members are risk-averse due to their high concentration of

financial assets in one firm (Gomez-Mejia et al., 2007). Although the appropriable returns of basic research can be significant, the risk stemming from timing and commercialization uncertainties may diminish a family firm's willingness to engage with a research institute. Model 13 conveys the image that family firms have a lower probability than non-family firms to engage with research institutes (coeff: -.400, p = .010). This effect can be observed through all generational stages: first-generation (coeff: -.524, p = .008), second-generation (coeff: -.363, p = .099), and later-generation family firms (coeff: -.452, p = .066). Ultimately, a firm may reap the benefits from the collaboration with a research institute if they can put the innovation outcomes to commercial ends. In this regard, family firms may also be at a disadvantage as they have an inferior cognitive diversity and hence absorptive capacity compared to their non-family firm counterparts. This proposition receives some support from our results, which indicate that a lower level of absorptive capacity associated with an internal TMT composition has a negative effect on the probability of an OI collaboration between a family firm and a research institute. The estimates pertaining to Model 15 show a strong negative effect of family firms composed of internal TMTs (coeff: -.656, p < .001) but no significant difference for family firms managed by mixed (coeff: -.092, p = .645) or external TMTs (coeff: -.135, p = .643) both of which are associated with a higher level of absorptive capacity.

TABLE 3.3 Logit Estimates

| | DV: Customers | | | | | | DV: Suppliers | | | | | |
| | Model 4 | | Model 5 | | Model 6 | | Model 7 | | Model 8 | | Model 9 | |
	Estimate	p-Value	Estimate	p-Value	Estimate	p-Value	Estimate	p-Value	Estimate	p-Value	Estimate	p-Value
Intercept	-3.424	<0.001 ***	-3.400	<0.001	-3.280	<0.001 ***	-4.313	<0.001 ***	-4.341	<0.001 ***	-4.264	<0.001 ***
Family Firm	-0.355	0.044 **					-0.017	0.927				
First Generation			-0.529	0.016 **					0.124	0.580		
Second Generation			-0.319	0.189					-0.237	0.383		
Third or Later-Generation			-0.362	0.219					-0.103	0.698		
Internal TMT					-0.728	<0.001 ***					-0.143	0.523
Mixed TMT					-0.224	0.321					0.022	0.925
External TMT					0.223	0.474					0.389	0.218
Size	0.089	0.201	0.077	0.269	0.045	0.535	0.336	<0.001 ***	0.346	<0.001 ***	0.317	<0.001 ***
East West	-0.495	0.006 ***	-0.496	0.006 ***	-0.461	0.010 **	-0.320	0.091 *	-0.288	0.132	-0.303	0.112
Product Innovation	0.752	0.000 ***	0.765	<0.001 ***	0.763	<0.001 ***	0.962	<0.001 ***	0.961	<0.001 ***	0.959	<0.001 ***
Process Innovation	0.342	0.041 **	0.340	0.043 **	0.330	0.050 *	0.266	0.134	0.267	0.133	0.252	0.157
Innovation Intensity	3.719	0.015 **	3.695	0.016 **	3.602	0.018 **	1.645	0.326	1.661	0.330	1.519	0.372
Export Ratio	0.424	0.282	0.430	0.269	0.341	0.396	0.776	0.050 *	0.751	0.057 *	0.738	0.066 *
Geolocation Sales (local)	0.501	0.005 ***	0.508	0.004 ***	0.528	0.003 ***	0.155	0.399	0.161	0.381	0.173	0.344
Geolocation Sales (national)	0.637	0.038 **	0.645	0.036 **	0.639	0.037 **	0.000	0.999	-0.005	0.985	0.001	0.998
Geolocation Sales (EU)	0.407	0.104	0.416	0.098 *	0.381	0.130	-0.135	0.596	-0.122	0.634	-0.144	0.575
Geolocation Sales (other)	-0.409	0.102	-0.417	0.096 *	-0.400	0.112	-0.132	0.623	-0.126	0.642	-0.139	0.604
M&A Activity	0.152	0.566	0.135	0.611	0.142	0.595	0.300	0.270	0.302	0.267	0.286	0.293
Sale or Closure	0.274	0.432	0.288	0.413	0.260	0.458	0.340	0.302	0.318	0.332	0.333	0.315
Industry Dummies	Yes		Yes		Yes		Yes		Yes		Yes	
Observations	N=1874		N=1874		N=1874		N=1874		N=1874		N=1874	
AIC	1122.00		1123.30		1116.50		1057.10		1059.50		1058.60	

* p < 0.10; ** p < 0.05; *** p < 0.01

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TABLE 3.3 (continued) Logit Estimates

	DV: Competitors						DV: Research Institutes					
	Model 10		Model 11		Model 12		Model 13		Model 14		Model 15	
	Estimate	p-Value	Estimate	p-Value	Estimate	p-Value	Estimate	p-Value	Estimate	p-Value	Estimate	p-Value
Intercept	-5.765	0.000 ***	-5.851	0.000 ***	-5.753	0.000 ***	-2.947	0.000 ***	-2.927	0.000 ***	-2.837	0.000 ***
Family Firm	-0.964	<0.001 ***					-0.400	0.010 ***				
First Generation			-1.065	0.004 ***					-0.524	0.008 ***		
Second Generation			-1.194	0.017 **					-0.363	0.099 *		
Third or Later-Generation			-0.443	0.310					-0.452	0.066 *		
Internal TMT					-1.026	0.004 ***					-0.656	<0.001 ***
Mixed TMT					-0.894	0.024 **					-0.092	0.645
External TMT					-0.506	0.376					-0.135	0.643
Size	0.246	0.023 **	0.238	0.028 **	0.246	0.025 **	0.170	0.004 ***	0.161	0.007 ***	0.135	0.024 **
East West	-0.512	0.048 **	-0.550	0.037 **	-0.523	0.046 **	-0.922	0.000 ***	-0.918	0.000 ***	-0.911	0.000 ***
Product Innovation	0.628	0.033 **	0.619	0.036 **	0.625	0.034 **	0.608	<0.001 ***	0.616	<0.001 ***	0.617	<0.001 ***
Process Innovation	0.257	0.305	0.261	0.296	0.242	0.331	0.224	0.133	0.225	0.132	0.221	0.138
Innovation Intensity	4.451	0.073 *	4.473	0.072 *	4.352	0.077 *	5.450	0.000 ***	5.447	0.000 ***	5.356	0.000 ***
Export Ratio	0.091	0.903	0.111	0.881	0.059	0.939	0.865	0.005 ***	0.868	0.005 ***	0.829	0.007 ***
Geolocation Sales (local)	1.164	0.000 ***	1.173	0.000 ***	1.158	0.000 ***	0.432	0.006 ***	0.441	0.005 ***	0.444	0.005 ***
Geolocation Sales (national)	0.352	0.442	0.371	0.415	0.305	0.505	0.223	0.396	0.225	0.394	0.212	0.417
Geolocation Sales (EU)	0.660	0.095 *	0.665	0.093 *	0.655	0.105	0.412	0.078 *	0.421	0.074 *	0.376	0.109
Geolocation Sales (other)	-0.497	0.201	-0.511	0.185	-0.478	0.226	0.037	0.862	0.033	0.878	0.053	0.801
M&A Activity	-0.281	0.529	-0.268	0.548	-0.293	0.511	0.018	0.939	0.002	0.994	0.018	0.938
Sale or Closure	0.794	0.081 *	0.798	0.079 *	0.781	0.085 *	0.433	0.126	0.441	0.122	0.440	0.117
Industry Dummies	Yes		Yes		Yes		Yes		Yes		Yes	
Observations	N=1874		N=1874		N=1874		N=1874		N=1874		N=1874	
AIC	582.60		585.46		587.10		1317.00		1318.30		1315.30	

* p < 0.10; ** p < 0.05; *** p < 0.01

3.6 DISCUSSION

The innovation behavior of family firms is a controversial topic. On the one hand, family firm attributes are theorized to put them at a disadvantage concerning innovation. This belief is primarily driven by the conservatism associated with family firms, which is said to result in a lower willingness to engage in innovation. On the other hand, family firms are proclaimed to have certain advantages in the innovation process, which are rooted in their long-term orientation and the possession of unique resources (Duran et al., 2016). To date, the debate surrounding the effect of family firm idiosyncrasies on innovation is far from settled. While prior literature primarily focused on innovation pertaining to internal sources of the firm, scholars acknowledge the increasing importance of external sources in today's complex innovation environment (Feranita et al., 2017). Grounded in the socioemotional wealth (SEW) theory (Gomez-Mejia et al., 2007) and the ability-willingness framework (De Massis et al., 2014), this study investigated the direct effect of family firm status on the probability to engage in an open innovation (OI) collaboration. We theorize and provide empirical evidence supporting the notion that family firms are more reluctant to engage with an OI partner than their non-family firm counterparts. We suggest that this reluctance results from a lower willingness and ability toward this strategic choice. Moreover, we theorize and demonstrate that family firm heterogeneity has a significant effect on the above-proposed relationship. Specifically, we are the first to investigate the moderating effect generational differences have on the probability of engaging in an OI collaboration. Although no significant moderation was found for the overall model estimate, the generation in control significantly moderates the relationship between family firm status and OI when boundary conditions were considered in our post-hoc analysis (i.e., collaboration partner type). In addition, we found empirical support for a moderating effect of a family firm's top management team (TMT) composition, which corroborates the idea of an elevated willingness and ability to collaborate as the presence of external managers increases. Finally, the results of our post-hoc analysis suggested that individual partner types and their associated characteristics may act as boundary conditions to our model predictions.

3.6.1 Academic Implications

This study contributes to the family business literature by exploring mechanisms shaping innovation-related decision-making. While the vast majority of previous studies demonstrated that family firms have a lower willingness to employ internal innovation resources such as R&D investment (cf., Chrisman & Patel, 2012), it was the aim of this study to explore why family firm idiosyncrasies may also put them at a disadvantage to bridge this resource gap by tapping into external resources through OI collaborations. Family business scholars have highlighted the necessity to augment theoretical developments with a sufficiency condition requiring the presence of both ability and willingness when making inferences about behavioral differences between family and non-family firms (De Massis et al., 2014). In agreement with this proposition, we theorized that SEW-related idiosyncrasies ascribed to family firms may negatively affect both their willingness and ability to engage with an OI partner. We found empirical results in support of the notion that family firms are less likely to engage in an OI collaboration compared to their non-family firm counterparts. Further, we enrich our understanding of family firm heterogeneity by investigating the effect of generational differences and the presence of external top managers, which may affect a family firm's willingness and ability to engage in OI. Our findings suggest that external TMT members indeed alleviate the inferior willingness and ability, but a firm's generation in control did not appear to have a significant effect at first sight. Interestingly, our post-hoc estimates corroborate the idea that the significance of both moderation effects is notably affected by the collaboration partner type. This gives reason to believe that a family firm's willingness and ability do not unilaterally depend on internal factors of heterogeneity but that external factors, such as characteristics associated with a particular partner type, act as boundary conditions. In this regard, our post-hoc analysis suggest that first-generation family firms are less willing to engage with an external partner who is more likely to restrict the owners' discretion over the firm's innovation trajectory. We propose that this result is likely driven by the pronounced identification with and emotional attachment of first-generation family owners to their firm, which induces a surplus of conservatism with such a partner type. We found that this effect is particularly apparent with competitors as potential OI collaborators. Regarding the TMT, our results suggest that the presence of external managers occupying TMT positions positively affects the willingness and ability of family firms to collaborate by curtailing the family owner's decision autonomy and fostering the firm's cognitive diversity, which increases absorptive capacity.

3.6.2 Practical Implications

From our results, it becomes apparent that family firms lag behind their non-family firm counterparts in terms of OI partnerships. Several managerial implications can be inferred from our findings. Firstly, family firm managers must recognize and understand that alternatives to internal R&D activities exist. The characteristics and resources associated with family firms render them well suited to engage in innovation, and OI is one avenue to promote innovation without incurring the significant cost associated with internal R&D. For decades, the paradigm of successful innovation through internal innovation efforts has been a promising strategy to remain competitive. However, today's fast-moving and hyper-competitive innovation landscape likely provides a fertile ground for open innovation models to dominate. Firms that do not recognize this change and the value of external innovation sourcing risk losing their competitive edge in the long run. Secondly, family owners have to accommodate the idea that a strong tendency to retain control over the firm's innovation trajectory may ultimately result in a lack of innovative competitiveness lowering a firm's chance of survival. This is especially true for founder firms where emotional attachment and identification with the firm are particularly pronounced. Hence, family owners need to recognize that "more control equals more security" is a misconception with regard to innovation and competitiveness in the new millennium. The integration of external knowledge with internal knowledge is not only a cost-effective alternative to relying on internal resources exclusively but may be fundamental for firm renewal and the creation of new and valuable knowledge in an increasingly complex innovation environment. Third, employing external managers appears to be an effective way to combat the OI impediments associated with family ownership. Hence, we suggest that family owners attract external managers to foster the firm's cognitive diversity and refrain from dominating external managers concerning innovation-related strategic decision-making.

3.6.3 Limitations and Future Research

The findings and conclusions expressed in this paper are based on our empirical results, which brings along several limitations that future research may want to address. First, the cross-sectional nature of the underlying data restricts our ability to infer causality for some of the investigated relationships. Although family firm status and the generation in control can be considered endogenous, the presence of external top managers may be affected by external factors such as the need for enhanced cognitive diversity resulting from an OI collaboration.

Hence, we were limited to assessing the presence of an association between the presence of external managers and the moderation effect. Second, our data set does not provide additional information on the OI collaborator beyond the partner type. Previous research has shown that characteristics such as trust, commitment, complementarity, and potential payoff, among others, may affect the attractiveness of a partner in the selection process (Shah & Swaminathan, 2008). Third, our findings are limited to enhancing our knowledge about the probability of a family firm engaging with an OI collaboration partner. Although important conclusions about the decision-making process can be drawn from this, our results do not allow for inferences about the intensity, duration, or performance outcomes of said OI collaborations. Fourth, our study does not allow for a simultaneous assessment of the two moderation effects due to multicollinearity. This is likely caused by the increased presence of external top managers in family firms that have grown and transitioned past the founder family firm. Finally, the MIP data set does not provide information on firm age, which could be a relevant factor, as more mature firms may possess a greater stock of disposable resources and capabilities to engage in OI collaborations.

4 INTERTEMPORAL DECISION-MAKING IN FAMILY FIRMS: CONTINGENCIES OF CORPORATE SOCIAL PERFORMANCE

Abstract: A firm's temporal orientation is advocated to present a cornerstone in family firm decision-making and significantly affect corporate social activities. In the literature, family firms are generally portrayed to embrace a static long temporal orientation neglecting this heuristic's potentially conditional nature. We use data from public firms listed on the US stock exchange between 2002 and 2010 to decompose the moderating effects of firm-level and macro-level financial distress (i.e., individual bankruptcy risk and financial crisis) on corporate social performance (CSP). Drawing on knowledge from the inter-temporal choice literature, we theorize that the managerial decision model of family firms is significantly affected by internal and external contingencies. In line with previous scholars, we find a positive baseline effect of family firm status on CSP in a "steady-state" condition. However, contrary to the prevailing opinion that firm-level financial distress negatively moderates the relationship between family firm status and long-term strategic choices (i.e., CSP), our findings corroborate the idea that the macroeconomic situation has to be considered.

4.1 INTRODUCTION

Marcel Proust once said, "time, which changes people, does not alter the image we have of them." The concept of time (i.e., long-term vs. short-term) has long been utilized to predict firm behavior and – more often than not – scholars proclaiming that temporal orientation (TO) is an intentional choice and an attribute associated with a particular firm type implying stability over time (e.g., public pension funds are long-term oriented; activist hedge funds are short-term oriented). However, TO may not constitute a deliberate strategic choice on behalf of an individual but rather a concept that is subject to change over time, affecting our cognitive processes guiding our choices and behaviors rather than constituting a strategy in itself (Loewenstein & Thaler, 1989; Lumpkin & Brigham, 2011). As such, internal and external contextual factors (e.g., firm-level financial distress and macro-level financial crisis) may affect the TO of a decision-maker. Time is embedded in many strategic decisions, but it is particularly salient for intertemporal choices (e.g., activities characterized by immediate costs and deferred gains). Accordingly, time represents a fundamental component of the concept of sustainability (Bansal & DesJardine, 2014) and "is inextricably linked to the ability to think and act with a longer time horizon in mind, and to manage the intertemporal tensions inherent in balancing short-term financial considerations and longer-term social […] considerations" (Sternad & Kennelly, 2017, p.179). Over the past decades, corporate social performance (CSP) has become a subject that is increasingly at the center of attention (cf., Malik, 2015) because the demand for solutions to social issues is increasingly important to a variety of stakeholders, and governments and social institutions appear incapable of resolving the issues of today's society. Family-controlled businesses play a pivotal role in this debate because they represent the dominant form of business (La Porta, Lopez-de-Silanes, & Shleifer, 1999; Morck & Yeung, 2003) and contribute significantly to employment, economic, and social prosperity around the globe (Shanker & Astrachan, 1996; Anderson & Reeb, 2003; Sirmon & Hitt, 2003), which might allow attenuating social issues caused by an institutional void.

Family firms[31] do not only constitute the most pervasive form of business (La Porta, Lopez-de-Silanes, & Shleifer, 1999; Morck & Yeung, 2003), but their behavior deviates from

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[31] We define family firms as firms in which one family has significant influence over strategic decisions (Miller et al., 2007) via both their ownership and active board participation by family members, which concurs with our upper-echelon-related logic that cognitive processes on the individual level affect strategic behavior on the organizational level (Hambrick & Mason, 1984).

the traditional economic theory of profit maximization (Gomez-Mejia et al., 2007) as they have "a strong social element affecting the decisions that determine […] strategy" (Chrisman, Chua, & Steier, 2005: p.238). While some scholars argue for a greater level of CSP[32] among family firms owing to a long TO, which is rooted in the goal to preserve socioemotional wealth (SEW) (Cennamo et al., 2012), others suggest that family ownership may have no or a negative impact on prosocial activities (Morck & Yeung, 2004; Kellermanns et al., 2012a; Cruz et al., 2014). Advocates of a positive relationship between family firms and CSP point to the importance of reputation and a desire to protect family long-term assets (Berrone et al., 2010; Block, 2010; Dyer & Whetten, 2006). On the other hand, opponents claim that the same socioemotional considerations facilitate family-centric behavior at the expense of other stakeholders (Morck & Yeung, 2004; Kellermanns, Eddleston, & Zellweger, 2012b; Cruz et al., 2012). Despite a notable recent growth in the literature surrounding the topic of family firms and CSP, mixed empirical evidence and substantially diverging theoretical views have left the debate far from being settled (Canavati, 2018).

