R&D MANAGEMENT

When is R&D beneficial for family firms? The concurrent roles of CSR and economic conditions

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How family firms innovate has captivated scholars for over a decade. However, an investigation into the benefits of research and development (R&D) for family firm value under differing economic conditions has received little attention in the family firm innovation or R&D literature. This study examines the relationship between R&D intensity and firm value among listed family firms during the economic recession period of 2007–2010 and nonrecessionary periods (referred to as normal periods) in the US between 1995 and 2013. Based on behavioral agency theory, we evaluate the moderating effects of investments in inward-looking and outward-looking corporate social responsibility (CSR) initiatives on this relationship. We hypothesize that R&D intensity is negatively related to family firm value during a recession period, but outward-looking CSR positively moderates the relationship between the two. The opposite is hypothesized during normal periods. The results support the assertions that outward-looking CSR can ease the negative impact brought about by R&D intensity on firm value during a recession period, while inward-looking CSR investments surprisingly bear no effects. Important implications for research, family firm leaders, and R&D managers are discussed.

1. Introduction

Behavioral agency theory proposes that a desire to preserve socioemotional wealth (SEW; the nonfinancial, affective wealth of the family) lies at the core of family firms' strategic R&D decision-making (Gomez-Mejia et al., 2014). The existing literature argues that family firm idiosyncrasy may lead them to pursue more risk-averse strategies (Gomez-Mejia et al., 2014; Hu and Hughes, 2020; Soluk et al., 2021) and exhibit lower R&D investments (Sciascia et al., 2015; Brinkerink and Bammens, 2018). However,

these idiosyncrasies can offer advantages to family firms by helping them convert and extract greater value from their R&D investments (Duran et al., 2016). The existing literature also states that family firms are not homogeneous (Chua et al., 2012). For example, many defy these assertions by investing heavily in R&D (Röd, 2016; Soluk et al., 2021), while others struggle to generate superior value from their R&D investments (Block et al., 2022). Hence, advancing a heterogeneity perspective on family firm R&D is critical to better understand how and why family firms exhibit distinct R&D behaviors and returns.

While research has provided much insight into family firm heterogeneity in R&D *investment decisions* (Chrisman and Patel, 2012; Patel and Chrisman, 2014), what is urgently needed is a better understanding of family firm heterogeneity in *benefiting financially* from R&D investments (Sun et al., 2019). First, explanations for family firm heterogeneity lie in the financial and socioemotional goals that family firms pursue through innovation (Soluk et al., 2021; Soluk and Kammerlander, 2021). Financial goals are reflected in achieving firm value, with a high firm value indicative of financial success (e.g., strong shareholder returns) and organizational vitality. Yet, it remains unclear whether and which family firms can achieve their financial goals through R&D, leaving the financial value of increasing R&D investments for family firms unknown. Second, when attending to family firm heterogeneity, prior work has tended to examine the role of individual strategic choices or contextual conditions in family firm R&D independently, without accounting for their concurrent nature. Yet, we know that family firm goals and the potential returns to their strategic decisions can shift under different contextual conditions (e.g., economic shock; Sun et al., 2019) and social pressures (Mariani et al., 2021). Thus, accounting for the concurrent nature of the strategic choices that family firms make is necessary to refine theorizing of the financial value of investing in R&D for family firms under different conditions. These gaps generate an essential research question: *Under what conditions can R&D intensity enhance family firm value?*

To answer this research question, we draw on behavioral agency theory to develop a model predicting that the impact of R&D on firm value is contingent on the economic situation and family firms' strategic investments in corporate social responsibility (CSR). Behavioral agency theory anticipates that various reference points determine whether senior managers are in a loss frame or gain frame at any moment in time (Hoskisson et al., 2017). These reference frames change the willingness to bear risk, which, as a default, is presumed to be a position of risk aversion (Wiseman and Gómez-Mejía, 1998). This is expected to be more prevalent among family firms because of the priority placed on nonaffective wealth tied to familiness (Gómez-Mejía et al., 2007). This is the first reference point. However, adopting a contingency view of behavioral agency, we foresee that exogenous shocks shape the conditions family firms must successfully navigate to profit and survive (Soluk et al., 2021). As a second reference point characterized by high uncertainty about means–ends relationships, the greater probability of losing socioemotional wealth in economic recessions (Sun et al., 2019) activates the loss aversion behavior expected under behavioral agency theory (Gómez-Mejía et al., 2007; Chrisman and Patel, 2012). However, economic crises carry expectations of socially responsible behavior (Kramer, 2020) brought on by societal pressures for businesses to bear part of the responsibility (Lins et al., 2017; Bae et al., 2021). This comes at a time when firms also face a trade-off in where to devote their social efforts (Wang et al., 2020). In stable times, inward-looking CSR (focused on employee relations) can increase firm productivity by addressing the priorities of internal stakeholders (Stock et al., 2022). However, in recessions, family firms must carefully manage their reputation, stakeholder relationships, and social impact, calling for outward-looking CSR (focused on investments in environment, community, and product) (Jo and Harjoto, 2012; Randerson, 2022). Internal and external stakeholders become the third reference point, which resets the priority given to R&D intensity and firm value.

We test our arguments on a dataset of 67 listed family firms engaged in R&D and CSR, two regular economic periods between 1995–2006 and 2011–2013, and a recessionary period between 2007 and 2010. Our study makes two theoretical contributions to the family firm innovation, R&D, and CSR literature. First, we refine behavioral agency theory to explain why some family firms are traditionally coy in investing in risk-laden activities such as R&D, while other studies show that family firms can be better at accruing innovation outputs (Duran et al., 2016). We reveal the economic situation as a boundary condition shaping how family firms' R&D intensity shapes firm value. We extend behavioral agency theory with greater nuance into why family firms make strategic choices to protect or weaken R&D investments in economic recessions, specifically (called for by Sun et al., 2019). This adds to the burgeoning body of work recognizing the importance of economic conditions in predicting family firm behavior (Ferrigno and

Cucino, 2021; Soluk et al., 2021), which we reveal to be an important (but overlooked) reference frame for family decision-making. Second, we distinguish between inward-looking and outward-looking CSR as moderators of the relationship between R&D intensity and firm value. Our findings stress the importance of CSR for value creation in family firms (Cruz et al., 2014; Mariani et al., 2021) but extend present knowledge by drawing attention to types of CSR investments and their timing. CSR investments are discretionary efforts (McWilliams and Siegel, 2001). Economic crises heighten stakeholder expectations while intensifying a firm's resource constraints. Firms 'still struggle to figure out where, how, and when to devote their social efforts', leading to accusations that CSR research is undertheorized (Wang et al., 2020, p. 1). By grounding CSR choices in behavioral agency theory and tying these choices to economic circumstances, we show when investments in R&D and CSR are complementary or competing in generating firm value.

2. Theory: Behavioral agency theory, R&D and CSR in family firms

We begin by clarifying our position on CSR. CSR activities carry either an inward-looking or outward-looking *intent* (Cruz et al., 2014; Stock et al., 2022). An inward-looking intent prioritizes internal stakeholders' concerns and predominantly focuses on employee relations, diversity, and inclusivity. Outward-looking intent prioritizes those stakeholders outside the firm, concentrating on community initiatives, environmental stewardship, and the quality and safety of its products to consumers.

Family firms are beset by societal pressures for a more sustainable, equitable, and inclusive future. These stakeholder pressures call for CSR investments (Cruz et al., 2014; Mariani et al., 2021). This raises a question concerning a strategic dimension to CSR. Jo and Harjoto (2012) and Baron (2010) distinguish between corporate social performance (CSP) and CSR, where CSR involves a moral duty to undertake social activities and where CSP need not arise from moral duties. CSP requires activities beyond law and regulation and involving the private provision of public goods or private redistribution (Jo and Harjoto, 2012). Consistent with Baron (2010), Jo and Harjoto (2012) take the position that CSR implies CSP, but CSP need not be morally motivated and instead be strategically chosen to serve the firm's interests first and foremost. It is not possible to say for each firm, neither ex ante nor ex post, whether their CSR activities were intended as strategic or not. However, considering that contemporary CSR investing speaks to a plethora of stakeholder pressures firmly placed on firms, we expect that all CSR activities have at least some strategic elements to them. This is consistent with stakeholder theory, which predicts that managers conduct CSR to fulfill their moral, ethical, and social duties to their stakeholders and strategically achieve corporate goals for their shareholders (Jo and Harjoto, 2012). Jensen (2002) even goes so far as to assert that the best strategy to advance social welfare is to maximize the firm's long-term value, which is consistent with our conceptualization. This is further consistent with Hillman and Keim (2001) that stakeholder management (e.g., through investments in inward-looking and outward-looking CSR activities) is done so to improve shareholder value.

Based on Table 1, the existing research has largely overlooked R&D intensity and firm value.[1] R&D intensity is a form of managerial risk-taking (Chrisman and Patel, 2012; Sun et al., 2019). Behavioral agency theory assumes that top managers are *loss* averse (Wiseman and Gómez-Mejía, 1998), and the object of interest is the reference point behind decisions. Perceived wealth-at-risk discourages managerial risk-taking (Hoskisson et al., 2017). This is relevant for family firm research because a behavioral agency theory of family firms depicts the family as having a strong desire to preserve and protect socioemotional, nonfinancial wealth (SEW). This SEW endowment is the chief reference point for determining strategic (in)action (Gómez-Mejía et al., 2007). This thesis is problematic as it leads to the conclusion that family firms are risk-averse and uneager to make intense R&D investments (Sciascia et al., 2015). Yet, we know some family firms are highly innovative, and others are superior at generating greater innovation outputs from their R&D investments (Duran et al., 2016; Röd, 2016; Soluk et al., 2021). Hence, R&D investment and outcomes in family firms are context-specific and subject to boundary conditions (Soluk and Kammerlander, 2021).