There are multiple possible explanations for the prevalence of mixed findings surrounding the topic of CSP in the family business domain. First, the concept of TO has hardly received any attention among scholars, although prior work acknowledges the vital role that time plays in strategic behavior, particularly in intertemporal choices such as CSP (Lumpkin & Brigham, 2011; Bansal & DesJardine, 2014; Bansal, Jiang, & Jung, 2015). As a result, our current knowledge of the effects of TO remains limited crippling significant advances in our understanding of the decision-making process about intertemporal choices. Second, CSP is often assessed as one comprehensive measure collapsing multiple dimensions (e.g., social, environmental, and governance) into a single unit of analysis despite their theoretical and practical distinctiveness (Cruz et al., 2014). This can lead to distorted estimates and inaccurate interpretations. Third, many scholars ground their theoretical argumentation on the assumption that the decision process among family firms is guided by SEW considerations neglecting the possibility of a more complex decision process involving trade-offs between financial and non-financial utility considerations (cf., Gomez-Mejia et al., 2011). This oversimplification has

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[32]We follow previous scholars in defining CSP as "a business organization's configuration of principles of social responsibility, processes of social responsiveness, and policies, programs, and observable outcomes as they relate to the firm's societal relationships" (Wood, 1991, p.693). Owing to our interest in understanding the decision-making process about intertemporal choices, we decided to focus on CSP, which is representative of measurable outcomes related to prosocial behavior and "requires more than just the consideration of projects with deferred pay-offs; it requires a real commitment of funds to such projects "(Souder & Bromiley, 2012, p.551).

likely curtailed our understanding of the underlying decision-making process and the mechanisms guiding family firms' strategic behavior (Gomez-Mejia et al., 2014). In this context, the final gap pertains to the prevalent assumption that family firms act – per se – under the premise of a long TO (cf., Miller & Le-Breton Miller, 2005, Gomez-Mejia et al., 2011), which disregards the critical impact of contextual factors on intertemporal choices in the decision-making process surrounding CSP (Cruz et al., 2012). As a result, it remains poorly understood whether or not family firms engage in more prosocial behavior than non-family firms and what mechanisms shape the respective decision-making process.

To address the above-described gaps in the literature, we analyze and compare the weighting and trade-off process between CSP-related financial and non-financial utilities (i.e., SEW) by integrating knowledge from the intertemporal choice literature (Loewenstein & Thaler, 1989; Lumpkin & Brigham, 2011). In addition, we explore the role of contextual factors and their impact on cognitive processes to explain why changing internal and external situational factors may affect the decision-making process of intertemporal choices. Specifically, we challenge the prevailing assumption that family firms act – per se – under the premise of a long TO by theorizing that contextual factors (i.e., internal and external financial distress) trigger variations in managerial TO thereby affecting the perceived utilities of strategic choices. This change, in turn, should be observable in a firm's CSP outcomes. In this study, we will specifically examine the social dimension of CSP[33]. This allows us to tightly connect our theoretical argumentation to the empirical results for two reasons. Firstly, this particular dimension is closely associated with family idiosyncratic *identifiable ownership* and *long-term ownership*, which are believed to have a significant impact on the decision-making process of intertemporal choices. Secondly, the distribution of costs and benefits over time is characteristic of an intertemporal strategic choice (cf., Ganesan, 1994; Miller, Le Breton-Miller, & Scholnick, 2008; Lumpkin & Brigham, 2011). We analyze panel data covering 890 listed U.S. firms between 2002 and 2010 and exploit the global financial crisis of 2008 as an exogenous shock (i.e., external financial distress) in addition to firm-level bankruptcy risk indicators (i.e., internal financial distress). Our results confirm a general positive effect of family firms on CSP in a "steady-state" condition and support the idea of significant changes in TO induced by internal and external contingencies.

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[33] For simplicity, we shall use the term CSP or prosocial behavior/activity below when referring to the social dimension.

Our study provides several contributions to family business research and the domain of CSP research. First, we enrich the theoretical debate in family business research. While prior work focused primarily on non-financial considerations, we analyze the role of temporal considerations more profoundly and integrate insights from the intertemporal choice model (Loewenstein & Thaler, 1989). This adds to our knowledge about the mechanisms and processes guiding the decision-making process of family firms and is a response to the call of Le Breton-Miller and Miller (2011) and Slawinski and Bansal (2015) for a multitemporal view. Toward this end, we theorize that TO functions as a higher-order heuristic affecting managerial cognitive processes explaining differences between family and non-family firm CSP. Second, we contribute to our knowledge stock regarding the mental decision model family-owned businesses likely adhere to by arguing that potential financial and non-financial CSP utilities are considered in a more complex decision model. To date, many family business studies build on the underlying assumption that SEW loss aversion functions as the central reference point shaping the decision-making process of family firms. We add to this debate by explaining that family firms are likely confronted with a more complex mental model involving the trade-off between financial and non-financial utilities. Third, we extend prior family business research by explaining the role of the broader macro-level environment in modeling a family firm's financial situation/performance as a moderator. Our results corroborate the idea that the moderating effect of firm-level financial distress on CSP is likely cushioned by social capital, and that a macro-level crisis can diminish this cushion. In this regard, we challenge the widely held assumption that family firms are – per se – guided by a long TO (cf., Sirmon & Hitt, 2003; Gomez-Mejia et al., 2007). By investigating two essential moderators of managerial TO (i.e., internal and external financial distress), we join Sternad and Kennelly's (2017) quest to resolve the issue that "there has also been surprisingly little research on what makes managers think and act in the long term" (p.181). With this study, we hope to highlight the necessity for future family business scholars to assess the validity of popular assumptions and decision models.

4.2 THEORY AND HYPOTHESES

4.2.1 Corporate Social Performance

The topic of CSP has enjoyed much attention in the literature (cf., Velte, 2021). While the focus on establishing its positive direct impact on firm performance, unveiling related moderators (e.g., region, size, diversity, industry, ISO, export orientation, culture), and identifying long-term orientation as a critical antecedent to CSP has provided many valuable insights, "there has been surprisingly little research on what makes managers think and act in the long term "(Sternad & Kennelly, 2017, p.181). Time has been universally identified as a key element in CSP (cf., Gladwin et al., 1995; Held, 2001; Bansal & DesJardine, 2014), yet the time dimension, potential contingencies affecting TO, and how this concept affects the decision-making process is often absent from CSP research (Slawinski & Bansal, 2012; 2015) and even strategy scholarship (Bansal & DesJardine, 2014; Sternad & Kennelly, 2017).

Following Souder and Bromiley (2012), we define TO as "the relative importance given in strategic choices to investments with differing distributions of costs and benefits over time" (p.551). The temporal orientation (TO) logic enables us to explain how the perceived utilities in a decision process are affected by higher-order cognitive processes reflecting a decision-maker's temporal preference. According to Lumpkin and Brigham (2011), TO functions as a higher-order heuristic, affecting the interpretation and evaluation of information rather than constituting a strategy in itself. Viewed as a dominant logic, a firm's TO functions as an information filter and mental map guiding the cognitive processes before and during a decision process rather than constituting a type of strategy or resource (Lumpkin & Brigham, 2011). Hence, the TO logic allows us to better understand the evaluation process of financial and non-financial utilities, particularly those pertaining to intertemporal choices characterized by immediate costs and deferred gains (e.g., CSP). The TO of a decision-maker affects the utility evaluation of strategic choices through two related mechanisms. First, TO is reflected in the discount rate used by a decision-maker, which should equal their marginal rate of time preference (Loewenstein & Thaler, 1989). A decision-maker with a short TO uses a higher discount rate attributing lower value to utilities realized in the future, thus rendering the evaluation of inter-temporal choices less desirable. Second, TO determines the total time periods a decision-maker considers in their utility calculus. In the words of Lumpkin and Brigham (2011), a firm characterized by a long TO "values extended time horizons and assigns

greater importance to the future "(p.1151), which allows decision-makers to take deferred utilities into account when evaluating a choice. A short TO, in contrast, curtails a decision-maker's ability to consider utilities that materialized after an extended period of time, leading to the disregard of such long-term utilities in the decision process.

In the domain of management, it is widely assumed that TO is constant over time (e.g., pension fund managers have a long TO, hedge fund managers have a short TO), yet there has been very little research on potential contingencies affecting TO (Sternad & Kennelly, 2017, p.181). According to the classic discounted utility model (Samuelson, 1937), the sum of discounted future utilities is maximized. Here, the discount rate is assumed to equal a stable rate corresponding to an individual's time preference. However, there has been little empirical support for the simple discount utility model (Loewenstein & Thaler, 1989). Instead, the intertemporal choice literature advocates that a decision-maker's TO is not necessarily stable but subject to contingencies (Loewenstein & Prelec, 1992; Sternad & Kennelly, 2017) that can vary over time (Chrisman & Patel, 2012; Sounder & Bromiley 2012). In the context of corporate strategic decision-making, we suggest that TO may vary due to changes in risk and uncertainty inside or outside the organization. These changes, in turn, should impact the cognitive processes of decision-makers pertaining to intertemporal trade-offs.

Prosocial activities are widely regarded as a vehicle to develop trust-based relationships with a variety of key stakeholders inside and outside the organization (Cennamo et al., 2012) characterized by immediate and continuous costs while associated benefits – such as access to valuable unique resources through reciprocity (financial) and a good reputation (non-financial) – generally require a significant amount of time to develop (Coleman 1988; Harrison et al., 2010; Lumpkin & Brigham, 2011; Cennamo et al., 2012). Accordingly, CSP represents the outcome of an intertemporal choice, and its utility should be affected by a decision maker's TO. For simplicity, we refer to choices characterized by immediate costs and deferred benefits as intertemporal choices below. Despite variation in the definition of the term CSP, it generally refers to a firm's measurable social performance "beyond the narrow economic, technical, and legal requirements of the firm" (Davis, 1973, p.312). While prior work often refers to multiple dimensions (i.e., environment, social, and governance) of CSP simultaneously, we focus our attention on the social dimension to account for each dimension's theoretical and practical distinctiveness (Cruz et al., 2014). In the context of family firms and intertemporal choices, the social dimension of CSP is particularly suitable because it pertains to a firm's impact on the well-being of society, which is highly relevant to family firm decision-making. Family firms

often have strong social ties to their communities and likely prioritize social activities to maintain and enhance their reputation and legitimacy. The social dimension can also be seen as a way for family firms to demonstrate their commitment to long-term relationships with stakeholders, which is consistent with their intergenerational perspective.[34]

As such, typical social engagement includes community involvement and development, caring for human rights, employing human resource systems that care for employees and strengthen labor relationships, promoting diversity, and developing products and services that have social features (McWilliams & Siegel, 2001; Aguilera et al., 2007). Due to this distribution of costs and benefits over time, a firm's CSP is particularly sensitive to the TO and should – at least partly – reflect a decision-maker's temporal preference. Our goal is to model the impact of internal and external contingencies on a decision-maker's temporal orientation to determine the extent to which CSP is pursued.

4.2.2 Family Firms and Corporate Social Performance

The role of family ownership is two-fold; it is an antecedent of TO, and it affects the components that are considered in a decision-maker's utility calculus (i.e., financial and non-financial). The behavior of family firms is known to deviate from the traditional economic theory of profit maximization (Gomez-Mejia et al., 2007) as they have "a strong social element affecting the decisions that determine […] strategy" (Chrisman, Chua, & Steier, 2005, p.238). The classical economic theory suggests that firms evaluate strategic choices to maximize financial utilities (Gomez-Mejia et al., 2011; Berrone et al., 2012). Family business scholars, in contrast, advocate that family firms primarily maximize the utility of their affective endowment related to non-financial wealth in addition to considering financial utilities (Gomez-Mejia et al., 2014, Kotlar et al., 2018). The non-financial endowments have been labeled socioemotional wealth (SEW) (Gomez-Mejia et al., 2007). In the context of TO and CSP, we want to emphasize two SEW-related elements, which are of particular relevance: First, family owners "manage the business to realize a vision that extends beyond the lifespan of the current generation" (Chrisman et al., 2012; p.274). Grounded in the SEW framework, family business scholars

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[34] The environmental dimension of CSP, on the other hand, is more focused on a firm's impact on the natural environment. While this dimension may also be relevant to family firm decision-making, it may not be as central to their identity and values as the social dimension. Additionally, environmental concerns may be viewed as less urgent or immediate than social issues, especially in times of financial distress or a financial crisis.

argue that this *long-term ownership* is a prerequisite in achieving the non-economic goals governing the decision process of family firms (Gomez-Mejia et al., 2007; Souder & Bromiley, 2012). Second, family firms have a heightened need for reputation and legitimacy because corporate behavior does not only affect the firm's image but directly reflects on the owners. Thus, a family's reputation (i.e., SEW) is tightly linked to corporate activities (Adams, Taschian, & Shore, 1996; Dyer & Whetten, 2006, Gomez-Mejia et al., 2007). As a result of this *identifiable ownership*, family firms may be more prone to behave socially and be responsive to stakeholder claims (Miller, Le Breton-Miller, & Scholnick, 2008; Gomez-Mejia et al., 2011). *Long-term ownership* and *identifiable ownership* are likely to affect the cognitive processes of CSP-related utility evaluations. We propose that family firms, compared to non-family firms, have an increased likelihood to favor CSP for two reasons:

Regarding *long-term ownership*, it is well established that family ownership is accompanied by a longer TO compared to non-family firms (Miller & Le Breton-Miller, 2005, Gomez-Mejia et al., 2007). We propose that this long TO associated with family ownership affects cognitive processes rendering the perceived probability of financial gains of CSP higher than that of non-family firms. When evaluating the probability of CSP-related financial utilities, a decision-maker's TO functions as a higher-order heuristic determining the number of deferred time periods considered when evaluating the prospect and at what rate future utilities are discounted. As we have pointed out above, a decision-maker with a long TO considers an extended time window including utilities in the more distant future and employs lower discount rates for deferred utilities. As a result, the perceived financial utility of CSP is higher, rendering prosocial choices more favorable among family firm managers. Non-family firm managers, on the contrary, have been demonstrated to systematically overvalue immediate returns relative to future returns (Souder & Bromiley, 2012), which has been labeled temporal myopia (Levinthal & March, 1993; Miller, 2002) and its presence is particularly pronounced among publicly traded firms and in the US economy (cf., Graham, Harvey, & Rajgopal, 2006). We acknowledge that the external pressure from capital markets to pursue short-term goals (Demirag, 1995; Bushee, 2001) may also negatively affect family managers' TO in the public domain. However, the literature suggests that family ownership "as a class may, on average, embrace longer perspectives and invest more generously in the future than rival non-family businesses operating in the same domain" (Le Breton-Miller & Miller, 2006, p.736). Additional support for this proposition comes from Liljeblom and Vaihekoski (2009), who found that managers of public family firms feel significantly less pressured to abandon long-term goals in

favor of short-term goals than their non-family firm managers. In short, although public family firms in the US may feel restricted in their ability to fully act in line with their inherently long TO compared to private family firms, it appears plausible to assume that their cognitive processes are still guided by a longer TO than that of their non-family firm counterparts operating in the same domain.

Identifiable ownership refers to family members' identification with the firm. In the words of Berrone, Cruz, and Gomez-Mejia (2012), "the identity of a family firm's owner is inextricably tied to the organization, [..., which] causes the firm to be seen both by internal and external stakeholders as an extension of the family itself "(p.262) and corporate actions reflect on the family name and its members (Miller, Le Breton-Miller, & Scholnick, 2008; Berrone et al., 2010). Hence, an owning family does not only see the firm as a way of making profits, but non-financial utilities pertaining to image and reputation constitute an integral element in the utility calculus of this ownership group (Gomez-Mejia et al., 2007, 2011). In other words, the utility calculus of CSP among family owners comprises, in addition to financial utility, also non-financial utilities (i.e., SEW), which are absent in the calculus of non-family firms according to the classical economic theory. These non-financial utilities include conveying and preserving a positive family image and reputation (Westhead, Cowling, & Howorth, 2001; Sharma & Manikutty, 2005), deriving a sense of identity from the firm (Sharma, 2004), enjoying personal recognition for charitable activities by the firm (Schulze, Lubatkin, & Dino, 2003b), and experiencing private prestige in the community and social support from friends and acquaintances(Renato & Davis, 1996; Stafford et al., 1999; Corbetta & Salvato, 2004; Berrone et al., 2010; Cennamo et al., 2012).

Based on the arguments presented above, we propose that the total perceived utility derived from prosocial behavior is likely higher for family firms than for non-family firms. CSP constitutes an *intertemporal choice* characterized by immediate costs but deferred benefits. A long TO leads to a lower discount rate in the evaluation of deferred financial utilities and affects the cognitive evaluation process so that family firms also consider time periods in the more distant future. Hence*, long-term ownership* associated with family firms is likely to render the financial evaluation of CSP favorable compared to non-family firms. Moreover, due to their *identifiable ownership*, utilities pertaining to non-financial considerations (i.e., reputational benefits of CSP) represent an integral component of a family firm's utility calculus. This utility component is absent in the calculus of non-family firms striving for profit maximization. Hence, we hypothesize that:

Hypothesis 1: Family firm status has a positive effect on the level of CSP.

4.2.3 The Moderating Effect of Internal Financial Distress

In the above, we suggested that family firm idiosyncrasies (i.e., *long-term ownership* and *identifiable ownership*) generally lead to a long TO that manifests in elevated levels of CSP in a "steady-state" condition. However, a decision-maker's TO is not necessarily stable over time (Loewenstein & Thaler, 1989). Instead, the intertemporal choice literature suggests that TO may vary due to changing internal and external conditions (cf., Sounder & Bromiley 2012; Chrisman & Patel, 2012). Building on this premise, we propose that internal contextual factors can induce a change in the TO of family managers, thereby affecting the utility evaluation of CSP. Specifically, it is argued that the increased benefits associated with family firm *long-term ownership* and *identifiable ownership* attenuate as firm-level financial distress increases. Our baseline hypothesis established that the cognitive processes guiding family firm managers' behavior (i.e., long TO) allow them to consider an extended time window in their utility evaluation and discount deferred utilities at a lower rate. However, internal financial distress has been suggested to put managers under severe levels of pressure (Campa & Camacho-Miñano, 2015). Such "threats induce psychological stress and anxiety, which have a cognitive and motivational influence on managers" (Chen & Miller, 2007, p.370) and affect the cognitive processes (Staw, Sandelands, & Dutton, 1981) that are particularly determinant of intertemporal decision evaluations. We put forward that increased firm-level bankruptcy risk likely shortens a family firm manager's TO, leading to a less favorable utility evaluation of CSP. In addition, we expect an increased pressure for short-term performance to attenuate the cognitive perception of perceived non-financial utilities unique to family businesses.

Managers confronted with a heightened bankruptcy risk have been demonstrated to increasingly engage in behaviors associated with short-term performance benefits at the expense of long-term value creation (Campa & Camacho-Miñano, 2015). Empirical evidence supports the idea that managers conserve resources (e.g., cutting expenditures) to boost short-term performance regardless of the disadvantages and costs for long-term value creation (Bhojraj et al., 2009, Souder & Bromiley, 2012). Such behaviors include – but are not limited to – conserving resources (Chen & Miller, 2007), focusing on cost reductions (Schendel, Patton, & Riggs, 1976), abolishing operations and business expenses that are not strictly necessary to maintaining current operations (March & Shapira, 1987). In a similar vein, research suggests

that, in extreme cases of financial distress, managers increasingly engage in antisocial and fraudulent behaviors like earnings manipulations (Rosner, 2003; Campa & Camacho-Miñano, 2014). Unambiguously, these behaviors are indicative of a shortened TO. Since significant financial short-term returns from CSP are questionable (McWilliams & Siegel, 2001; Cruz et al., 2014), it can be inferred that financial distress negatively affects the utility calculus of CSP. Intertemporal choices suffer particularly from severely shortened time windows and higher discount rates for future utilities. Accordingly, we propose that the TO advantages of family firms associated with *long-term ownership* deteriorate as financial distress increases. Given that public non-family firm managers – particularly in the United States – act under the premise of a short TO (cf., Jensen and Murphy, 1990; Drucker, 1993; Marginson and McAulay, 2008), we expect family managers to behave more like non-family firm managers as internal financial distress increases.

In addition to the above-proposed prioritization of short-term financial utilities, the non-financial considerations owing to *identifiable ownership* may also be negatively affected. As firm-level financial distress increases, a shift in preferences from non-financial to financial utilities may occur (cf., Chrisman & Patel 2012). This shift can also be affected by TO considerations pertaining to the importance attributed to long-term non-financial gains.[35] In contrast to non-family firms, family firms are confronted with balancing two – sometimes competing sometimes harmonizing (Martin & Gomez-Mejia, 2016) – reference points: financial wealth and SEW (Gomez-Mejia et al., 2014; Martin & Gomez-Mejia, 2016; Alessandri et al., 2018). In line with Chrisman and Patel (2012), we argue that "the relative importance of these [reference points] should vary according to the priorities placed on long- and short-term family goals" (p.977). With an increased bankruptcy risk and the associated shorter TO guiding the managerial cognitive processes, the perceived utility ascribed to non-financial considerations (e.g., reputational benefits of CSP) likely diminishes in favor of short-term economic utility prioritization (Chen & Miller, 2007; Gomez-Mejia, 2007, 2010, 2011; Berrone et al., 2012; Chrisman & Patel, 2012). Empirical evidence suggests that the prioritization of financial utilities over non-financial utilities may be particularly salient when bankruptcy represents an imminent risk to firm survival, accompanied by a dual loss of future

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[35] We acknowledge that some non-financial utilities from prosocial activities materialize in the present. This is particularly true for tactical (i.e., ad hoc) initiatives. However, a serious commitment to CSP requires a strategic approach and generally involves changes in organizational structures and routines, which are largely associated with long-term utilities (Bansal, Jiang, & Jung, 2015).

financial wealth and SEW. In the words of Berrone and Patel (2012), "faced with an increasingly untenable trade-off between a desire to preserve socioemotional wealth and declining firm performance, family owners and managers are likely […] to reverse that decline" (p.981). Based on the above, we hypothesize that:

Hypothesis 2: Internal financial distress in the form of increased bankruptcy risk negatively moderates the positive relationship between family firm status and CSP.

4.2.4 The Moderating Effect of External Financial Distress

Whereas we previously focused on the role of an internal situational factor on TO, we will now discuss why external situational factors may affect the above-proposed moderation. It is argued that financial distress in a firm's macro-level environment (i.e., financial crisis) exacerbates the moderation of internal financial distress.

We expect internal financial distress to shorten the TO guiding intertemporal choices, yet this effect may be cushioned by the goodwill and resources available from key stakeholders in a family firm's network. Family firms possess a unique intangible resource, namely social capital (Sirmon & Hitt, 2003; Miller et al., 2008; Gedajlovic & Carney, 2010), which may function as a buffer against the TO shortening effect of financial distress (cf., Adler & Kwon, 2002; Hitt et al., 2002; Arregle et al., 2007; Villalonga & Amit, 2010; Gomez-Mejia et al., 2011, Minichilli et al., 2016). Social capital is defined as "[…] the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (Nahapiet & Ghoshal, 1998, p.243). Family firms are superior at developing and leveraging these relationships facilitating the agglomeration of social capital (Lester & Cannella, 2006; Arregle et al., 2007; Gedajlovic et al., 2012). It is frequently suggested that social capital serves as a valuable resource, which can be leveraged in times of hardship, granting privileged access and treatment thanks to high-quality ties with financiers, customers, suppliers, and communities (Arregle et al., 2007; Gomez-Mejia et al., 2011; Souder & Bromiley, 2012, Minichilli et al., 2016). As such, benefits ascribed to social capital can take various forms to cushion performance hazards, for example, by providing access to better credit conditions, delayed payments to suppliers, and support by loyal customers and employees (Lyman, 1991; Adler & Kwon, 2002; Arregle et al., 2007; Micelotta & Raynard, 2011; Minichilli et al., 2016). Hence, we propose that family firm managers may perceive social capital as an 'insurance against risk' cushioning the perception of

underperformance as a threat and thus buffering against a TO shortening effects of internal financial distress.

However, this buffer is likely to dissipate during a global financial crisis. A major exogenous shock, such as a financial crisis, is accompanied by an economic downturn and a surge in risk and uncertainty (Wan & Yiu, 2009; Kunc & Bhandari, 2011). First, key stakeholders may be unable to provide family firms with generous treatment in this situation because they are confronted with substantial performance hazards. Second, key stakeholders may be less willing to engage in acts of generosity because expected long-term benefits resulting from actions of reciprocity diminish during times of hardship. Prior literature indicates that increased market uncertainty in a firm's external environment has a significant negative effect on actions of reciprocity among long-term partners (Ryu, Park, & Min, 2007). Given the reduced dependability on stakeholders as an 'insurance against risk,' we suggest that family firm managers perceive internal financial distress as a more severe threat during a global financial crisis. Taken together, we infer that external financial distress amplifies the TO shortening effect of internal financial distress by undermining the TO buffer associated with a family firm's social capital. Accordingly, we hypothesize that external financial distress promotes a negative moderation of internal financial distress.

Hypothesis 3: External financial distress intensifies the negative moderation of internal financial distress on the relationship between family firm status and CSP.

4.3 SAMPLE AND METHODS

4.3.1 Sample

To empirically test our hypotheses, we constructed a rich sample based on the Standard & Poor's 1500 (S&P 1500) covering the period between 2002 and 2010. Although family firms represent the dominant form of business (La Porta, Lopez-de-Silanes, & Shleifer, 1999), their presence in the public domain is relatively low compared to the private domain, with 10% conforming to our conservative definition. Hence, we opted for the S&P 1500 as this index covers 90% of the market capitalization of U.S. stocks ensuring the identification of an adequate number of family firms to conduct meaningful statistical analysis. The timeframe between 2002 and 2010 allows for a representative pre and post-crisis analysis window. Due to differing

accounting and regulatory standards affecting a firm's investment choices we excluded the following industries from our sample: Corporations from the utility sector (SIC 46, 48, & 49), the financial sector including the depository and non-depository sector (SIC 60-61), brokers (SIC 62), insurance companies (SIC 63-64), real estate firms (SIC65), and holdings and investment offices (SIC 67). After merging and manipulating the data set according to the below-described procedure or final sample covered the period between 2002 and 2010 counting 955 distinct firms, of which 89 comply with our family firm definition.

4.3.2 Dependent Variable

To obtain our dependent variable, we followed previous scholars and utilized the data set from the data vendor MSCI – formerly KLD and GMI (cf., Dyer & Whetten, 2006; Minichilli et al., 2016). This data set covers approximately 3000 U.S. firms and contains data on a wide range of CSP measures, which makes the data set popular within the domain of CSP-related research (cf., McWilliams & Siegel, 2001). Regarding corporate social indicators, the data set contains performance indicators covering the following categories: community, human rights, employee relations, diversity, and product. Each category covers both positive and negative indicators. Following previous research, we measured a firm's prosocial behavior by subtracting the sum of negative CSP indicators from the sum of positive CSP indicators (cf., Bingham et al., 2011). This procedure resulted in a variable measuring CSP for each firm i in year t along 39 distinct items[36].

4.3.3 Independent Variable and Moderator

Family Firm. We retrieved the family firm status information from GMI ratings. In line with our definition and previous studies (e.g., Gomez-Mejia et al., 2014, 2019; Kotlar et al., 2018), a firm qualifies as a family firm when the family owns at least 20% of outstanding equity and is actively involved in corporate affairs. Specifically, the operationalization requires a family-controlled firm to be "a company where family ties, most often going back a generation or two to the founder, play a key role in both ownership and board membership. Family members may not have full control of the shareholder vote (greater than 50%), but will generally hold at least

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[36] In the strict sense, our dependent variable is discrete. However, the variable was treated as a continuous variable in our model estimates, to account for the variable's empirical properties that resulted from the large number of items incorporated in the measure (ie., 39).

20%" (cf. Gomez-Mejia et al., 2014, 2019). This ownership threshold is relatively conservative among publicly traded family firms, given that the Security Exchange Commission (SEC) considers a threshold of 5% sufficient to influence strategic decision-making (Villalonga & Amit, 2009; Berrone et al., 2010). However, our choice of a stricter ownership threshold combined with active family involvement is advantageous for this study as it ensures that identified family firms have substantial influence to shape corporate strategy in a meaningful way (cf., upper echelon theory; Hambrick & Mason, 1984). After a rigorous examination of the data structure, we discovered a high number of changes in GMI's family firm variable in 2004 and 2005. This pattern is suspicious, given that family firms are considered a very stable ownership group.[37] (Gomez-Mejia et al., 2011). To cure this issue, we decided to follow Gomez-Mejia et al. (2014) and kept the variable constant at the firm level because changes in the family firm variable occurred with the expected low frequency in all other years. Our family firm dummy equals 1 if a firm is identified as a family firm in more than 75% of its observations.[38] In accordance with prior research (Block, 2013; Miller et al., 2013; Kotlar et al., 2018) suggesting that family and founder firms tend to have distinct strategic objectives due to socioemotional preferences and agency issues that affect their corporate innovation, we limited our analysis to true family firms, excluding founder firms from the family firm measure.

   Internal Financial Distress. The bankruptcy risk of a firm, proxies for internal corporate distress and was measured by the Altman z-score (Altman, 1968, p.603) for firm *i* in year *t*. The Altman z-score is widely used by scholars and practitioners alike and is considered an effective predictor of corporate distress (Altman & Saunders, 1997; Altman, 2013). The measure is calculated according to the following formula:

$$Z_{i,t} = 1.2\, X_{i,t}^1 + 1.4\, X_{i,t}^2 + 3.3\, X_{i,t}^3 + 0.6\, X_{i,t}^4 + 0.999 X_{i,t}^5 \tag{7}$$

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[37] This observation may be an artifact that resulted from fluctuations around the ownership threshold or changes in the identification procedure on behalf of the data vendor. Unfortunately, the author did not receive any response from the data vendor GMI ratings after multiple contact attempts.

[38] This 75% threshold is used to prevent that small fluctuations around the shareholder vote threshold of 20% would lead to misidentifications of family firms as non-family firms in a given year; it also accounts for potential misidentifications by GMI Ratings in the years 2004 and 2005, for which we noticed an unusually high number of changes in family firm status based on the GMI indicator, that we could not confirm based on a manual check of the 14A filings retrieved from the Securities and Exchange Commission EDGAR database. For the years 2006-2009, the GMI-based family firm indicator again appeared much more stable.

, where X^1 = working capital / total assets, X^2 = retained earnings / total assets, X^3 = earnings before interest and taxes / total assets, X^4 = market value of equity / book value of total liabilities, X^5 = sales / total assets. Since the variable is an accounting-based measure representing a snapshot recorded at the end of a period, we lagged the variable by one period to account for the time difference between observation and impact on strategic decision-making. Importantly, this also effectively controls for potential reverse causality. To facilitate the interpretation of the coefficient, we reversed the variable so that larger values indicate increased firm-level financial distress[39].

External Financial Distress. The global financial crisis of 2008 constitutes a sudden and unexpected natural exogenous shock, which we exploit in our analysis to reflect the impact of external financial distress. Our binary variable was coded to equal 1 from 2008 until 2009 and 0 otherwise[40]. This period covers both the year of the bankruptcy of Lehman Brothers Holding on 15th September 2008 and the following year, which was characterized by a significant economic downturn and significant market uncertainty. Between 2008 and the end of 2009, 85% of the firms in our sample recovered to their pre-crisis stock prices.

Control Variables. We control for the following confounding variables, which have been shown to affect CSP (DesJardine, Bansal, & Yang, 2019): trend indicator, age, size, intangible assets, workforce, capital intensity, profitability, equity-to-debt ratio, innovativeness, and industry. The trend indicator accounts for a potential macroeconomic trend associated with prosocial behavior over time. This variable is a continuous variable ranging consecutively from 1 to 9 for each respective year in our sample. Age is measured by the natural logarithm of the number of years since incorporation. Younger firms have less experience handling internal and external distress. Moreover, they have less time to build up social capital and likely encounter greater difficulty in acquiring resources that help mitigate situations of financial distress (Iyer

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[39] As a robustness test, we also transformed the moderator variable to range from 0 to 1 ($Z' = \frac{z}{1+z}$) to limit the influence of outliers and to reduce possible correlations with other variables. The unreported results are consistent with the untransformed variable estimates.

[40] The second moderator was not lagged by one year for the following reasons: Firstly, we want to ensure that the moderator only captures the distinct impact of the crisis period. Lagging the proxy prohibits the isolation of the crisis from the recovery period following in 2010, which is problematic. Due to data availability, lagging the second moderator also reduced our sample size, impairing model comparability. Finally, reverse causality is no reason to justify a lag since the 2008 financial crisis constitutes an exogenous shock. Nonetheless, we estimated Model 4 with the crisis moderator lagged by one period as a robustness test, which did not alter the estimated interaction effects in a meaningful way. Consistent with our presented estimates for Model 4 (Table 2), the first interaction effect remained insignificant and small in size ($\beta = 0.003$, $p < 0.886$), and the three-way interaction remained negative and significant ($\beta = -0.067$, $p < 0.010$).

et al., 2013). Size is calculated by the natural logarithm of the book value of total assets. Banks and investors may judge larger firms to be more resilient during the financial crisis (Iyer et al., 2013) facilitating the attraction of external finance and investors' support, which may mitigate the perception of a threat. Intangible assets equal the market value of assets divided by the book value of assets. The market value of assets captures the value of intangible assets in addition to the value of physical assets (DesJardine et al., 2019). While pure financial indicators help banks, suppliers, and other stakeholders gauge a firm's resilience during a crisis, intangible assets have been demonstrated to serve as a substitute for trust in times when other indicators are less reliable. Workforce equals the natural logarithm of the number of employees. During a crisis, firms often downsize their workforce significantly to increase operating efficiency by reducing labor costs (Chadwick, Hunter, & Walston, 2004). This practice aims at improving the firm's competitive position (Cameron & Huber, 1997; Noe et al., 2017). As a result, firms with a higher workforce and thus impaired operating efficiency and liquidity may be inclined to reduce costs in other domains (e.g., prosocial behavior) to boost their competitive position and free up resources. Operational efficiency is calculated by deflating sales by the book value of total assets. According to DesJardine et al. (2019), a more efficient firm may have an advantage since disappointed investors seek reliable investment sources. Conversely, less efficient firms may have an advantage as their asset slack can be liquidated and used more efficiently. Capital intensity is measured by the total capital expenditure divided by the total assets. Firms with a high capital intensity have been shown to perform worse in times of severe external shocks (Gittell et al., 2006). Profitability equals the EBITDA (earnings before interest, taxes, depreciation, and amortization) divided by a firm's total assets. More profitable firms may have an advantage in obtaining credits and investors' support during a financial crisis. The equity-to-debt ratio equals the total equity divided by the total long-term debt. The ratio indicates a firm's unused borrowing capacity, and firms with a high equity-to-debt ratio are considered more safe investment choices for banks and investors due to the security provided by the equity. Innovativeness is measured by citation-weighted patents, which proxies for a firm's intangible stock of knowledge (Block et al., 2013; Kogan et al., 2017). The use of this proxy has become a best practice (cf., Acharya & Subramanian, 2009; Aghion et al., 2013) to assess the economic and technological importance of innovations (cf., Harhoff et al., 1999; Katila, 2000; Block et al., 2013; Brav et al., 2016). Banks and investors may favor more innovative firms due to the value of these intangible assets and their association with substantial future returns. The patent data used to proxy for a firm's innovativeness was retrieved from the

publicly available data set provided by Kogan et al., (2017). All other raw data, such as daily stock prices and accounting data, were obtained from CRSP and Compustat Capital IQ. All accounting-based measures have been winsorized at the one percent level to prevent outliers from driving the estimates. Finally, we coded binary variables to control for industry differences. After analyzing the number of firms in each two-digit SIC group in the respective year, we noticed an uneven distribution, with 35 out of 55 SIC groups counting less than five individual firms per year on average. This small number does not allow to control for industry-fixed effects reliably. Hence, we aggregated similar industries to 10 industry groups with an average of 110 firms per industry to accurately control for industry fixed effects.[41]

4.3.4 Data Analysis

Our hypotheses were tested utilizing random effects estimation on the effect of family firm status on CSP before and during the financial crisis. We opted for a random-effects model for theoretical and practical reasons. Whereas fixed effects models are often utilized to analyze within-group variation (i.e., family firm vs. family firm), random effects models are helpful for between-group comparisons over time (i.e., family firm vs. non-family firm) while controlling for industry fixed effects (cf., Minichilli et al., 2016). In addition to the theoretical rationale, a random-effects model is necessary from a practical standpoint to estimate the direct effect of our time-invariant family firm proxy. All fitted models presented in this paper are estimated with a robust variance-covariance matrix to control for heteroscedasticity, which was identified utilizing the Breusch-Pagan test. The residuals of our models were close to a normal distribution. Multicollinearity was assessed with generalized variance-inflation factors (Fox & Monette, 1992). The values were relatively low, with a mean GVIF of 2.1 and 5.4 denoting the highest value. This value is well below the commonly accepted threshold of 10 (Kutner et al., 2005). The estimation results are based on the following models, where v_i denotes individual-specific effects and $\varepsilon_{i,t}$ the error terms assumed uncorrelated with the right-hand side variables:

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[41] Industry categories have been agglomerated as follows: Mining (SIC 10-14); Construction (SIC 15-17); Manufacturing (food, tobacco, apparel, lumber) (SIC 20-27); Manufacturing (chemicals and petroleum) (SIC 28-29); Manufacturing (rubber, leather, stone, metal) (SIC 30-34); Manufacturing (machinery, transportation, instruments) (SIC 35-39); Transportation, Communications, Electric, Gas and, Sanitary Service (SIC 40-47); Wholesale Trade (SIC 50-51); Retail Trade (SIC 52-59); Services (SIC 70-87).