Behavioral agency theory does not assume that all managers act solely with loss aversion. Instead, the theory accepts that under certain conditions, some managers may be in 'gain frames' while others are in 'loss frames' (Bamberger and Fiegenbaum, 1996; Hoskisson et al., 2017; Soluk et al., 2021). Boundary conditions hence alter the weight given to SEW in family firm decision-making and the extent to which managerial risk-taking will seek financial gain or retreats to protect

Table 1. Impact of R&D on family firm value

Authors	Theoretical perspectives used	Method used	Data source	Family firm studies (yes or No)	Nature of the relationship between R&D expenditure and firm value	Firm value measures	Main findings
Chauvin and Hirschey (1993)	R&D and market value	Sample with 20 leading firms in the Compustat database in 1988–1990	Compustat	No	Direct	The market value of a firm	R&D expenditure and firm value are positively related in high-tech industries. The effect between R&D expenditure and firm value is more pronounced in larger firms
Connolly and Hirschey (2005)	R&D and Tobin's Q	Sample with 3,100 publicly traded firms from 80 countries	Compustat	No	Direct	Tobin's Q	R&D spending is positively related to firm value, and this relationship is more pronounced in larger firms
Ehie and Olibe (2010)	R&D and market value	Sample with 26,499 US firms in 1990–2007	Compustat	No	Direct	Market-based performance	R&D investment is positively related to firm value regardless of industry. The effect between R&D investment and firm value is stronger in manufacturing than in service industries pre-9/11 (between 1990 and 2001). However, the effect of R&D investment and firm value is stronger in the service industry than in the manufacturing industry after 9/11 (2001 onwards)
Gupta et al. (2017)	R&D and Tobin's Q	Sample with 82,367 firm-year observations from 75 countries	International Monetary Fund (IMF), ICRG index	No	Direct	Tobin's Q	In developing countries, R&D intensity is positively related to firm value only in less competitive industries. R&D intensity and firm value are positively related to competitive industries in developed countries
Huang et al. (2015)	Resource-based view	Sample with 15,039 US firms in the period 1962–2001	Compustat	No	Direct	Market-to-book value	In manufacturing firms, firm value can be benefited from intensive R&D investment. But the relationship between R&D investment and firm value turns negative in nonmanufacturing firms
Johnson and Pazderka (1993)	R&D and firm performance	Unbalanced sample with 224 Canadian listed firms (52 firms in the period 1985–1987, 54 firms in 1986–1988, 47 firms in 1985–1988).	Compustat	No	Direct	The market value of equity	R&D spending and firm value are positively related in listed firms
Jose et al. (1986)	R&D and firm performance	Top 250 of the Fortune 500 corporations	Compustat	No	Direct	Tobin's Q	R&D intensity, driven by product obsolescence, is negatively related to firm value

Table 1. (Continued)

Authors	Theoretical perspectives used	Method used	Data source	Family firm studies (yes or No)	Nature of the relationship between R&D expenditure and firm value	Firm value measures	Main findings
Kim et al. (2020)	Dividend signaling theory	Sample with 11,946 financially constrained firms in the period 1980–2017	Compustat	No	Direct	Market value minus the book value of equity divided by the total assets of the firm	R&D investment is positively related to firm value in financially constrained firms. The effect of R&D investment on firm value is stronger in firms with dividend payout policies than those without dividend payout policies.
Liu et al. (2022)	R&D and firm value	Sample with 941 listed firms in China	China Stock Market and Accounting Research (CSMAR), Shenzhen Stock Exchange, Shanghai Stock Exchange	No	Direct (nonlinear)	Tobin's Q	The relationship between R&D investment and firm value is an inverted U-shape. This relationship exhibits that R&D investment benefits firm value, but excessive R&D investment can also harm firm value
Min and Smyth (2016)	R&D and firm value	Sample with Korean listed firms in the period 2007–2012	Electronic Disclosure System (DART), KIS-Value database for Korea, Korea Listed company association (KLCA)	No	Direct	Stock returns	R&D investment positively impacts firm value. Firms are expected to obtain more profits if they engage more in R&D
Neill et al. (2001)	R&D and value creation	Sample with 89 publicly traded firms in the period 1987–1994	Center for Research in Security Prices (CRSP)	No	Direct	Abnormal stock returns	Firm value can be increased if firms are continuously engaging with R&D
Pindado et al. (2010)	Equilibrium in the economic theory	Unbalanced panel with European firms in the period 1986–2003	Organization for Economic Cooperation and Development OECD	No	Direct	Market value minus the book value of equity divided by the replacement value of total assets of the firm	R&D investment is positively related to firm value
Pindado et al. (2015)	R&D and market value	Sample with 1,199 listed firms in the European Union, United States, and Japan in 1986–2003	OECD	No	Direct	Market value minus the book value of equity divided by the replacement value of total assets of the firm	R&D investment is positively related to firm value. The effect of R&D investment on firm value is strong when policymakers motivate economic agents to undertake R&D projects
Qiao et al. (2013)	Yin-Yang theory of Chinese philosophy	A-share listed Chinese firms – 651 firms in 2011, 531 firms in 2010, and 204 firms in 2007)	Shenzhen Stock Exchange	No	Direct	Tobin's Q	R&D expenditure is positively related to firm value among Chinese A-share listed firms

(Continues)

Table 1. (Continued)

Authors	Theoretical perspectives used	Method used	Data source	Family firm studies (yes or No)	Nature of the relationship between R&D expenditure and firm value	Firm value measures	Main findings
Simeth and Cincera (2016)	R&D and market value	Sample with 1,739 listed US firms from high-tech sectors	Compustat, OECD, Worldwide Patent Statistical Database, United States Patent and Trademark Office (USPTO)	No	Direct	Tobin's Q	The R&D expenditure is positively related to firm value.
Tong and Zhang (2014)	R&D and firm value	Sample with 1.027 US firms and 5,871 observations in 1998–2006	Compustat, CRSP	No	Direct	Future expected cash flow	R&D investment is positively related to firm value. The effect between R&D investment and firm value is stronger when boards consist of larger proportions of independent directors
Warusawitharana (2015)	Endogenous growth theory	US Financial firms in the period 1985–2006	Compustat, Center for Research in Security Prices (CRSP)	No	Direct	Tobin's Q	R&D expenditure is positively related to firm value across different industries

the family (Soluk et al., 2021). R&D is a significant ingredient to successful innovation, facilitating integration between knowledge and new technologies, increasing a firm's ability to compete, and enhancing a firm's resilience to outward pressures (Cohen and Levinthal, 1990; Gomez-Mejia et al., 2014). However, firms *cannot* witness immediate financial results, and R&D outcomes are inherently uncertain (Chrisman and Patel, 2012; Gomez-Mejia et al., 2014). In the short term, investments in R&D increase financial burdens on family firms (Chrisman and Patel, 2012).

Family firms expect their business to be sustainable across generations (Chua et al., 1999). To achieve such sustainability, firms should respond to the business environment to decelerate the process of aging and inertia (Sørensen and Stuart, 2000). R&D investment increases the quality and novelty of products, preparing a family firm for ever-changing customer interests (Kammerlander and Ganter, 2015). In times of environmental stability, fewer economic uncertainties mean fewer threats to the family firm's immediate viability, and reduced risks to SEW (Zellweger et al., 2012; Chua et al., 2018). R&D risks are perceptively less (Kotlar et al., 2020), and the financial outcomes more predictable (Heeley et al., 2006). The risk of SEW loss from R&D investment is relatively low (a gain frame), and family firms are more willing to invest in R&D to receive financial gains (Chrisman and Patel, 2012; Chua et al., 2018). Therefore, R&D intensity can enhance firm value (represented by Tobin's Q; Villalonga and Amit, 2006). Behavioral agency theory also anticipates that family firms will become risk-averse when managers perceive that firm survival is seriously threatened (Hoskisson et al., 2017). Since family wealth and firm performance are tightly coupled in family firms (Sun et al., 2019), a threat to survival presents an existential threat to SEW, which should activate protective SEW behaviors (a loss frame). Under behavioral agency theory, an economic recession is expected to deprioritize the linkage between R&D intensity and firm value. This theoretical expectation is commensurate with studies reporting how, in an unstable environment, family firms often react by constraining resource allocation (Soluk et al., 2021).

Family firms are also beset by CSR demands brought on by societal pressures for a more sustainable, equitable, and inclusive future (Cruz et al., 2014; Mariani et al., 2021). CSR investments can shape how R&D intensity converts into firm value inside and outside recessions. CSR is a construct reflecting societal good and being in tune with the environment, community, employee relations, and diversity, all of which are activities delivered by firms in addition to their economic activities (Hill et al., 2007). We distinguish

between inward-looking CSR (employee relations and diversity) and outward-looking CSR (environment, community, and product; Cruz et al., 2014). Economic crises carry expectations of socially responsible behavior (Kramer, 2020), but firms face a trade-off in where to devote their social efforts (Wang et al., 2020). Inward-looking CSR can increase firm productivity and effectiveness by addressing the priorities of internal stakeholders (Baron et al., 2011; Cruz et al., 2014). Diversity, treating employees fairly, providing equal chances for employee promotion, and positive employee relations (e.g., retirement benefits, employee involvement, and concern for well-being) help family firms to retain workers (Baron et al., 2011; Cruz et al., 2014) and make positive economic contributions to society at large. However, in recessions, family firms must carefully manage their public reputation, stakeholder relationships, and social impact, calling for outward-looking CSR (Jo and Harjoto, 2012). Hence, decisions on CSR investments can potentially alter the financial *versus* SEW balance of the family firm, capable of resetting the frame of reference given to R&D intensity and firm value.