Model 1: (8)

$$CSP_{i,t}^{social} = \alpha_0 + \delta' Control\ Variables_{i,t-1} + \theta' Industry_i + v_i + \varepsilon_{i,t}$$

Model 2: (9)

$$CSP_{i,t}^{social} = \alpha_0 + \beta_1 Family\ Firm_i + \delta' Control\ Variables_{i,t} + \theta' Industry_i + v_i + \varepsilon_{i,t}$$

Model 3: (10)

$$CSP_{i,t}^{social} = \alpha_0 + \beta_1 Family\ Firm_i + \beta_2 Internal\ Financial\ Distress_{i,t-1}$$
$$+ \beta_3 Family\ Firm_i \times Internal\ Financial\ Distress_{i,t-1}$$
$$+ \delta' Control\ Variables_{i,t} + \theta' Industry_i + v_i + \varepsilon_{i,t}$$

Model 4: (11)

$$CSP_{i,t}^{social} = \alpha_0 + \beta_1 Family\ Firm_i + \beta_2 Internal\ Financial\ Distress_{i,t-1}$$
$$+ \beta_3 External\ Financial\ Distress_t$$
$$+ \beta_4 Family\ Firm_i \times Internal\ Financial\ Distress_{i,t-1}$$
$$+ \beta_5 Family\ Firm_i \times External\ Financial\ Distress_t$$
$$+ \beta_6 Internal\ Financial\ Distress_{i,t-1} \times External\ Financial\ Distress_t$$
$$+ \beta_7 Family\ Firm_i \times Internal\ Financial\ Distress_{i,t-1}$$
$$\times External\ Financial\ Distress_t + \delta' Control\ Variables_{i,t} + \theta' Industry_i + v_i$$
$$+ \varepsilon_{i,t}$$
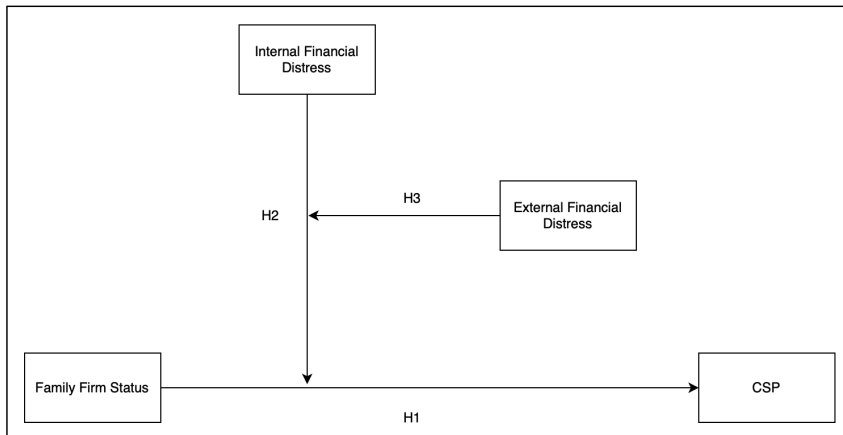
Figure 3. Conceptual Model

4.4 RESULTS

4.4.1 Descriptive Statistics

Table 4.1 presents the means, standard deviations, and correlations for the variables. The shown correlations between independent and control variables are within acceptable levels. As mentioned earlier, the computed GVIFs are moderate suggesting no reason for concern.

TABLE 4.1 Means, Standard Deviations, and Pearson Correlation Matrix

		Mean	STD	A	B	C	D	E	F	G	H	I	J	K	L	M	N
CSP^{social}	A	-0.28	1.30	1.000													
Family Firm	B	0.09	0.28	0.009	1.000												
Internal Financial Distress$_{t-1}^{z-score}$	C	-5.17	4.35	-0.146	0.045	1.000											
Internal Financial Distress$_{t-1}^{EMS}$	D	-11.76	9.38	-0.151	0.048	0.956	1.000										
External Financial Distress	E	0.38	0.49	-0.142	0.020	0.101	0.093	1.000									
Trend Indicator	F	5.33	2.54	-0.167	0.020	0.086	0.083	0.828	1.000								
Age	G	3.49	0.96	-0.010	0.138	0.072	0.074	-0.057	-0.059	1.000							
Assets	H	7.58	1.44	-0.217	-0.029	0.277	0.269	0.026	0.050	0.159	1.000						
Intangible Assets	I	3.01	1.86	-0.104	-0.052	0.199	0.193	0.008	0.032	0.097	0.623	1.000					
Workforce	J	2.25	1.27	-0.249	0.024	0.202	0.247	-0.032	-0.025	0.220	0.738	0.497	1.000				
Capital Intensity	K	0.05	0.04	-0.015	0.018	-0.037	-0.008	-0.076	-0.057	-0.028	0.056	-0.258	0.082	1.000			
Profitability	L	0.14	0.08	0.014	-0.005	-0.330	-0.270	-0.066	-0.023	0.092	0.102	0.056	0.192	0.300	1.000		
Equity-to-Debt	M	0.83	0.50	0.182	-0.022	-0.679	-0.690	-0.017	-0.007	-0.148	-0.448	-0.336	-0.425	-0.024	0.038	1.000	
Citation-weighted Patents	N	1.58	2.08	0.083	-0.156	-0.048	-0.091	-0.048	-0.052	0.105	0.344	0.364	0.143	-0.149	-0.017	0.054	1.000

Note: In this table, we present the means, standard deviations, and correlations. The values are based on the transformed variables used in our regression analysis. Bold formatting indicates a significance at the 5% level.

4.4.2 Hypotheses Testing

A graphic illustration of the tested relationships is depicted in Figure 3. In *Table 4.2*, we present the regression results for our hypotheses testing. Model 1 displays the estimates based on the control variables exclusively. The majority of these variables confirm the anticipated effects. Age, profitability, and innovativeness are, for example, positively associated with CSP and a large workforce negatively. Interestingly, there appears to be a significant negative trend toward the social dimension of CSP over time. Model 2 displays the baseline effect of family firm status on CSP. In conformity with our first hypothesis, the model estimate suggests a strong positive effect ($\beta = 0.140$, $p < 0.027$). Model 3 includes our first interaction term measuring the impact of internal financial distress (i.e., reverse Altman z-score). While the baseline estimate remains positive and marginally significant ($\beta = 0.143$, $p < 0.067$), the interaction coefficient is very small ($\beta = 0.001$) and insignificant ($p < 0.943$) providing no support for our second

hypothesis. The overall effect of family firm status on CSP remains positive and significant[42]. Model 4 introduces our moderating moderator external financial distress (i.e., financial crisis). Similar to Model 2 and Model 3, the results indicate a positive baseline effect ($\beta = 0.243$, $p < 0.046$). The expected negative moderation effect of internal financial distress remains small in size and insignificant ($\beta = 0.016$, $p < 0.186$). The three-way interaction indicates a negative and significant effect ($\beta = -0.062$, $p < 0.016$). Based on the results of Model 4 in conjunction with the linear restricted model estimate, we cannot confirm a significant difference in levels of CSP between non-family firms and family firms in financial distress during the financial crisis ($p < 0.320$), providing support for our third hypothesis. Surprisingly, the results suggest that external financial distress moderates the relationship between family firm status and CSP even if the focal firm is not in financial distress.

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[42] In order to assess the significance of overall effects, we conducted a Wald-test-based comparison (asymptotic Chi-squared statistics) between the original models and the linearly restricted model. The purpose of this test is to assess whether the combined effect of variables (i.e., the baseline effect of family firm status, both individual interaction effects with internal and external financial distress, and the three-way interaction effect) is significantly different from 0. The test result was insignificant ($p > 0.319$), suggesting that the CSP of family firms in financial distress during a financial crisis does, overall, not significantly differ from that of non-family firms.

TABLE 4.2 Panel Data Estimates

The presented model estimates are based on our sample consisting of 890 distinct firms (n = 890) over the period 2002 until 2010 (T = 1 - 8), and a total of 5070 observations (N = 5070). The variables were measured and transformed according to the procedures outlined in the methodology section.

	Model 1				Model 2				Model 3				Model 4			
	Estimate	Std. Error	t-Statistic	p-Value	Estimate	Std. Error	t-Statistic	p-Value	Estimate	Std. Error	t-Statistic	p-Value	Estimate	Std. Error	t-Statistic	p-Value
CSP^{social}																
Intercept	-0.129	0.448	-0.289	0.773	-0.138	0.442	-0.312	0.755	-0.147	0.437	-0.338	0.736	-0.151	0.435	-0.348	0.728
Trend Indicator	-0.095	0.020	-4.676	< 0.001 ***	-0.095	0.020	-4.678	< 0.001 ***	-0.095	0.020	-4.807	< 0.001 ***	-0.092	0.026	-3.510	< 0.001 ***
Age	0.040	0.020	2.013	0.044 *	0.035	0.020	1.785	0.074 †	0.036	0.020	1.773	0.076 †	0.039	0.021	1.835	0.067 †
Size	0.011	0.025	0.422	0.673	0.012	0.025	0.480	0.631	0.012	0.025	0.488	0.626	0.018	0.022	0.817	0.414
Intangible Assets	0.003	0.017	0.163	0.871	0.003	0.017	0.187	0.852	0.003	0.017	0.204	0.838	0.000	0.017	0.012	0.991
Workforce	-0.229	0.060	-3.790	< 0.001 ***	-0.230	0.060	-3.807	< 0.001 ***	-0.231	0.062	-3.751	< 0.001 ***	-0.236	0.061	-3.862	< 0.001 ***
Capital Intensity	0.052	0.637	0.081	0.935	0.053	0.637	0.083	0.934	0.086	0.639	0.134	0.893	0.021	0.598	0.035	0.972
Profitability	0.693	0.319	2.175	0.030 *	0.700	0.315	2.220	0.026 *	0.717	0.264	2.714	0.007 **	0.662	0.254	2.611	0.009 **
Equity-to-Debt	0.072	0.061	1.179	0.238	0.071	0.061	1.171	0.242	0.091	0.080	1.134	0.257	0.078	0.085	0.920	0.358
Innovativeness	0.037	0.019	1.932	0.053 †	0.039	0.019	2.013	0.044 *	0.038	0.019	1.995	0.046 *	0.037	0.018	2.073	0.038 *
Industry Group (2)	0.040	0.540	0.075	0.940	0.034	0.537	0.064	0.949	0.042	0.566	0.074	0.941	0.020	0.561	0.035	0.972
Industry Group (3)	0.377	0.215	1.758	0.079 †	0.355	0.218	1.629	0.103	0.365	0.219	1.668	0.095 †	0.349	0.218	1.605	0.109
Industry Group (4)	0.238	0.256	0.931	0.352	0.240	0.254	0.946	0.344	0.252	0.237	1.062	0.288	0.237	0.235	1.008	0.313
Industry Group (5)	0.371	0.192	1.934	0.053 †	0.365	0.192	1.905	0.057 †	0.373	0.184	2.025	0.043 *	0.359	0.179	2.008	0.045 *
Industry Group (6)	0.570	0.178	3.198	0.001 **	0.573	0.178	3.215	0.001 **	0.583	0.183	3.193	0.001 **	0.577	0.176	3.270	0.001 **
Industry Group (7)	0.641	0.206	3.116	0.002 **	0.629	0.206	3.053	0.002 **	0.639	0.206	3.099	0.002 **	0.626	0.210	2.974	0.003 **
Industry Group (8)	0.598	0.152	3.939	< 0.001 ***	0.601	0.150	4.021	< 0.001 ***	0.617	0.135	4.580	< 0.001 ***	0.594	0.129	4.604	< 0.001 ***
Industry Group (9)	0.402	0.179	2.244	0.025 *	0.403	0.178	2.268	0.023 *	0.418	0.164	2.548	0.011 *	0.415	0.161	2.583	0.010 **
Industry Group (10)	0.601	0.120	4.993	< 0.001 ***	0.602	0.120	5.028	< 0.001 ***	0.614	0.110	5.589	< 0.001 ***	0.608	0.102	5.989	< 0.001 ***
Family Firm					0.140	0.063	2.216	0.027 *	0.143	0.078	1.831	0.067 †	0.243	0.122	1.993	0.046 *
Internal Distress$_{t-1}$									0.004	0.007	0.647	0.517	0.006	0.007	0.850	0.396
External Distress													-0.076	0.063	-1.210	0.226
Family Firm × Internal Distress$_{t-1}$									0.001	0.014	0.072	0.943	0.016	0.012	1.322	0.186
Family Firm × External Distress													-0.334	0.121	-2.764	0.006 **
Internal Distress$_{t-1}$ × External Distress													-0.014	0.004	-3.896	< 0.001 ***
Family Firm × Internal Distress$_{t-1}$ × External Distress													-0.062	0.026	-2.400	0.016 *
Year Dummies	No				No				No				No			
Industry Dummies	Yes				Yes				Yes				Yes			
Observations	5070				5070				5065				5065			
Number of firms	890				890				889				889			
Adjusted R^2	0.090				0.090				0.089				0.090			

† p < 0.10; * p< 0.05; ** p< 0.01; *** p< 0.001

4.4.3 Robustness Tests

In order to ensure the robustness of the results estimated in Model 4 (*Table 4.2*), the estimation was reproduced in Model 5 (*Table 4.3*) with the addition of year-fixed effects. Naturally, the direct effect of the trend indicator variable and the binary external financial distress variable (i.e., financial crisis) were omitted due to collinearity with the year fixed-effects intercept.

Model 5: (12)

$$CSP_{i,t}^{social} = \alpha_0 + \beta_1 Family\ Firm_i + \beta_2 Internal\ Financial\ Distress_{i,t-1}$$
$$+ \beta_3 Family\ Firm_i \times Internal\ Financial\ Distress_{i,t-1}$$
$$+ \beta_4 Family\ Firm_i \times External\ Financial\ Distress_t$$
$$+ \beta_5\ Internal\ Financial\ Distress_{i,t-1} \times External\ Financial\ Distress_t$$
$$+ \beta_6 Family\ Firm_i \times Internal\ Financial\ Distress_{i,t-1}$$
$$\times External\ Financial\ Distress_t + \delta' Control\ Variables_{i,t}$$
$$+ \theta' Industry_i + \iota' Year_t + \upsilon_i + \varepsilon_{i,t}$$

The results presented in *Table 4.3* are consistent with the estimates presented for our full model in *Table 4.2* (Model 4) with regard to effect directions, coefficient sizes, and the significance levels of the direct effect and interaction effects. The direct effect of family firm status on CSP remains positive yet drops slightly in significance (Model 5: $\beta = 0.230$, $p < 0.070$; Model 4: $\beta = 0.140$, $p < 0.027$). Concerning the interaction between our first moderator (internal financial distress) and family firm status, the estimates remain comparable, too (Model 5: $\beta = 0.013$, $p < 0.280$; Model 4: $\beta = 0.016$, $p < 0.186$). The results pertaining to the three-way interaction attest

TABLE 4.3 Robustness Test

The presented model estimate is based on our sample consisting of 889 distinct firms (n = 889) over the period 2002 until 2010 (T = 1 - 8), and a total of 5065 observations (N = 5065). Due to collinearity with the year fixed-effects intercept, two variables were ommitted (*Trend Indicator* and *External Financial Distress*) in this model (cf., baseline Model 4).

CSP^{social}	Model 5			
	Estimate	Std. Error	t-Statistic	p-Value
Intercept	-0.356	0.319	-1.116	0.265
Trend Indicator	.	.	.	.
Age	0.031	0.015	2.080	0.038 *
Size	0.012	0.019	0.656	0.512
Intangible Assets	-0.006	0.015	-0.362	0.717
Workforce	-0.227	0.064	-3.581	< 0.001 ***
Capital Intensity	-0.299	0.721	-0.415	0.679
Profitability	0.780	0.266	2.927	0.003 **
Equity-to-Debt	0.081	0.075	1.074	0.283
Innovativeness	0.039	0.018	2.214	0.027 *
Industry Group (2)	-0.011	0.574	-0.019	0.985
Industry Group (3)	0.326	0.226	1.441	0.150
Industry Group (4)	0.216	0.231	0.938	0.348
Industry Group (5)	0.335	0.178	1.886	0.059 †
Industry Group (6)	0.551	0.186	2.957	0.003 **
Industry Group (7)	0.608	0.205	2.975	0.003 **
Industry Group (8)	0.570	0.127	4.506	< 0.001 ***
Industry Group (9)	0.383	0.157	2.441	0.015 *
Industry Group (10)	0.578	0.103	5.634	< 0.001 ***
Year (2004)	0.042	0.012	3.409	< 0.001 ***
Year (2005)	-0.061	0.020	-3.116	0.002 **
Year (2006)	-0.117	0.020	-5.900	< 0.001 ***
Year (2007)	-0.226	0.020	-11.358	< 0.001 ***
Year (2008)	-0.381	0.024	-15.788	< 0.001 ***
Year (2009)	-0.395	0.021	-18.984	< 0.001 ***
Year (2010)	-0.779	0.021	-36.808	< 0.001 ***
Family Firm	0.230	0.127	1.810	0.070 †
Internal Distress$_{t-1}$	0.008	0.006	1.354	0.176
External Distress	.	.	.	.
Family Firm × Internal Distress$_{t-1}$	0.013	0.012	1.081	0.280
Family Firm × External Distress	-0.338	0.122	-2.784	0.005 **
Internal Distress$_{t-1}$ × External Distress	-0.015	0.004	-4.091	< 0.001 ***
Family Firm × Internal Distress$_{t-1}$ × External Distress	-0.064	0.026	-2.417	0.016 *
Year Dummies	Yes			
Industry Dummies	Yes			
Observations	5065			
Number of firms	889			
Adjusted R^2	0.104			

† p < 0.10; * p< 0.05; ** p< 0.01; *** p< 0.001

to the accuracy of our full model estimate presented in Model 4 (Model 5: β = -0.064, p < 0.016; Model 4: β = -0.062, p < 0.016).