3. Hypothesis development

3.1. Normal economic periods

In normal economic periods, firms often commit to market expansion and adjust strategies to behave attractively to the market, expecting to witness increases in sales and profit (Osmani and Deari, 2016; Martin-Rios and Pasamar, 2018). Under the market expansion, family firms could have higher current ratios, profit margins, and cash flow ratios (Scholes et al., 2021; Hu et al., 2022a), reflective of higher liquidity. Liquidity is an essential enabler of firms' R&D activities, which allows family firms to ease their attention to the preservation of SEW. Therefore, family firms can bear more risks strategically and hold a gain frame. First, family firms generally own more cash and hold a low desire to rely on debt (Hu et al., 2022a). In normal economic periods, family firms can accumulate more patient capital, easing family owners' concerns about the potential negative impacts of risky activities on financial performance and firm survival (Hu and Hughes, 2020). Second, opportunities resulting from individuals' increased disposable income during normal economic times provide significant support for market development (Hoffmann and Lemieux, 2016) that can be capitalized upon through R&D. R&D intensity helps family firms to stand out in the marketplace by differentiating their products away from competitors while also increasing firm productivity and efficiency to further build firm value (Broekaert et al., 2016). Hence, family firms with high R&D intensity can respond to opportunities quickly to enhance strategic fit with the environment (König et al., 2013; Prajogo, 2016). This provides a strong basis for improving firm value:

> **Hypothesis 1** The relationship between R&D intensity and firm value in family firms is positive.

Family members share the same values, norms, and backgrounds, accelerating communication and knowledge absorption (Hu and Hughes, 2020). However, family firms usually prioritize family members' benefits in making strategic decisions (Gómez-Mejía et al., 2007; Kotlar et al., 2020), thereby overlooking the commitment of nonfamily members (Kellermanns et al., 2012). Inward-looking CSR focuses on employee policies, diversity, and good governance (Stock et al., 2022). When family firms engage strongly in inward-looking CSR, they closely engage with nonfamily members and receive more support and effort from them. This increased effort resolves the financial implications posed by investing in inward-looking CSR. Moreover, many family firms view the relationships among nonfamily members as a part of SEW (Cennamo et al., 2012) and as part of the family (Berrone et al., 2012). While engaging in inward-looking CSR, family firms can achieve higher efficiency in innovation execution and employee productivity to benefit firm value. As employees' willingness to stay and work for the family firms increases, the firm can save on recruitment and training costs (Cruz et al., 2014). With increasing tenure in the family firm, longer-tenured employees are more familiar with the firm's mission, vision, and culture and can accelerate strategy execution when pursuing innovation (Jo and Harjoto, 2012). Hence, inward-looking CSR could accelerate the translation of R&D intensity into firm value:

> **Hypothesis 2a** Inward-looking CSR has a positive moderation effect on the relationship between R&D intensity and firm value in family firms.

Outward-looking CSR can also benefit value creation in family firms (Miroshnychenko and De Massis, 2022). However, an investment in outward-looking CSR (e.g., environment and community) increases financial pressure on family firms, which

are often identified as financially lagging behind their nonfamily counterparts (Miroshnychenko and De Massis, 2022). This financial pressure may lead family firms to lessen their commitment to the investments in extracting financial value from their R&D during normal economic periods, given that it represents a significant financial cost for family firms that could worsen their immediate financial position. Considering the two-sided moderation effect (benefits and drawbacks), we expect that outward-looking CSR investments will not contribute to the relationship between R&D intensity and firm value during normal economic periods. Accordingly:

Hypothesis 2b Outward-looking CSR has no moderation effect on the relationship between R&D intensity and firm value in family firms.

3.2. Recession periods

Competitive conditions change dramatically during economic recessions (DeDee and Vorhies, 1998), and the financial crisis between 2007 and 2010 was particularly harsh (Srinivasan and Lilien, 2009). As is typical in downturn conditions, the strategic focus moves toward cost-cutting instead of innovation to shore up firm survival (DeDee and Vorhies, 1998). Family firms became less liquid and had lower current ratios in the 2007–2010 financial crisis, driving firms to sell less on credit and collect money faster (Scholes et al., 2021). Slow financial value creation and intense competition threaten family firms' survival and endanger SEW. Because of this, family firms actively protect SEW (a loss frame), but in doing so, the link between R&D intensity and firm value is deprioritized. R&D requires continuous financial and human capital injection to maintain (Schiehll et al., 2018), which reduces resource support for operations and causes the process of delivering products and services to slow down (He and Wong, 2004). Additionally, the benefits of R&D (e.g., new products) in recessionary times can be questioned as the demand for new technology-based and durable goods are characteristically lower in recession periods, leading to decreases in return on investment from R&D (Golder et al., 2009). Therefore, we expect that the jeopardies to the family from risk-laden investments in R&D intensity will be too great and detract from firm value:

Hypothesis 3 The relationship between R&D intensity and firm value in family firms is negative during recession periods.

Opportunities during recession periods are inherently uncertain (Choi, 2013). Consumers' attention could drift toward alternatives that intensifies competition. In this circumstance, family firms can rely on outward-looking CSR to stand out from competitors by integrating this into their strategies, which could ease the negative impacts of R&D intensity on firm value. First, family firms are more willing to maintain their family's name and reputation (Miller et al., 2006; Kellermanns et al., 2012; Deephouse and Jaskiewicz, 2013). Because of this, family firms are willing to take extra care of external social links (Hu and Hughes, 2020). Second, outward-looking CSR plays a significant role in engaging with the quality and safety of the product in innovation activities that benefits customer retention (Jo and Harjoto, 2012). Third, after receiving support from family firms, the local community could reciprocate family firms, which is crucial to develop sales of new products and services generated from R&D (Kellermanns et al., 2012). It is then expected that outward-looking CSR will provide a halo effect for the family firm in the marketplace with outward-looking CSR activities signaling positive virtues to consumers, which, when coupled with R&D intensity, will increase firm value. Outward-looking CSR activities will produce benefits for increasing firm value from R&D during recession periods:

Hypothesis 4a Outward-looking CSR has a positive moderation effect on the relationship between R&D intensity and firm value in family firms during recession periods.

During an economic recession, the purchasing power of individuals and market demand during recessions is significantly low. This results in a market surplus, enhancing market competition (Sun et al., 2019). Concurrently, customers are quickly surrounded by substitutes that draw their attention. Therefore, the productivity and operational efficiency enhancements from inward-looking CSR could barely benefit the R&D and firm value during recession periods:

Hypothesis 4b Inward-looking CSR has no moderation effect on the relationship between R&D intensity and firm value in family firms during recession periods.

Figure 1 illustrates our theoretical framework.

4. Methods

4.1. Data and sample

We used three sources—ORBIS, KLD's Stat, and COMPUSTAT databases—to identify family firms and gather data on R&D intensity, CSR, and firm value. First, we targeted listed firms from

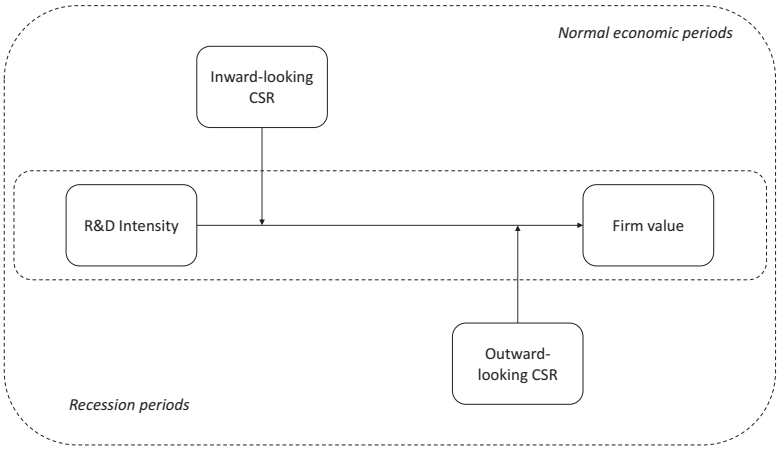

Figure 1. Theoretical framework.

ORBIS (e.g., Cruz et al., 2014; Brinkerink and Bammens, 2018). It contains ownership and management information (e.g., percentage of shares, names of shareholders, and directors) for listed firms worldwide. Based on Zhao et al. (2020), we removed firms from the financial sector, firms with a single owner, and those with extensive missing data (e.g., shareholders' names, ownership percentages, and R&D expenditure). Second, we adopted the 'ultimate owner' criteria used by Cruz et al. (2014) and Hu et al. (2022a,2022b) to identify listed US family firms in ORBIS: (1) at least one shareholder shares the same family name with the firm's ultimate owner; (2) at least one individual (except the ultimate owner) shares the same family name with the ultimate owner; at the same time, at least one shareholder shares the same family name is on the board of directors; (3) the ultimate owner and shareholder/shareholders who share the same family name should own at least 20% of the shares during ten-consecutive years within the period between 1995 and 2013. Moreover, we manually inspected annual reports and official websites to confirm relationships among shareholders. Notably, we paid extra attention to the family firm's succession events and succession intentions through company history to further verify their status as a family firm. Following this process, 108 listed family firms were identified.

KLD's Stat is a common database employed to gauge CSR performance in family research studies (Stavrou et al., 2007; Bingham et al., 2011). This database contains CSR Strength and Concern Ratings regarding CSR performance in employee relations, diversity, community, environment, and product quality for US firms, but are limited to the period from 1991 to 2013 (Jo and Harjoto, 2012). KLD uses various sources to obtain data, including reports, proxy statements, quarterly reports, articles in the general business press, and agencies (Hillman and Keim, 2001). We inserted the names of family firms identified from ORBIS into KLD to obtain CSR data. We then acquired data for firm characteristics (e.g., R&D expenditure) from COMPUSTAT. Since 1995 is the earliest available data on COMPUSTAT that match our criteria, we restrict our data period to 1995–2013 to match data across KLD and COMPUSTAT. As we applied strict criteria to identify family firms, the number of firms included in this study is less than in other studies (e.g., Fang et al., 2021). We have an unbalanced panel of 580 observations across 67 listed US family firms from 1995 to 2013. Of these observations, 208 are in the recession period (2007–2010), and 372 are in the normal period (1995–2006, 2011–2013).