In order to preserve as much variation in our initial model estimates as possible, we proxied for corporate distress with a continuous variable (Altman z-score). A continuous z-score has been demonstrated to be an effective predictor of a firm's bankruptcy risk (Altman & Saunders, 1997; Altman, Danovi, & Falini, 2013), which explains its prevalence in research and practice. However, some prior research suggests that family firms may only focus on short-term financial utilities in extreme situations (cf., Chrisman & Patel, 2012; Canavati, 2018). Although we believe it is plausible to assume that internal financial distress affects TO on a continuum rather than in extreme scenarios exclusively (e.g., high probability of bankruptcy), a high default probability certainly presents a situation of very high corporate distress and has been used in the family business domain several times for this reason (e.g., Chrisman & Patel, 2012; Canavati, 2018). To increase the robustness of our findings, we replaced our first moderator (i.e., z-score) in our full model (Model 4) with a binary variable (Bankruptcy Risk$_{t-1}$[43]) coded to equal 1 for firms with a z-score below 1.81 and 0 otherwise. Within the domain of finance research, a z-score cut-off value of 1.81 is commonly used to indicate that a firm is "highly risky and likely to go bankrupt" (Altman et al., 2013, p.2).

Model 6: (13)

$$CSP_{i,t}^{social} = \alpha_0 + \beta_1 Family\ Firm_i + \beta_2 Bankruptcy\ Risk_{i,t-1} + \beta_3 External\ Financial\ Distress_t$$
$$+ \beta_4 Family\ Firm_i \times Bankruptcy\ Risk_{i,t-1}$$
$$+ \beta_5 Family\ Firm_i \times External\ Financial\ Distress_t$$
$$+ \beta_6 Bankruptcy\ Risk_{i,t-1} \times External\ Financial\ Distress_t$$
$$+ \beta_7 Family\ Firm_i \times Bankruptcy\ Risk_{i,t-1} \times External\ Financial\ Distress_t$$
$$+ \delta' Control\ Variables_{i,t} + \theta' Industry_i + v_i + \varepsilon_{i,t}$$

In accordance with the previous tests, the results presented in *Table 4.4* corroborate the idea that family firms in distress reduce their CSP. As expected, the three-way interaction effect is

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[43]Model 6 was also estimated without lagging the *Bankruptcy Risk* dummy because a firm with a high probability of bankruptcy in year t is likely to have adjusted corporate actions already since severe underperformance in the previous year(s) is very likely to precede a high default probability in year t. As expected, the unreported results do not show noteworthy discrepancies in effect sizes and significance levels.

larger in extreme situations (Model 6: β = -0.734, p < 0.004). The baseline effect of family firm status on CSP remains positive and marginally significant (Model 6: β = 0.157, p < 0.100). As it turns out, transforming the moderator into a binary variable results in an insignificant interaction effect between family firm status and the *External Financial Distress* variable. This is likely because some of the effect is now captured by the 3-way interaction, which increases substantially in coefficient size. Taken together, the regression estimates of Model 6 confirm the direction and significance of our findings.

TABLE 4.4 Robustness Test

The presented model estimate is based on our sample consisting of 889 distinct firms (n = 889) over the period 2002 until 2010 (T = 1 - 8), and a total of 5065 observations (N = 5065). The variable Bankruptcy Risk$_{t-1}$ is a dummy variable coded to equal 1 for values below 1.81 for firm i in year t (Altman, Danovi, & Falini, 2013), and 0 otherwise.

	Model 6			
	Estimate	Std. Error	t-Statistic	p-Value
CSP^{social}				
Intercept	-0.156	0.430	-0.362	0.717
Trend Indicator	-0.093	0.026	-3.585	< 0.001 ***
Age	0.038	0.022	1.689	0.091 †
Size	0.018	0.023	0.807	0.420
Intangible Assets	-0.002	0.016	-0.134	0.894
Workforce	-0.234	0.056	-4.203	< 0.001 ***
Capital Intensity	-0.021	0.651	-0.033	0.974
Profitability	0.656	0.280	2.338	0.019 *
Equity-to-Debt	0.062	0.071	0.881	0.378
Innovativeness	0.038	0.019	2.026	0.043 *
Industry Group (2)	0.027	0.552	0.050	0.961
Industry Group (3)	0.352	0.220	1.598	0.110
Industry Group (4)	0.235	0.228	1.034	0.301
Industry Group (5)	0.358	0.177	2.026	0.043 *
Industry Group (6)	0.572	0.183	3.120	0.002 **
Industry Group (7)	0.625	0.208	3.013	0.003 **
Industry Group (8)	0.591	0.125	4.729	< 0.001 ***
Industry Group (9)	0.400	0.169	2.363	0.018 *
Industry Group (10)	0.608	0.104	5.844	< 0.001 ***
Family Firm	0.157	0.095	1.646	0.100 †
Bankruptcy Risk$_{t-1}$	-0.028	0.067	-0.426	0.671
External Financial Distress	-0.003	0.064	-0.039	0.969
Family Firm × Bankruptcy Risk$_{t-1}$	0.153	0.247	0.619	0.536
Family Firm × External Financial Distress	0.006	0.042	0.145	0.885
Bankruptcy Risk$_{t-1}$ × External Financial Distress	0.008	0.195	0.043	0.966
Family Firm × Bankruptcy Risk$_{t-1}$ × External Financial Distress	-0.734	0.258	-2.850	0.004 **
Year Dummies	No			
Industry Dummies	Yes			
Observations	5065			
Number of firms	889			
Adjusted R^2	0.090			
† p < 0.10; * p< 0.05; ** p< 0.01; *** p< 0.001				

Despite its wide application, the Altman z-score was initially developed to assess corporate distress among manufacturing firms listed on the U.S. stock market. However, the model was continuously revised by its authors (Altman et al., 2013), and the parameters have been adapted to different populations of firms (i.e., manufacturing as well as non-manufacturing) and other markets. Unlike the z-score, the EMS model [44] (Altman, Hartzell, & Peck, 1998) "was introduced for the non-manufacturing as well as manufacturing sectors or companies operating in developing countries " (Altman et al., 2013, p.2).

$$EMS_{i,t} = 6.56\,X_{i,t}^1 + 3.26X_{i,t}^2 + 6.72\,X_{i,t}^3 + 1.05X_{i,t}^4 + 3.25 \qquad (14)$$

Although the majority of firms (55.3%) in our sample qualify as manufacturing firms (two-digit SIC code 20-39), we tested our full model (Model 4) with the EM-Score to ensure that industry sectors do not distort our results. Similar to our z-score coding logic, we reverse coded the moderator measuring corporate distress (EMS) to facilitate the interpretation of the coefficient and lagged the variable by t-1 period. Again, larger values indicate increased firm distress.

Model 7: $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ (15)

$$
\begin{aligned}
CSP_{i,t}^{social} = {}& \alpha_0 + \beta_1 Family\ Firm_i + \beta_2 EMS_{i,t-1} + \beta_3 External\ Financial\ Distress_t \\
& + \beta_4 Family\ Firm_i \times EMS_{i,t-1} + \beta_5 Family\ Firm_i \times External\ Financial\ Distress_t \\
& + \beta_6 EMS_{i,t-1} \times External\ Financial\ Distress_t \\
& + \beta_7 Family\ Firm_i \times EMS_{i,t-1} \times External\ Financial\ Distress_t \\
& + \delta' Control\ Variables_{i,t} + \theta' Industry_i + \upsilon_i + \varepsilon_{i,t}
\end{aligned}
$$

---

[44] A description of each coefficients' calculus (X^1 to X^4) can be found on page 102 (*Formula 7*).

While the EMS model is "best suited for assessing relative value among emerging markets" (Altman et al., 1998, p.391), it provides additional support for our previous estimates and demonstrates a slightly better model fit in terms of adjusted r-squared (Model 7: adjusted R^2 = 0.091; Model 4: adjusted R^2 = 0.090). Hence, industry effects do not appear to distort the estimates of our full model (Model 4) in a meaningful way.

TABLE 4.5 Robustness Test

The presented model estimate is based on our sample consisting of 889 distinct firms (n = 889) over the period 2002 until 2010 (T = 1 - 8), and a total of 5065 observations (N = 5065). In this model the initial first moderator (z-score) has been replaced by the EM-Score (according to Altman, Hartzell, & Peck, 1998, p. 393) to ensure that industry sectors do not cause distortions.

CSP^{social}	Model 7			
	Estimate	Std. Error	t-Statistic	p-Value
Intercept	-0.146	0.440	-0.331	0.741
Trend Indicator	-0.093	0.027	-3.488	< 0.001 ***
Age	0.040	0.021	1.896	0.058 †
Size	0.018	0.022	0.831	0.406
Intangible Assets	0.000	0.018	0.001	1.000
Workforce	-0.236	0.061	-3.859	< 0.001 ***
Capital Intensity	-0.001	0.586	-0.002	0.999
Profitability	0.665	0.281	2.365	0.018 *
Equity-to-Debt	0.078	0.076	1.014	0.311
Innovativeness	0.037	0.018	2.056	0.040 *
Industry Group (2)	0.018	0.554	0.032	0.974
Industry Group (3)	0.349	0.215	1.619	0.106
Industry Group (4)	0.236	0.245	0.962	0.336
Industry Group (5)	0.356	0.184	1.934	0.053 †
Industry Group (6)	0.574	0.174	3.307	< 0.001 ***
Industry Group (7)	0.629	0.207	3.038	0.002 **
Industry Group (8)	0.595	0.142	4.202	< 0.001 ***
Industry Group (9)	0.416	0.169	2.459	0.014 *
Industry Group (10)	0.609	0.104	5.878	< 0.001 ***
Family Firm	0.237	0.123	1.934	0.053 †
EMS$_{t-1}$	0.003	0.003	1.155	0.248
External Financial Distress	-0.085	0.066	-1.303	0.193
Family Firm × EMS$_{t-1}$	0.007	0.006	1.164	0.244
Family Firm × External Financial Distress	-0.359	0.118	-3.047	0.002 **
EMS$_{t-1}$ × External Financial Distress	-0.007	0.003	-2.668	0.008 **
Family Firm × EMS$_{t-1}$ × External Financial Distress	-0.030	0.010	-2.875	0.004 **
Year Dummies	No			
Industry Dummies	Yes			
Observations	5065			
Number of firms	889			
Adjusted R^2	0.091			

† p < 0.10; * p< 0.05; ** p< 0.01; *** p< 0.001

4.5 DISCUSSION

Growing social problems represent a significant challenge faced by our society nowadays, and family firms play a significant role in this debate given their global market dominance and a heightened level of stakeholder demands for corporate social behavior. Despite considerable growth in the literature surrounding this topic, research has yet to provide a coherent theoretical perspective on the determinants and contingencies of corporate social performance (CSP) (Canavati, 2018). The current prevalence of mixed theoretical and empirical insights is, at least partly, driven by two factors: The absence of an explicit consideration of the concept of time (Lumpkin & Brigham, 2011; Bansal & DesJardine, 2014) and an over-reliance on popular assumptions among family business scholars. By relaxing the assumption of a static long temporal orientation (TO) among family firms (Gomez-Mejia et al., 2007) and the behavioral agency model's (Wiseman & Gomez-Mejia, 1998; Martin et al., 2013) assumption of SEW risk aversion as the central reference point, this study aimed at providing novel insights on the relationship between family firms and CSP by taking a closer look at the underlying managerial decision-making process with a focus on the concept of time and its impact on intertemporal choices. To this end, we provide novel theoretical insights on the influence of TO in strategic decision-making. Despite its prevalence and importance for family firm research, the concept of TO remains underdeveloped to date and requires more attention (Lumpkin & Brigham, 2011). Our findings support the notion that utility evaluations among family firms are, at least partly, affected by changing temporal preferences and that both financial and non-financial utilities are likely juxtaposed in the mental decision-making model. In addition, we made an exciting observation suggesting that moderating mechanisms that were previously considered in isolation should be considered jointly (i.e., internal and external financial distress).

In line with the majority of prior studies, our study supports the general notion that family firms excerpt, on average, a higher level of CSP compared to their non-family firm counterparts (Malik, 2015). We theorize that this phenomenon is likely driven by a longer TO, which leads to a favorable evaluation of deferred financial utilities associated with CSP, in addition to a consideration of non-financial utilities, which is absent in non-family firms. Moreover, our findings inform the debate surrounding differences between public and private family firms. To this end, our results provide support for the notion that publicly traded family firms can, at least partly, act in line with their inherently longer time horizon, even though listed

family firms in the U.S. are confronted with a greater pressure for short-term results (Demirag, 1995; Bushee, 2001; Graham et al., 2006) than family firms in the private domain.

Against our prediction, we observe that family firms maintain a higher level of CSP, suggesting no deterioration of perceived financial and non-financial utilities. This is indicative of a maintained long TO guiding managerial decision-making of family firms confronted with increased firm-level financial distress. In line with previous management scholars, we proposed that such financial distress induces psychological stress restricting cognitive processes and inducing a focus on short-term performance, which is indicative of a shortened TO. This proposition was supported by scholars arguing that organizations respond to financial distress by accentuating cost reductions that are not strictly necessary to maintain core business operations (e.g., Schendel, Patton, & Riggs, 1976; Chen & Miller, 2007). According to our proposition, a shortened TO should attenuate the perceived long-term financial and non-financial utilities associated with CSP. Additional support for our hypothesized moderation can be found in the family business literature. "The importance of non-financial goals in strategic decision-making in family firms is at the core of the arguments that support a positive relationship between family ownership and CSP" (Canavati, 2018; p.236). Although a reduction in CSP among family firms is unlikely in a "steady-state" condition – even if this meant foregone financial long-term benefits – previous research attests that family firms facing performance hazards are less prone to act in accordance with their predominant SEW preservation goal and "are more likely to make strategic choices that result in diminished socioemotional wealth" (Gomez-Mejia et al., 2011, p.688). The fact that our finding persists in our robustness test where internal financial distress was re-coded to reflect firms faced with severe bankruptcy risk (cf., Chen & Miller, 2007; Berrone et al., 2012; Chrisman & Patel, 2012) (*Table 4.4*) attests the idea that additional mechanisms may be at play. Given that many studies rely on the financial distress argument, our findings provide new insights into the family firm decision process. In the context of CSP, internal financial distress alone does not appear to curtail the long TO of family firms, which suggests that other mechanisms must be considered. This raises the question to what extent this finding is related to CSP-related characteristics and to what extent TO shortening effects of internal financial distress materialize for other strategic choices.

In our final hypothesis, we argue that social capital may act as a cushion buffering against a TO shortening effect of internal financial distress and that this cushion likely disappears when external financial distress disrupts the focal firm's macro-environment. In

support of our explication, we find that family firms behave more like non-family firms during a financial crisis, insinuating a shortened TO and a changed perception of the utilities associated with CSP. This presents an insightful contribution to our current understanding of family firm decision-making pertaining to intertemporal choices and conveys the idea that social capital may not only counter force institutional voids in less developed economies but may also act as a cushion in well-developed countries.

We have explored TO changes in the realm of prosocial activities, which are tightly linked to reputational concerns and characterized by immediate costs and deferred gains. Nevertheless, investigating how strategic choices with other characteristics are affected by TO and potential contingencies offers the possibility to uncover additional mechanisms and is likely a fruitful avenue for future research.

4.5.1 Academic Implications

This study makes several theoretical contributions. The basic concept of a long TO is well established among family business scholars and represents a common underlying assumption in the field, yet our knowledge about the role of TO in family firm decision-making is minimal (Lumpkin & Brigham, 2011). Although it is reasonable to believe that many family firms are guided by a longer TO than their non-family firm counterparts (Gomez-Mejia et al., 2007) in a "steady-state" condition, TO is not necessarily stable over time (Loewenstein & Thaler, 1989) rendering the universal assumption of a long TO of family firms questionable. The concept of TO, its antecedents, contingencies, and associations with decision mechanisms are underdeveloped (Lumpkin & Brigham, 2011), which presents a significant obstacle to advancing our understanding of the family firm decision process. This study joins the stream of research dealing with the decision process and its underlying mechanisms. Often, family firm studies restrict their focus on SEW arguments to theorize about family firm behavior following the proposition of Gomez-Mejia et al. (2007), who suggest that non-financial considerations represent the central reference point determining strategic behavior. In this study, we argue for a simple trade-off between financial and non-financial utilities, which are jointly considered. This is not to say that the perceived utility associated with SEW does not exceed the perceived utility of financial utilities. However, we believe that a simultaneous assessment is more realistic. In that sense, we follow previous work on mixed gambles (e.g., Gomez-Mejia et al., 2014; Kotlar et al., 2018). The mixed-gamble logic is rooted in prospect theory (Kahneman & Tversky, 1979; Benartzi & Thaler, 1995; Thaler et al., 1997) and acknowledges a trade-off

between financial and non-financial utilities. This framework appears useful in predicting family firm behavior, yet is limited to, decisions characterized by different levels of risk (e.g., radical vs. incremental innovation, and diversification). Our study, in contrast, focalizes on the time dimension and informs the debate surrounding utility trade-offs by integrating knowledge from the intertemporal choice literature to predict firm behavior, which allows us to theorize about strategic decisions that are not preliminarily characterized by varying levels of risk. By doing so, we enrich our understanding of the decision process by explaining how TO affects the cognitive processes as a higher-order heuristic, thereby shaping the perceived utilities of intertemporal choices. Challenging the widely held assumption of a long TO that is frequently associated with family ownership, our findings suggest that internal and external situational factors significantly affect managerial TO and that family firms are not universally guided by a longer TO than non-family firms. This is an answer to the call of an increasing number of scholars advocating the urgency to examine the concept of time in family firm decision-making, which is still in its infancy despite its significant impact on managerial choices (cf., Lumpkin & Brigham, 2011; Slawinski & Bansal, 2012; Bansal & DesJardine, 2014; Sternad & Kennelly, 2017; Gavronski et al., 2018). Lastly, we also contribute to the ongoing debate on the relationship between family firms and CSP (cf., Canavati, 2018). Our results corroborate the idea that publicly-traded US family firms outperform non-family firms on average in terms of prosocial behavior. It is our conviction that a longer TO in a "steady-state" condition renders both the financial and non-financial utility evaluation of CSP among family firms favorable, which suggests that family firms are able to act, at least partly, in accordance with their inherently longer time horizon despite an increased pressure for short-term financial performance accompanying public companies (Demirag, 1995; Bushee, 2001).