4.2. Measurement

To be consistent with the direction of causality implied through theory and to account for likely delays in the creation (or destruction) of firm value from implementing specific activities, we maintained a 1-year time lag between the dependent variable and the independent variables, and the moderator variables. Table 2 lists variables tested in the current study. Firm value is measured by Tobin's Q (Hughes et al., 2019), which is a stock market's estimation of net present worth (Brainard and Tobin, 1968). It is a standard measure of firm value widely applied in accounting, economics, and finance literature (Hillman and Keim, 2001). We follow Cai et al. (2012) and calculate Tobin's Q as: (market value of common stock + value of preferred stock – the value of long-term debt

Table 2. Variable definitions and data source

Variables	Definitions	Data source
Inward-looking CSR Index	An aggregate measure of diversity index and employee relations index following Hillman and Keim (2001) and Baron et al. (2011)	KLD
Outward-looking CSR Index	An aggregate measure of community index, environment index and product quality and product safety index	KLD
R&D intensity	Total R&D expenditure over total sales at year *t*	Compustat
Tobin's Q	Market value over total assets	Compustat
Leverage	(short-term debt + long-term debt) over total assets	Compustat
ROA	Operating income before depreciation over total assets	Compustat
OCF/Assets	Operating cash flows over total assets	Compustat
Capex/Assets	Capital expenditure over total assets	Compustat

+ value of current liabilities – the value of current assets – the value of inventories)/value of total assets. We measure R&D intensity following Padgett and Galan (2010) and calculate R&D intensity by dividing total R&D expenditure by total sales in the year *t*, letting *t* as one of the years in the period 1995–2013.

CSR Strength and Concern Rating is a scale rating system in the KLD database, ranging from −2 (major concerns), −1 (concern), 0 (natural), +1 (strength), to +2 (major strength) (Hillman and Keim, 2001). A full list of Strength and Concern Ratings for Inward-looking and Outward-looking CSR in the KLD database is available from Jo and Harjoto (2012). This list contains 15 strength items and 8 concern items for Inward-looking CSR organized around diversity and employee relations, and 19 strength items and 15 concern items for Outward-looking CSR in community, environment, and product quality and product safety at year *t*. We used a CSR composite index equation developed by Jo and Harjoto (2012), following Hillman and Keim (2001) and Baron et al. (2011), which is a standard measure of CSR among existing studies. We then follow Cruz et al. (2014) to create *Inward-looking and Outward-looking CSR* categories. The *Inward-looking CSR composite index* and *Outward-looking CSR composite index*, as proxies of Inward-looking CSR and *Outward-looking CSR*, are calculated separately by using the equations below:

$$C^{it} = \frac{\sum_j C^{ijt}}{C^t}$$

C^{ijt} is an indicator variable of CSR for firm *i* with strength *j* for year *t*. C^t denotes the maximum scale of KLD strength in year *t* for any firm. C^{it} is the CSR composite index for firm-year observation.

$$Inward-looking\ CSR = (employee\ relations\ index + diversity\ index)/2$$

$$Outward-looking\ CSR = (community\ index + envrionment\ index + product\ index)/3$$

We follow Choi (2013) and classify the recession period between 2007 and 2010, covering the financial crisis between 2007 and 2008 and the Great Recession Period between 2008 and 2010. Although the Great Recession ended in late 2009, issues such as the bankruptcy of companies and unemployment existed in the postrecession period between 2009 and 2010 (Elsby et al., 2010). The recovery period technically started in the third quarter of 2010. Until 2011, the GDP annual growth reached 2.6%, slightly less than 2.9% in 2006; GDP growth was stable between 2011 and 2013 (World Bank, 2020). Thus, between 1995 and 2006 and between 2011 and 2013 are coded as the normal period in the present study.

Control variables are included in the analysis to ensure robustness. We controlled for *leverage* by dividing total debt by total assets because leverage is found to adversely affect firm value (Obradovich and Gill, 2012). We controlled for *ROA* (return on assets), calculated as operating income before depreciation over total assets, because firms with high ROA are found to behave effectively in resource allocation and, in turn, positively impact firm value (Tang et al., 2012). The *CAPEX* ratio (capital expenditure over total assets) and *OCF* ratio (operating cash flows over total assets) are also controlled. Control variable values are taken from *t* +1. We obtain the same results by using the values at year *t* also.