4.5.2 Practical Implications

We also offer practical implications pertinent to family firms, investors, and other stakeholders. Family managers would benefit from a heightened awareness of the impact of TO on their cognitive decision processes. As a higher-order heuristic, TO guides the evaluation process like an "invisible hand." In some financially distressful situations, adjustments to strategic activities may be necessary. This requires a rational evaluation of utilities. Our results suggest that family firms experience a significantly shortened TO when confronted with a major external shock (ie., financial crisis) independent of an association with internal financial distress. This behavior suggests an ill-suited threat perception and results in a TO shortening effect. Next, family firms

appear to emphasize their key stakeholders, which is reflected in higher levels of CSP compared to non-family firms. Managers seeking to pursue social endeavors should know that their chances of implementing such practices are contingent on a firm's ownership structure and are likely higher in family firms. Likewise, investors and funds seeking to enhance their portfolio with regard to CSP appear well advised to take a closer look at family firms.

4.5.3 Limitations and Future Research

The generalizability of our findings may be limited by factors pertaining to the institutional setting (macro-environment) of our sample and by our focus on publicly traded firms. Within the scope of this study, we analyzed U.S. family firms in the public domain, yet the observed behaviors regarding CSP likely deviate from that of family firms in other economies (Demirag, 1995; Segelod, 2000; Bushee, 2001; DesJardine & Bansal, 2014; Sternad & Kennelly, 2017) and family firms in the private sector (Carney et al., 2015). The institutional context at the country level has been proposed to constitute a predictor of a firm's CSP (Van Gils et al., 2014; Canavati, 2018; Labelle et al., 2018), and according to Canavati (2018), the "relationship between family firms and CSP is stronger in institutional environments with weak labor and corporate governance regulatory frameworks" (p.235). Future studies could add to our understanding by exploring how the effects of TO differ as a function of the institutional context (cf., Van Gils et al., 2014). Moreover, behavioral differences likely exist between public and private family firms. When a family firm decides to go public, they face increased pressure for short-term financial performance from a variety of stake- and shareholders, in addition to the necessity of public firms to issue annual reports (Dyer, 1986; Bushee, 1998; Graves & Waddock, 1990; Jacobs, 1991; Porter, 1992). Increased pressure for short-term performance is particularly pronounced in the U.S. economy (cf., Graham et al., 2006). As a result, public family firms in the U.S. may be particularly limited in their ability to fully embrace their inherently longer time horizon when making strategic decisions. Taken together, this suggests that our study may underestimate proposed TO shortening effects and overestimate family firms' perceived financial utility associated with CSP. This provides a fertile ground for future research. By studying the impact of a firm's macro-environment on TO and how the impact of TO may differ between public and private family firms, future studies can enhance our understanding of the TO concept and its impact on decision mechanisms.

Further, we chose to focus on one pillar of CSP, namely the social dimension (i.e., community, human rights, employee relations, diversity, and product). Conceptually, this

makes sense as it allowed us to tightly connect characteristics associated with this dimension (e.g., reputational benefits and distribution of costs and benefits over time) to our theoretical framework. Despite these benefits and the dimensions' high relevance for family firms and society as a whole, the impact of TO and the perceived (non-)financial utilities likely differ between CSP dimensions (e.g., environmental and corporate governance) (Bingham et al., 2011; Block & Wagner, 2014; Rees & Rodionova, 2015). Hence, future research could benefit from investigating the impact of TO and testing their predictions specific to the characteristics of alternative CSP dimensions and other strategic decisions. As Lumpkin and colleagues (2010) point out, how TO manifests varies depending on the type of strategic decisions and is, to date, poorly understood.

We assessed family ownership based on a binary variable, yet perceived utilities in a decision calculus likely vary due to the level of family involvement. A recent meta-analysis by Canavati (2018) suggests that a higher family involvement (e.g., ownership and top management involvement) complements a firm's CSP. We acknowledge that there are more dimensions indicative of family involvement, such as the number of family generations involved, the percentage of top management positions or board seats held by family members, ownership percentages, succession intention, and more (Miller, Minichilli, & Corbetta, 2013). Although our dummy variable approach suits the research purpose to assess the between-variation of family and non-family firm behavior, it would be interesting to take a closer look at the effects of within-variation to explore the effect of TO in family firm decision-making further. Studies focusing on within-variation would also help answer the question posted by Brigham and colleagues (2014) as to what factors are involved in the development and maintenance of a long TO, which gives rise to other related exciting questions: What dimensions of familiness support/hinder the development of a long TO? How is the utility evaluation of (non-) financial utilities pertaining to intertemporal choices affected by varying levels of familiness and TO? What is the association between familiness, TO, and internal and external contingencies on TO? Are specific dimensions of familiness associated with a more substantial buffer against certain TO shortening effects (e.g., internal/external financial distress)?

Finally, we want to acknowledge that we did not directly measure behavioral concepts and mechanisms employed within this study. Although it is common practice to exploit family involvement as a proxy for SEW and its related non-financial utility considerations (cf., Gomez-Mejia et al., 2014, 2018; Kotlar et al., 2018), we believe that more direct measures of the

perceived utilities pertaining to (non-) financial utilities in a family firm's decision process would yield significant insights in the underlying decision mechanisms.

Many strategic decisions are time-sensitive, which is why developing a better understanding of the impact of TO on a firm's dominant coalition decision process represents an important arena for future scholars. In the words of Lumpkin and Brigham (2011), "time-based issues may be especially important to family firms because of their multigenerational perspective and emphasis on building lasting relationships" (p.1151). As the decision-making process of family firms remains poorly understood, it is crucial to advance our understanding of the effects of TO on the mental models employed by decision-makers and how contingencies may affect them. We hope that our insights about changing temporal preferences provided in this study highlight how significant the impact of TO on observable outcomes is and that it awakens interest among other scholars to develop this promising stream of research further.

5   DISCUSSION AND CONCLUSION

5.1 INTRODUCTION

It was the aim of this dissertation to enhance our understanding of the strategic behavior of family firms in the realm of innovation and corporate social performance (CSP). To do so, the chapters in this work addressed the following research questions:

RQ1:   How does family firm status, and its interaction with activist hedge funds, influence a firm's strategic inclination to pursue radical innovation outcomes?

RQ2:   How does family firm status, and its interaction with generational stage and family managerial involvement, affect a firm's strategic inclination to engage in open innovation collaborations?

RQ3:   How does family firm status, and its interaction with firm-level bankruptcy risk and macro-level financial distress, influence a firm's strategic inclination to pursue corporate social performance outcomes?

This concluding chapter will summarize the main findings, discuss the overarching research context, reflect on limitations, and propose promising avenues for future research.

5.2 SUMMARY OF MAIN FINDINGS

Chapter 2. The second chapter dealt with the influence of ownership heterogeneity on strategic decision-making among family firms. The empirical analysis was carried out on a large-scale panel data set comprised of US firms listed in the S&P 1500 between the years 2002 and 2009. In line with previous research on firms in the public domain, the empirical results suggested that firms characterized by active family ownership are less inclined to pursue radical innovation than their non-family firm counterparts (cf., Block et al., 2013; Chin et al., 2009; Czarnitzki & Kraft, 2009). Moreover, the results revealed that the negative effect of family firm status on radical innovation outcomes is aggravated in the presence of activist hedge funds. This finding contradicts the prevailing opinion among finance scholars that hedge fund activism represents an effective tool to foster radical innovation outputs and sanction corporate misconduct (e.g., Brav et al., 2018). Instead, the finding is indicative of the hypothesized principal-principal costs, which likely arise in the presence of multiple influential shareholders with diverging preferences (i.e., family owners and activist hedge funds). Taken together, the results of this chapter complement previous work by illustrating that family firms are less inclined to pursue radical innovation and that the ownership configuration plays a significant role in strategic decision-making.

Chapter 3. The third chapter contributes to the ongoing debate about family firms and open innovation (cf., Classen et al., 2012; De Massis et al., 2012; Lazzarotti & Pellegrini, 2015; Kellermanns & Hoy, 2016; Lambrechts et al., 2017; Feranita et al., 2017; Gjergji et al., 2019). The empirical analysis was carried out on a representative sample of the German private sector covering over 2800 unique firms in 2015. The results of this chapter suggest that family firms are generally less likely to engage in OI partnerships. However, this relationship is significantly affected by family firm heterogeneity. Specifically, I found support for a positive moderation induced by the presence of external top management members, which corroborates the idea of an elevated willingness and ability to collaborate. Interestingly, the empirical results did not support the proposition that the generational stage of a family firm affects the likelihood to engage in an OI partnership. This is surprising given that previous research largely suggested that the generational stage represents a key factor influencing a family firm's desire to preserve socioemotional wealth (cf., Davis & Harveston, 2001; Gomez-Mejia et al., 2007; Stockmans, Lybaert, & Voordeckers, 2010; Kellermanns et al., 2012; Le Breton-Miller & Miller, 2013; Pittino et al., 2013). A post-hoc analysis revealed that the collaboration partner type (i.e.,

customer, supplier, competitor, and research institute) is likely to function as a boundary condition to both of the above-proposed moderations.

Chapter 4. The fourth chapter of this dissertation considers the relationship between active family ownership and corporate social performance (CSP) in the public domain. The analysis was carried out on firms listed in the S&P 1500 covering the periods between 2002 and 2010. The results confirm a positive baseline effect of family firm status on CSP in a "steady-state" condition. Whereas previous work suggested that elevated performance hazards (e.g., bankruptcy risk) among family firms may lead to greater short-term behavior (cf., Gomez-Mejia et al., 2011), the estimates presented in this chapter cannot confirm an attenuation of the positive relationship between active family ownership and CSP as bankruptcy risk increases. This finding insinuates that internal financial distress by itself may be an insufficient condition to explain changes in a family firm's prosocial behavior. However, when a financially distressed family firm (i.e., increased bankruptcy risk) simultaneously finds itself confronted with a financial crisis the results showed that the previously positive effect of family ownership on CSP vanishes. This finding hints at the existence of more complex decision mechanisms. One possible explanation for this finding is the existence of a buffer against the temporal-orientation shortening effect of internal financial distress (e.g., social capital) which vanished in the presence of severe external financial distress (i.e., financial crisis).

5.3 OVERARCHING ACADEMIC IMPLICATIONS

The research presented in this dissertation has several theoretical implications for scholars interested in innovation, corporate social performance, and the strategic decision-making process of family firms. Chapter 2 and Chapter 3 complement the literature on the relationship between family firms and innovation by analyzing the impact of heterogeneity on innovation outputs and inputs, respectively. Chapter 4 adds to our knowledge about the relationship between family firms and corporate social performance by studying the interaction of internal and situational factors. Taken together, this dissertation improves our understanding of the strategic decision-making process among family firms.

It is today's prevailing opinion that family involvement in corporate affairs affects a firm's innovation behavior (Carnes & Ireland 2013; Chrisman et al. 2015). Yet, our understanding of the antecedents and underlying decision mechanisms of family firms and innovation is still limited (Carnes & Ireland, 2013; Duran et al., 2016; Calabrò et al., 2019) and

scholars call for theoretical advancement and a critical perspective on the innovation behavior of family firms (Urbinati et al., 2017; Calabrò et al., 2019; Hu & Hughes, 2020). This dissertation has three central implications. First, family firms generally favor lower risk profiles with respect to innovation-related decisions. From a theoretical perspective, it is suggested that control loss aversion and dynastic considerations lead to unfavorable utility evaluations and lower levels of radical innovation and external collaboration. Second, heterogeneity among family firms does play a major role in innovation-related decision-making of public and private family firms. To this end, the results suggest that the impact of individual heterogeneity factors is non-trivial and contingent on the decision-making context, situational factors, and boundary conditions. Third, an over-reliance on simplified decision-making frameworks and the disregard of contextual factors and boundary conditions has likely curtailed our understanding of the complex underlying mechanisms.

Part of this dissertation presents a response to the "urgent calls among scholars to […] understand the conditions for family firm radical innovation" (Hu & Hughes, 2020, p.1119). Studies about family firms and radical innovation are particularly scarce (Hu & Hughes, 2020), which is unfortunate because radial innovation is particularly salient to avoid a competency trap and ensure long-term competitiveness (Hu & Hughes, 2020). Controlling for a firm's R&D budget, the presented evidence in this dissertation suggests that public family firms are less inclined to pursue radical innovation outcomes compared to non-family firms. This finding provides support for the notion of earlier work claiming that most family firms favor innovation strategies with a lower risk profile, such as incremental innovation (Hall et al., 2001; Nieto et al., 2015). Moreover, it was found that the presence of an influential non-family owner (i.e., institutional investor) has a significant and non-trivial impact on strategic affairs. It is the prevailing opinion among finance scholars that activist hedge funds have a universally positive effect on radical innovation outcomes of their targets (e.g., Brav et al., 2015, 2016, 2018). Although a generally positive direct effect of activist hedge funds on radical innovation outcomes was confirmed, the presence of this institutional investor type in a family firm did not mitigate the negative effect of family firm status on radical innovation but aggravated it instead. This finding corroborates the idea of principal-principal costs arising between influential owners with diverging preferences. To this end, insights from prospect theory and multiple agency theory were integrated to enrich our current understanding of the behavioral agency lens. The negative interaction between family and hedge fund ownership complements the work of Gomez-Mejia et al. (2014), who found a positive effect of institutional investor

ownership (i.e., mutual and pension funds) on a family firm's R&D spending. By studying another institutional investor type (i.e., activist hedge funds), this dissertation attests that it is important for family business scholars to assess the impact of different non-family shareholder types. The negative interaction between the studied blockholders has an important implication for future theoretical work to consider the dynamics between different shareholders rather than making inferences solely based on the direct effect associated with a given shareholder type. In this regard, future family firm research would benefit from studying the dynamics between different shareholder types in more detail. The finding also has implications for finance scholars by informing the debate that hedge fund activism does not represent a universal remedy. As such, the negative interaction contradicts the prevailing opinion in the finance literature that hedge fund activism represents a universally effective tool to foster radical innovation outputs and sanction corporate misconduct (e.g., Brav et al., 2015, 2016, 2018).

Additional implications for the significant impact of family firm heterogeneity on corporate innovation can be inferred from the presented open innovation study. Whereas scholars relying on the resource-based view suggest that family firms are more open, scholars drawing on the socioemotional wealth (SEW) framework suggest the opposite (Gjergji et al., 2019). In this dissertation, it is theorized that the likelihood of a family firm to engage in an open innovation partnership is generally lower and depends on family members' desire to protect their socioemotional wealth (SEW) and their ability to identify and expropriate returns from such collaboration. This dissertation has implications for scholars studying the effect of two heterogeneity factors (i.e., generational stage and top management composition) and the impact of potential boundary conditions. Previous research suggested a lower attachment of family members to the firm with an increase in a firm's generational stage (Gersick et al., 1997; Westhead, 2003; Van Gils, Voordeckers, & Van den Heuvel, 2004; Gomez-Mejia et al., 2007). Thus, it was hypothesized that a firm's likelihood to engage in open innovation partnerships increases with later generational stages. Contrary to this prediction, the empirical results did not support this notion. Next, in line with previous scholars (Classen et al., 2012), the empirical evidence provided some support for the notion that the presence of external top management members attenuates the negative relationship between family firms and open innovation by fostering a firm's absorptive capacity and hence identification and expropriation abilities. The somewhat conflicting findings gave rise to an insightful follow-up analysis. The post-hoc empirics revealed that both above-stated moderations were significantly affected by the external collaborator type (i.e., customer, supplier, competitor, research institute), supporting the

proposition of De Massis and colleagues (2015) to consider partner characteristics. For future theory advancement, this implies that it is likely insufficient to study the impact of heterogeneity factors in isolation. Rather, it appears expedient to identify and consider context-dependent factors and boundary conditions to better understand the mechanisms driving family firm decision-making.

Finally, this dissertation has some theoretical implications pertaining to the role of temporal considerations in family firm decision-making. This represents a response to the call of Le Breton-Miller and Miller (2011) and Slawinski and Bansal (2015) for a multitemporal view. Although family business scholars frequently build their theoretical argumentation on the critical underlying assumption of a long temporal orientation, the concept has hardly received attention among scholars in the field (Lumpkin & Brigham, 2011; Bansal & DesJardine, 2014). Rather than constituting a strategy in itself, the findings of this dissertation imply that temporal orientation functions as a higher-order heuristic affecting the cognitive processes involved in strategic decision-making (Loewenstein & Thaler, 1989; Lumpkin & Brigham, 2011). Contrary to the prevailing view that firm-level financial distress induces short-term behavior, an attenuation of the long temporal orientation associated with family ownership was only found in the simultaneous presence of external financial distress (i.e., financial crisis). This suggests that the macro-level environment plays an important role in a family firm's decision-making process regarding inter-temporal choices. From a theoretical perspective, this leads to the central implication that the temporal orientation of a family firm is unlikely to be a static attribute. Instead, it appears to vary over time and is likely affected by interactions between internal and external situational factors, many of which remain undiscovered to date.

5.4 OVERARCHING PRACTICAL IMPLICATIONS

The core findings of this dissertation suggest that family firm decision-making involves a trade-off between financial and non-financial objectives (Chrisman et al., 2012), that family firms are primarily concerned with the preservation of their non-financial (i.e., socioemotional) benefits (Gomez-Mejia et al., 2007; Berrone et al., 2010), and that these behavioral decision-making dynamics are affected by various internal and external factors. Based on the presented research, several practical implications for family firm owners, managers, policymakers, and investors can be derived.

A central implication of our findings is that exchange-traded family firms underperform when it comes to radical innovation outputs and that shareholder activism does not represent an effective remedy. Technologically diversified investors may find that family-owned businesses favor sub-optimal risk profiles for their portfolios. If lower innovation risk profiles represent a wealth expropriation from more diversified shareholders this implies for policymakers that it may be useful to limit the influence of individual shareholders. This can, for example, be achieved with mandatory dual share class regulations. Moreover, our findings suggest that internal and external factors impede the ability of public family firms to act in full alignment with their non-financial aspirations and long temporal orientation. Today's ownership landscape consists of large blockholders (i.e., institutional investors) with individual agendas and substantial influence over corporate affairs. Institutional investors are generally highly diversified and thus benefit from high-risk, high-reward gambles. Moreover, exchange-traded companies face increased external pressure for short-term performance as a result of frequent reporting requirements (Graves & Waddock, 1990; Jacobs, 1991; Porter, 1992; Bushee, 1998). Family firms are generally known to have a lower emphasis on short-term financial performance and favor moderate risk levels due to their lower degree of asset diversification. To avoid detrimental shareholder conflicts, family owners should be in harmony with an increased focus on financial utilities and higher-risk projects before going public. Contrary to the currently prevailing opinion that activism can resolve shareholder issues effectively, we find that major shareholder conflict between family owners and more short-term-oriented blockholders (e.g., activist hedge funds) can significantly reduce a firm's radical innovation performance jeopardizing long-term competitiveness. For investors, this finding underlines the importance to include a careful shareholder evaluation prior to an investment, especially when changes in a target's strategy are desirable. This due diligence should not be limited to investigating the group of family owners because conflicts with or between other blockholders can also impair firm performance. Hence, it is advisable to attain a clear understanding of the agenda of all major blockholders pre-investment. This can be achieved by engaging in direct communication with the existing blockholders.

Another central implication of this dissertation is that exchange-traded family firms outperform their non-family firm counterparts in terms of corporate social performance (CSP). Again, implications arise from our findings related to the impact of internal and external factors. Institutional investors that are required to meet increased social demands of their clients or are interested in improving their competitive position by investing in more socially responsible,

family firms can be interesting portfolio additions. The presented research demonstrates that family firms, compared to non-family firms, maintain higher levels of prosocial behavior even when they are financially distressed (i.e., increased bankruptcy risk). Importantly, this advantage over non-family firms disappears during macroeconomic downturns. Thus, equity positions in family firms may not represent an effective way to buffer against CSP declines resulting from exogenous shocks (e.g., financial crisis). For family managers, our findings imply that increased awareness of internal performance measures (i.e., firm-level) may prevent sub-optimal decisions with long-term consequences that can be induced by exogenous shocks. From our results, it appears that family firms lose their CSP advantage during times of exogenous shocks regardless of firm-level performance variations. For managers seeking to pursue social agendas, family firms may represent a good organizational form to do so.

The presented findings have also several implications for privately held family firms. Our results convey the idea that family firms are less inclined to engage in collaborative innovation partnerships (i.e., open innovation) compared to non-family firms. From previous research, we know that family firms tend to favor lower R&D investment levels than non-family firms. Since innovation fosters long-term survival, bridging this investment gap by engaging in open innovation could be extremely beneficial to family firms. Hence, family managers have to recognize that alternatives to internal R&D activities exist and that family firms are particularly well equipped to establish open innovation partnerships. By doing so, family firms can promote innovation without incurring the significant cost and risk associated with internal R&D sourcing. The presented findings support the notion that the presence of external top managers can enhance the likelihood of family firms to engage in open innovation.

5.5 OVERARCHING LIMITATIONS AND FUTURE RESEARCH

There are several important limitations restricting the inferences that can be drawn from this dissertation. First, the results and conclusions expressed in this dissertation are based on the analysis of three data sets with several limitations. The operationalization of family firm status employed in Chapter 2 and Chapter 4 is based on GMI Rating's identification procedure, which requires family ties to play a key role in both ownership (20 percent voting shares or more) and board membership. Although a dichotomous approach is consistent with similar prior studies in the public domain (e.g., Gomez-Mejia et al., 2003, 2014, 2019; Berrone et al., 2010; Cannella et al., 2015; Keasey et al., 2015; Kotlar et al., 2018), it does not allow for the discrimination between varying levels of family influence and involvement. This limitation is – in part – accounted for by the robustness tests presented in Chapter 2. From the presented data it appears that ownership changes on behalf of an owning family are minimal to non-existent over time. Moreover, model results accounting for varying ownership levels between family firms did not significantly differ from the results of the binary models. Next, the family firm variable is time-invariant in nature prohibiting fixed-effect estimations. Similar to the fixed ownership threshold used to identify family firms in Chapter 2 and Chapter 4, the cross-sectional data utilized in Chapter 3 also employs a fixed ownership threshold (i.e., 50 percent or more). This data set provided additional information on managerial involvement, generational stage, and respondents were requested to indicate whether the firm is a family firm or not. Due to the cross-sectional nature of the data exploited in Chapter 3, it is not possible to verify the causality of the estimated relationships.

Second, the models presented in this dissertation employ behavioral concepts and mechanisms without measuring them explicitly (e.g., SEW, aggregation rules, ability and willingness, partner type characteristics, temporal orientation, reputational concerns, and social capital). While it is rather common to make inferences based on associated proxies, we encourage future research to include more direct measures of the explanatory constructs. In this regard, future research is encouraged to directly measure the impact of the behavioral concepts employed by collecting longitudinal primary data. Moreover, qualitative studies of the mechanisms and processes involved in family firm decision-making are likely to facilitate our understanding by building a more complex and holistic picture in a natural setting. Particularly case studies analyzing the innovation decision-making process could be helpful in developing a better understanding of the trade-off process pertaining to the evaluation of financial and non-

financial utilities. Qualitative research can bring important overlooked factors to the surface and contribute to the advancement of the currently employed theoretical models.

Third, while Chapter 2 suggests that the presence of influential owners other than the owning family has a significant influence on strategic decision-making, the study did not account for the impact of blockholders other than activist hedge funds. Hence, developing a holistic theoretical model to assess the impact of a focal firm's total ownership composition appears to be a promising avenue for future scholars to shed more light on the decision-making dynamics among multiple influential ownership types.

Fourth, while we assess the likelihood of a family firm to engage with four distinct open innovation partner types (i.e., customers, suppliers, competitors, research institutes), the data does not provide information on the count of partners belonging to the same partner type, interaction intensity, frequency, duration, or performance of such partnerships. Future research would benefit from analyzing the impact of these factors and how they relate to each other since these factors are likely to affect open innovation partnerships.

Fifth, the theoretical developments provided in Chapter 4 of this dissertation focus on the social dimension of CSP. However, CSP is a multi-dimensional concept comprised of three dimensions: social, environmental, and corporate governance. Since these CSP dimensions are theoretically and practically distinct (Cruz et al., 2014) focusing on one dimension helps to avoid inadequate theoretical interpretations and distorted estimates resulting from an overly aggregated CSP measure. Nevertheless, a generalization of our theory to other CSP dimensions may be limited. Hence, future scholars are encouraged to develop similar theoretical models that consider the distinct context of other CSP dimensions. Whereas recent advancements in decision models and mechanisms largely rest on risk as a primary decision criterion (e.g., mixed-gamble logic), integrating the temporal orientation logic (Loewenstein & Thaler, 1989) in future theoretical developments constitutes an alternative, which appears helpful in advancing our understanding of strategic behavior, which is not preliminarily characterized by varying levels of risk.

5.6 CONCLUDING REMARKS

Despite the above-presented limitations, the research presented in this dissertation enhances our understanding of how family involvement in corporate affairs affects a firm's strategic decision-making. Family firms represent the backbone of many economies and contribute

significantly to global wealth and prosperity. To ensure that this organizational form remains competitive in the future, we need to develop a better understanding of the complex underlying decision-making process and the internal and external factors affecting it. Overall, the findings of this dissertation support the notion that family ownership has a substantial influence on a firm's innovation trajectory and corporate social performance.

IMPACT STATEMENT

TITLE

The Strategic Behavior of Family Firms – Studies on Innovation and Corporate Social Performance

ISSUE

Family firms represent one of the most prevalent forms of business around the globe. Yet, our understanding of the strategic behavior associated with this ownership group remains limited despite a growing body of literature in the domain. Research unambiguously shows that the behavior of family firms differs significantly from that of their non-family firm counterparts, which is why predictions and inferences based on the same traditional economic models are likely inadequate. It is essential to attain a better theoretical understanding of the idiosyncratic decision-making processes and mechanisms shaping the behavior of family-influenced businesses to provide adequate managerial advice and enable policymakers to take appropriate measures. Today, socioemotional wealth (SEW) theory dominates the family business research landscape, a framework that is still relatively young, dating back no more than 15 years (Gomez-Mejia et al., 2007). In essence, the framework suggests that family firm behavior is not primarily motivated by the maximization of profits (traditional economic theory) but rather by the maximization of non-financial objectives (e.g., reputation, preservation of the family dynasty), which family members derive from holding a controlling position. Accordingly, it is assumed that any threat to an owning family's non-financial benefits leads to preventive strategic action even if this entails sacrificing economic performance. Another fundamental and prevalent assumption of the SEW framework is that family firms are *a priori* long-term oriented, which is a result of their desire to preserve control over time. While the SEW framework was useful to develop our current understanding, it may be overly simplistic, and more complex theoretical advancements are in place to explain family firm behavior with greater accuracy (Le Breton-Miller & Miller, 2022). From a theoretical perspective, a failure to consider factors of heterogeneity and context can lead to theoretical inadequacies and an

empirical misrepresentation impairing a reliable comparison between family and non-family firm behavior (Chrisman & Patel, 2012).

WHAT HAS BEEN DONE IN THIS DISSERTATION?

This dissertation intends to take a closer look at the strategic behavior of family firms and their underlying decision-making mechanisms in the context of innovation and corporate social performance (CSP). In this undertaking, prevailing assumptions in the family business research field are theoretically challenged, and empirical evidence is provided to support the notion that internal and external factors significantly impact the innovation and CSP output of family firms. Chapter 2 demonstrates that the presence of other influential owners has a substantial effect on radical innovation outputs. Chapter 3 shows that a family firm's likelihood to engage in open innovation depends on a family's managerial involvement and generational stage. Chapter 4 establishes that a family firm's CSP output is influenced by the presence of a financial crisis and its interaction with firm-level bankruptcy risk.

IMPACT

The theoretical work presented in this dissertation provides important insights into the field of family business research, which is crippled by insufficient consideration of heterogeneity, situational factors, and boundary conditions. In addition, there is little diversity of alternative and supplementary theoretical developments to advance our knowledge about the currently prevailing socioemotional wealth (SEW) paradigm. The presented work acknowledges the basic underlying premise of the SEW framework that non-financial considerations play a significant role in family firm decision-making and adds to our theoretical understanding of the decision-making peculiarities of family firms. The findings demonstrate that the research field can benefit from theoretical reassessments of underlying mental decision models, additional exploration of heterogeneity and situational factors, and the integration of more mature paradigms. Tapping into alternative theoretical paradigms appears particularly promising for generating new knowledge in the context of choices that are not primarily characterized by different levels of risk (e.g., CSP). Socio-emotional wealth theory is a derivative of the behavioral agency model, which builds on prospect theory and aims to predict behavior relating

to decisions characterized by varying levels of risk (e.g., innovation, diversification, internationalization). However, the managerial decision-making process is more nuanced, and factors such as temporal preferences, for example, also play a significant role. In this regard, Chapter 4 informs the debate by demonstrating the value of alternative theoretical approaches (i.e., temporal orientation logic) in predicting family firm behavior. The field of family business research is still relatively young, harboring many theoretical avenues to pursue. Overall, the work presented in this dissertation attests to the necessity for future scholars to advance our theoretical understanding of family firm decision-making by taking more contextualized approaches and by relaxing the static assumptions embedded in the SEW framework (Le Breton-Miller & Miller 2022).

Regarding societal implications, this dissertation also makes several valuable contributions. Family firm behavior is motivated by the achievement of two, sometimes competing sometimes harmonizing – goals: financial and non-financial wealth maximization. A basic understanding of these motives can help manage expectations, facilitate better decision-making, and successful relationship building for stakeholders and shareholders.

The second chapter focuses on ownership heterogeneity and the impact of hedge fund activism on radical innovation outputs among family firms. The findings suggest that radical innovation output is inferior among family firms compared to non-family firms, weakening their long-term competitive position. This behavior can be interpreted as wealth expropriation from more diversified stockholders favoring strategic choices characterized by higher risk and return profiles. Hence, policymakers may want to limit the power of influential individual blockholders, for example, by using dual-class shares. Moreover, the results advocate that hedge fund activism, as a corrective corporate governance tool, is ineffective among certain firm types (e.g., family firms). Contrary to the prevailing opinion that hedge fund activism is the holy grail in sanctioning corporate misconduct, this finding informs investors more generally that the effectiveness of hedge fund activism is not universal, and its long-term impact remains understudied, warranting further investigation.

The third chapter of this dissertation finds that family firms are less likely to engage in open innovation (OI) partnerships despite the prevailing academic opinion of its positive long-term performance impact. Hence, family firm managers should recognize that alternatives to internally financed research and development approaches exist and that family firms are likely well-equipped to embrace collaborative innovation partnerships, potentially reducing associated costs, risks, and time-to-market. Failure to recognize and implement external

innovation sourcing strategies may constitute an increasingly significant long-term disadvantage in today's fast-moving and highly competitive innovation landscape. In light of this, family business managers may be well-advised to actively search for OI partners in the planning phase of an innovation project. Managers can, for instance, identify potential collaboration partners by attending trade shows or by browsing trade directories.

The results of the fourth chapter on prosocial behavior suggest that family firms excel in corporate social performance (CSP) outputs. Hence, managers seeking to pursue social agendas may want to consider a career path in a family firm, given the higher probability of success in achieving social endeavors. For family managers, this chapter also provides an interesting recommendation. The results corroborate that a family firm's CSP is significantly affected by a financial crisis independent of firm-level financial risk. This decision could be sub-optimal. Hence, it would be advisable to rationally assess situations that appear threatening and pay explicit attention to the long-term implications associated with short-term cost-saving behaviors. Adopting a short-term logic during a crisis when firm performance is not significantly affected may undermine a firm's long-term value-creation capabilities. In contrast, strategic adjustments are in place once firm-level performance hazards require short-term action to ensure long-term survival. Hence, family firm managers could benefit from establishing a dedicated risk management program within the firm.

LAYMEN SUMMARY

When we think about corporations and their primary objective, many think about profit maximization. This is not wrong, given that most of us tend to think about non-family firms in a business context. However, to the surprise of many, the most prevalent form of business is, in fact, the family firm, and this organizational form does not follow a simple profit maximization principle. In my field of study (strategic management research), we try to understand how companies behave and why. In other words, we try to find out what firm characteristics and other factors affect a firm's behavior and how they respond to changing circumstances. For this, we build models and evaluate how accurate our predictions are. This is useful because accurate models allow us to identify inefficiencies (economically sub-optimal choices) in firm behavior and advise policymakers and managers on what they can do differently to resolve these problems. Economically speaking, irrational behavior does not produce optimal financial outcomes and occurs naturally – in part – because we are human beings, and our perception and emotions largely determine our behavior. In addition, our cognitive abilities have a limited capacity to assimilate and process information. Let me provide you with an example: A financial crisis can scare managers because they have never been in a situation like this or because everyone else seems to freak out. This likely affects the cognitive processes of a manager even when there is no severe threat to their own firm in this new situation. As a result, a manager may act irrationally by focusing on short-term cost savings. The manager may fire employees or abandon important long-term projects without rationally considering the long-term consequences of such actions. This example demonstrates that a perceived threat can impair a rational assessment and lead to a misjudgment of an appropriate response.

In my work, I consider family firms and the impact of this ownership type on strategic decision-making. It is the prevailing opinion that emotional considerations have greater priority in the decision-making process of family firms compared to their non-family firm counterparts. To family firms, things like reputation, relationships, dynastic succession, preserving control over the firm, and other factors play a significant role and affect their strategic choices. From a purely economic perspective it can be considered irrational behavior to prioritize these non-financial goals because it does not necessarily maximize profits. Hence, traditional economic models often do a poor job of predicting family firm behavior, and we need new models to

accurately predict family firm behavior. These models have to consider how non-financial goals affect the decision-making process of family firms. The field of family business research is still relatively young (15 years), and the theories and models that are currently used require significant development for us to comprehend why family firms behave the way they do. Understanding their behavior can address many economic inefficiencies and inequalities for firms, employees, partners, investors, and policymakers. This helps to foster global prosperity and benefits the society as a whole.

In Chapter 2, I study the presence of influential owners other than the family owners themselves and what impact their presence has on the innovation behavior. To do so, I study family firms traded at the U.S. stock exchange (i.e., S&P 1500). Traditionally, publicly traded firms are owned by many different owners each having a say in what the company is supposed to do via voting rights. A firm's ownership structure is important because today's economy has changed dramatically. A few decades ago, public firms were characterized by a dispersed ownership structure. In other words, lots of people owned tiny fractions of a given firm and each individual had very little power. Nowadays, large institutional owners dominate the stock market. Institutional investors own much larger portions of a single firm, which equips them with significant voting power to influence a firm's strategy. An institutional investor is a corporation that collects money from individuals and then invests on behalf of its clients (e.g., public pension funds, mutual funds, and hedge funds). An individual employed in public service, for example, pays a monthly pension contribution. This contribution is collected by a state-governed public pension fund and (partly) invested in stocks to ensure the availability of sufficient money to pay out the promised retirement pension in the future. Since, today, institutional investors hold the majority of all outstanding stock, they also have much power to influence corporate behavior. How is this relevant to family firm research you may ask. Family business theory suggests that family firms act in accordance with the preferences of the owning family. This premise rests on the assumption that it is the owning family who has the ability to decide over corporate decision. However, in this chapter, I show that the strategic preferences of other influential owners also play an essential role and that family firms cannot act in full accordance with their preferences in a public setting. This highlights the necessity to adjust our models to reflect the ownership structure. In particular, I find that it is insufficient to look at the strategic preferences of family firms in isolation – like we currently do. I demonstrate this by investigating the impact of one particularly aggressive institutional investor type (i.e., the activist hedge fund), which is focused on generating significant profits for its clients in a short

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amount of time. This is primarily achieved by promoting large dividend payouts from a company's cash reserves, selling business units, selling patents, and firing employees. Overall, my results reveal that the presence of this institutional investor has detrimental effects on the innovation output of family firms.

In Chapter 3, I also look at family firms and their innovation behavior. This time, however, I am not interested in the innovation outcomes but rather in the resources required to innovate. Innovation is essential and considered a primary driver of growth and prosperity. Think about major technological breakthroughs like health care advances, electricity, transportation, and communication technology, and how they completely transformed the world we are living in today to become a better place for all of us. Today's innovation landscape is becoming increasingly competitive and fast-paced. Innovation projects require lots of capital and returns are uncertain and often take a long time. As a result, internal financing has become increasingly difficult and less attractive. Imagine you invest a lot of money in an innovation that your company can only benefit from for a short amount of time or, even worse, a competitor is faster than you, and you do not reap any benefits. From research, we know that innovation has a very high and positive impact on firm performance and survival on average. In other words, not every innovation project is a success but if you undertake many innovation projects the benefits outweigh the costs of failed projects. Although family firms are said to be long-term oriented, they are considered less innovative. It is often argued that this is because innovation is very risky and requires lots of capital. As we know, non-family firms follow a profit maximization strategy, but family firms generally prioritize security and maintaining control over their firm even at the cost of financial performance. This is problematic for innovation. However, there are good alternatives to financing innovation internally. 'Open innovation' reduces both risk and capital requirements and may be an excellent strategy for family firms. Open innovation refers to firms partnering up with external collaborators to generate innovation together. In this research project, I investigate if family firms are more or less likely to engage in open innovation compared to non-family firms, and how different internal and external factors affect this relationship. From my research, it becomes apparent that family firms are less likely to engage in open innovation compared to non-family firms. This is surprising given the enormous benefits described above and the fact that family-owned firms should have a superior ability to nurture such partnerships. Nevertheless, the explanation makes sense if we consider that ability alone is not enough – willingness is just as important. Family owners likely lack the willingness to engage in open innovation strategies because it

requires, at least in part, to give up control over an innovation's trajectory. As pointed out earlier, the non-financial objective of control retention weighs very high in the decision-making process of family firms. Nevertheless, I also find that there are solutions to this paradox situation. Both willingness and ability appear to be significantly affected by several factors such as the firm's generational stage, the presence of non-family managers in a firm's top management team, and the type of open innovation partner (e.g., customer, supplier, competitor, or research institute). This is important because it informs the debate about changes a family firm can implement to increase their probability to engage in and benefit from open innovation strategies.

In my last chapter, I devote my attention to prosocial behavior on behalf of family firms. Prosocial behavior (also known as corporate social responsibility - CSR) means that a firm behaves socially responsibly above and beyond what is legally required. This could take the form of community engagement, favorable employee healthcare treatment, supporting humanitarian causes domestically or abroad, and much more. In the literature, many studies rely on the assumption that family firms are concerned with their reputation and follow a long-term orientation. Prosocial behavior has been shown to positively affect long-term financial performance and to foster a good reputation. This suggests that family firms should do better than non-family firms regarding prosocial activities and my statistical analysis attests to this proposition. In addition, I show that this is not always the case. The findings suggest that the temporal orientation of family firms is not stable over time. In other words, the prevailing assumption of family business research that family firms are always long-term oriented does not appear to be true – at least in the context of this particular investment type. The results suggest that situations of financial distress can significantly shorten the long-term focus of family firms and hence their behavior toward prosocial activities. Surprisingly, a global financial crisis leads to short-term behavior of family firms even if the respective firm's survival is not under threat. Increasing levels of bankruptcy risk, which potentially threatens a firm's survival, on the other hand, did not lead to the adoption of short-term behavior. This finding informs scholars about the conditional nature of the assumption that family firms act in accordance with a long-temporal orientation. Moreover, the findings represent a significant contribution because they demonstrate the interplay between internal and external situational factors (i.e., bankruptcy risk and financial crisis) and how they can affect temporal orientation.

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APPENDIX A

Appendix A: Table A1

TABLE A1 Robustness Test: Panel Data Random Effects Estimates

| | Panel a (family voting share %) | | | | | | | | Panel b (30% voting share threshold) | | | | | | | |
| | Model 1 | | | | Model 2 | | | | Model 1 (Threshold 30%) | | | | Model 2 (Threshold 30%) | | | |
	Estimate	Std. Error	t-Statistic	p-Value	Estimate	Std. Error	t-Statistic	p-Value	Estimate	Std. Error	t-Statistic	p-Value	Estimate	Std. Error	t-Statistic	p-Value
Citation Weighted Patents																
Intercept	0.832	0.493	1.687	0.092 †	0.832	0.492	1.690	0.091 †	0.856	0.488	1.753	0.080 †	0.853	0.488	1.747	0.081 †
Family Firm	-0.008	0.002	-3.714	< 0.001 ***	-0.008	0.002	-3.422	< 0.001 ***	-0.285	0.134	-2.132	0.033 *	-0.277	0.138	-2.001	0.046 *
Hedge Fund Activism$_{t-4}$	0.079	0.014	5.663	< 0.001 ***	0.085	0.014	5.966	< 0.001 ***	0.079	0.014	5.723	< 0.001 ***	0.084	0.014	5.948	< 0.001 ***
Hedge Fund Activism$_{t-4}$ × Family Firm					-0.002	0.000	-4.526	< 0.001 ***					-0.114	0.041	-2.745	0.006 **
R&D$_{t-4}$	0.438	0.024	18.115	< 0.001 ***	0.438	0.024	18.014	< 0.001 ***	0.440	0.026	17.053	< 0.001 ***	0.440	0.026	17.077	< 0.001 ***
Age$_{t-4}$	0.072	0.012	6.037	< 0.001 ***	0.072	0.012	6.142	< 0.001 ***	0.066	0.013	4.909	< 0.001 ***	0.066	0.013	5.011	< 0.001 ***
Sales$_{t-4}$	0.286	0.031	9.231	< 0.001 ***	0.285	0.031	9.278	< 0.001 ***	0.284	0.030	9.374	< 0.001 ***	0.284	0.030	9.384	< 0.001 ***
Tobin's Q$_{t-4}$	-0.032	0.040	-0.783	0.434	-0.032	0.040	-0.806	0.420	-0.033	0.036	-0.914	0.361	-0.033	0.036	-0.927	0.354
Return on assets$_{t-4}$	0.000	0.000	0.648	0.517	0.000	0.000	0.650	0.516	0.000	0.000	0.655	0.513	0.000	0.000	0.658	0.511
Current ratio$_{t-4}$	0.405	0.119	3.411	< 0.001 ***	0.406	0.119	3.400	< 0.001 ***	0.397	0.123	3.218	0.001 **	0.399	0.124	3.212	0.001 **
Year Dummies		Yes				Yes				Yes				Yes		
Industry Dummies (SIC Code)		Yes				Yes				Yes				Yes		
Observations		N=2601				N=2601				N=2601				N=2601		
Adjusted R²		0.35				0.35				0.35				0.35		

† p < 0.10; * p< 0.05; ** p< 0.01; *** p< 0.001

Appendix A: Table A2

TABLE A2 Robustness Test: Tobit Random Effects Estimates (BHHH Maximization)

| | Panel a (family firm dummy) | | | | | | | | Panel b (family voting share %) | | | | | | | |
| | Model 1 | | | | Model 2 | | | | Model 1 | | | | Model 2 | | | |
	Estimate	Std. Error	t-Statistic	p-Value	Estimate	Std. Error	t-Statistic	p-Value	Estimate	Std. Error	t-Statistic	p-Value	Estimate	Std. Error	t-Statistic	p-Value
Citation Weighted Patents																
Intercept	-2.961	1.183	-2.504	0.012 *	-3.059	0.564	-5.426	< 0.001 ***	-3.221	1.146	-2.811	0.005 **	-3.194	0.565	-5.657	< 0.001 ***
Family Firm (ownership %)	-0.969	0.136	-7.097	< 0.001 ***	-0.439	0.068	-6.490	< 0.001 ***	-0.021	0.003	-6.285	< 0.001 ***	-0.006	0.001	-4.525	< 0.001 ***
Hedge Fund Activism$_{t-4}$	0.171	0.088	1.935	0.053 †	0.136	0.044	3.115	0.002	0.173	0.088	1.978	0.048 *	0.131	0.044	2.986	0.003 **
Hedge Fund Activism$_{t-4}$ × Family Firm					-2.426	1.294	-1.875	0.061 †					-0.048	0.023	-2.069	0.039 *
R&D$_{t-4}$	0.711	0.017	41.852	< 0.001 ***	0.556	0.009	63.484	< 0.001 ***	0.703	0.016	43.261	< 0.001 ***	0.556	0.009	63.243	< 0.001 ***
Age$_{t-4}$	-0.100	0.048	-2.091	0.036 *	0.092	0.023	3.949	< 0.001 ***	-0.098	0.047	-2.083	0.037 *	0.088	0.023	3.854	< 0.001 ***
Sales$_{t-4}$	0.157	0.055	2.871	0.004 **	0.268	0.026	10.133	< 0.001 ***	0.175	0.051	3.429	< 0.001 ***	0.270	0.027	10.093	< 0.001 ***
Tobin's Q$_{t-4}$	0.012	0.198	0.061	0.952	-0.025	0.093	-0.269	0.788	0.016	0.193	0.085	0.932	0.013	0.092	0.146	0.884
Return on assets$_{t-4}$	0.001	0.000	1.770	0.077 †	0.000	0.000	0.606	0.545	0.001	0.000	1.802	0.072 †	0.000	0.000	0.985	0.325
Current ratio$_{t-4}$	0.655	0.266	2.465	0.014	0.783	0.130	6.049	< 0.001 ***	0.722	0.263	2.744	0.006 **	0.755	0.131	5.759	< 0.001 ***
Year Dummies		Yes				Yes				Yes				Yes		
Industry Dummies (SIC Code)		Yes				Yes				Yes				Yes		
Observations		N=2601				N=2601				N=2601				N=2601		
Left-censored		1319				1319				1319				1319		
Uncensored		1282				1282				1282				1282		
Right-censored		0				0				0				0		

† p < 0.10; * p< 0.05; ** p< 0.01; *** p< 0.001

TABLE A3 Robustness Test: Panel Data Random Effects Estimates – Excluding Low R&D Intensive Industries (OECD)

| | Panel a (family firm dummy) | | | | | | | | Panel b (family voting share %) | | | | | | | |
| | Model 1 | | | | Model 2 | | | | Model 1 | | | | Model 2 | | | |
	Estimate	Std. Error	t-Statistic	p-Value	Estimate	Std. Error	t-Statistic	p-Value	Estimate	Std. Error	t-Statistic	p-Value	Estimate	Std. Error	t-Statistic	p-Value
Citation Weighted Patents																
Intercept	-3.358	0.671	-5.006	<0.001 ***	-3.306	0.692	-4.778	<0.001 ***	-2.067	0.941	-2.198	0.028 *	-2.070	0.940	-2.202	0.028 *
Family Firm	-0.101	0.009	-11.100	<0.001 ***	-0.070	0.010	-7.223	<0.001 ***	-0.005	0.002	-2.470	0.014 *	-0.005	0.002	-2.309	0.021 *
Hedge Fund Activism$_{t-4}$	0.021	0.020	1.036	0.300	0.045	0.019	2.370	0.018 *	0.061	0.033	1.854	0.064 †	0.065	0.032	2.044	0.041 *
Hedge Fund Activism$_{t-4}$ × Family Firm					-0.321	0.106	-3.026	0.003 **					-0.001	0.000	-3.533	<0.001 ***
R&D$_{t-4}$	0.555	0.008	72.866	<0.001 ***	0.555	0.007	74.371	<0.001 ***	0.404	0.014	28.061	<0.001 ***	0.403	0.015	27.795	<0.001 ***
Age$_{t-4}$	0.125	0.015	8.461	<0.001 ***	0.127	0.015	8.499	<0.001 ***	0.140	0.046	3.045	0.002 **	0.141	0.046	3.072	0.002 **
Sales$_{t-4}$	0.366	0.040	9.238	<0.001 ***	0.364	0.041	8.890	<0.001 ***	0.305	0.047	6.448	<0.001 ***	0.305	0.047	6.476	<0.001 ***
Tobin's Q$_{t-4}$	0.024	0.077	0.309	0.757	0.023	0.079	0.292	0.770	-0.133	0.083	-1.596	0.111	-0.132	0.083	-1.596	0.111
Return on assets$_{t-4}$	0.000	0.000	0.668	0.504	0.000	0.000	0.656	0.512	0.000	0.000	0.906	0.365	0.000	0.000	0.902	0.367
Current ratio$_{t-4}$	0.913	0.086	10.605	<0.001 ***	0.878	0.093	9.459	<0.001 ***	0.370	0.252	1.470	0.142	0.369	0.256	1.443	0.149
Year Dummies		Yes				Yes				Yes				Yes		
Industry Dummies (SIC Code)		Yes				Yes				Yes				Yes		
Observations		N=1192				N=1192				N=1192				N=1192		
Adjusted R^2		0.66				0.66				0.30				0.30		

† p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001

APPENDIX B

Appendix B: Table B1

TABLE B1 Robustness Test: Panel Data Random Effects Estimates (Lag 5)

Citation Weighted Patents	Model 5				Model 6			
	Estimate	Std. Error	t-Statistic	p-Value	Estimate	Std. Error	t-Statistic	p-Value
Intercept	0.378	0.467	0.810	0.418	0.364	0.467	0.780	0.436
Family Firm	-0.585	0.121	-4.840	< 0.001 ***	-0.571	0.121	-4.720	< 0.001 ***
Hedge Fund Activism$_{t-5}$	0.014	0.034	0.400	0.687	0.020	0.034	0.580	0.560
Hedge Fund Activism$_{t-5}$ × Family Firm					-0.150	0.020	-7.530	< 0.001 ***
R&D$_{t-5}$	0.486	0.032	15.030	< 0.001 ***	0.486	0.032	14.970	< 0.001 ***
Age$_{t-4}$	0.068	0.012	5.890	< 0.001 ***	0.068	0.011	5.980	< 0.001 ***
Sales$_{t-5}$	0.285	0.014	19.830	< 0.001 ***	0.286	0.015	19.550	< 0.001 ***
Tobin's Q$_{t-5}$	0.001	0.125	0.010	0.991	0.002	0.124	0.020	0.988
Return on assets$_{t-5}$	0.000	0.000	1.460	0.144	0.000	0.000	1.460	0.143
Current ratio$_{t-5}$	0.526	0.106	4.960	< 0.001 ***	0.532	0.108	4.920	< 0.001 ***
Year Dummies		Yes				Yes		
Industry Dummies (SIC Code)		Yes				Yes		
Observations		N=1892				N=1892		
Adjusted R^2		0.40				0.40		

† p < 0.10; * p< 0.05; ** p< 0.01; *** p< 0.001

Appendix B: Table B2

TABLE B2 Robustness Test: Panel Data Random Effects Estimates (R&D Not Winsorized)

Citation Weighted Patents	Model 7				Model 8			
	Estimate	Std. Error	t-Statistic	p-Value	Estimate	Std. Error	t-Statistic	p-Value
Intercept	0.842	0.488	1.725	0.085 †	0.845	0.493	1.715	0.086 †
Family Firm	-0.569	0.163	-3.493	< 0.001 ***	-0.556	0.168	-3.315	< 0.001 ***
Hedge Fund Activism$_{t-4}$	0.079	0.014	5.607	< 0.001 ***	0.086	0.012	6.961	< 0.001 ***
Hedge Fund Activism$_{t-4}$ × Family Firm					-0.113	0.043	-2.610	0.009 **
R&D$_{t-4}$	0.436	0.025	17.670	< 0.001 ***	0.436	0.025	17.643	< 0.001 ***
Age$_{t-4}$	0.078	0.015	5.232	< 0.001 ***	0.078	0.015	5.270	< 0.001 ***
Sales$_{t-4}$	0.282	0.029	9.642	< 0.001 ***	0.282	0.029	9.584	< 0.001 ***
Tobin's Q$_{t-4}$	-0.028	0.040	-0.691	0.489	-0.028	0.039	-0.704	0.481
Return on assets$_{t-4}$	0.000	0.000	0.809	0.418	0.000	0.000	0.813	0.416
Current ratio$_{t-4}$	0.407	0.116	3.502	< 0.001 ***	0.407	0.117	3.477	< 0.001 ***
Year Dummies		Yes				Yes		
Industry Dummies (SIC Code)		Yes				Yes		
Observations		N=2601				N=2601		
Adjusted R^2		0.35				0.35		

† p < 0.10; * p< 0.05; ** p< 0.01; *** p< 0.001

CURRICULUM VITAE

On January 24th, 1990, Matthias Leute was born in Karlsruhe, Germany. He obtained his Bachelor of Science in Management from Mannheim University. During his studies, Matthias spent a semester abroad in San Diego, California, worked at multiple leading consultancies like KPMG, PWC, and Simon Kucher & Partners, and established his first social initiative called *Bildungshunger*, providing educational support for more than 160 disadvantaged children in Africa. Thereafter, Matthias graduated Cum Laude from Maastricht University completing the International Business master program with a specialization in entrepreneurship and small- and medium-sized enterprise (SME) management. While completing the master's program, Matthias found his first company (Stubbs), which introduced neoprene can coolers to the European market. Inspired by academia and driven by a philosophy of lifelong learning, he then pursued his doctoral degree in strategic management (Ph.D.), publishing in a leading journal (Family Business Review - forthcoming) and presenting his work at renowned international conferences in the realm of strategic management, entrepreneurship, and family business (e.g., Academy of Management; European Academy of Management; International Family Enterprise Research Academy). Next to the research during his Ph.D. trajectory, Matthias was involved in teaching, lecturing, master thesis supervision, and consulting multiple start-ups. In addition, he launched and expanded his second company (DopeGrip®) internationally, selling an in-house developed industry-leading anti-slipping pad with vibration-absorbing properties. The invention is now used on many small electric transportation devices (e.g., e-scooters, e-skateboards, EUCs. OneWheels, and more) and is known as the leading product in its class.

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