5. Results

IBM SPSS 25, in conjunction with the PROCESS plug-in by Hayes, is used for data analysis. We report descriptive statistics and the correlation matrix in Tables 3 and 4, respectively. To test our hypotheses, we construct the following regression model:

$$Tobin's\ Q_{t+1} = \alpha + \beta 1 \times \text{R\&D}\ intensity_{i,t} + \beta 2 \times External\ CSR_{i,t} + \beta 3 \times Internal\ CSR_{i,t} + \beta 4 \times \text{R\&D}\ intensity_{i,t} \times Internal\ CSR_{i,t} + \beta 5 \times \text{R\&D}\ intensity_{i,t} \times External\ CSR_{i,t} + \beta 6 \times \Sigma Control_{i,t} + \varepsilon_{i,t}$$

where i represents the listed firm, t denotes the year, and ε represents the error. The model was tested within family firms in both normal and recession periods (Hughes et al., 2019). We used values for year $t + 1$ for Tobin's Q and used values of the year t for Inward-looing and Outward-looking CSR and R&D intensity.

All results are presented in Table 5. We observe that R&D intensity shows no significant relationship with firm value in family firms in the normal period (0.814, $P = .92 > .05$), and H1 is rejected as a result.

Table 3. Descriptive statistics

	Family firms	
Variable	Mean	SD
Inward-looking CSR	0.3688	0.11897
Outward-looking CSR	0.04797	0.07364
R&D intensity	0.1729	1.88521
Tobin's Q	1.46673	2.244761
Leverage	0.41305	0.230676
ROA	0.13582	0.127131
OCF/Assets	0.10795	0.09187
Capex/Assets	0.0548	0.063998
Number of firms	67	
Number of observations	580	
Number of observations during recession periods	208	
Number of observations during normal periods	372	

This table reports sample distribution over the period of 1995–2013.

Both Inward-looking (−2.164, $P = .878 > .05$) and Outward-looking (2.054, $P = .904 > .05$) CSR has no significant moderation effects on the relationship between R&D intensity and firm value, which causes us to reject H2a and H2b. Outward-looking CSR also has no significant effect.

During recession periods, R&D intensity is negatively related to Tobin's Q in family firms (−17.973, $P = .036 < .05$); thus, H3 is supported. Regarding indirect effects, Outward-looking CSR positively and strongly moderates the relationship between R&D intensity and Tobin's Q in family firms during the recession period (50.099, $P = .003 < .01$), thus confirming H4a. Meanwhile, Inward-looking CSR shows no significant moderating effect (−11.757, $P = .57 > .05$), rejecting H4b.

6. Discussion

R&D receives significant attention among family firms scholars (Sciascia et al., 2015), with most attention centered on their cautious innovation decision-making (Cennamo et al., 2012), aversion to innovation from potential SEW losses (De Massis et al., 2013), inputs that shape their innovation behavior (Duran et al., 2016), and idiosyncrasies that impede innovation in family firms (Soluk and Kammerlander, 2021). However, little research has examined the conditions under R&D that can benefit family firm value (Table 1), or the boundary conditions that shape firm value outcomes from making R&D investments. As Sun et al. (2019, p. 8) note, '[i]t is not enough to measure what these firms do strategically or tactically, but we also need to know why'. Our study is an attempt to unveil this 'why' aspect.

We extend the reference point thesis contained in behavioral agency theory to inform. Behavioral agency theory assumes that family managers are loss averse and will not bear risk-taking that threatens

Table 4. Correlation matrix

		1	2	3	4	5	6	7	8
1	Inward-looking CSR	1							
2	Outward-looking CSR	0.235**							
3	R&D intensity	−0.03	−0.03						
4	Tobin's Q	−0.064**	0.02	−0.02*					
5	Leverage	−0.050**	−0.039*	−0.075**	0.091**				
6	ROA	0.035*	0.03	−0.233**	0.140**	0.229**			
7	OCF/Assets	0.03	0.02	−0.240**	0.147**	0.141**	0.850**		
8	Capex/Assets	−0.090**	−0.02	−0.053*	0.185**	0.126**	0.266**	0.325**	1

$N = 4{,}145$.
* $P < .05$.
** $P < .01$.

Table 5. Regression analysis results

	Recession			Normal period		
	Tobin's Q			Tobin's Q		
Variable	Coef.	SE	Sig.	Coef.	SE	Sig.
Inward-looking CSR	−0.723	0.666	0.280	−1.043	0.763	0.173
Outward-looking CSR	0.559	1.053	0.597	3.100	1.114	0.006**
R&D intensity	−17.973	8.443	0.036*	0.814	8.100	0.920
R&D intensity × Outward-looking CSR	50.099	16.668	0.003**	2.054	16.972	0.904
R&D intensity × Inward-looking CSR	−11.757	20.647	0.570	−2.164	14.07	0.878
Leverage	−1.481	0.310	0.000***	−0.923	0.510	0.072
ROA	3.746	0.958	0.000***	7.121	1.765	0.000***
OCF/Assets	0.587	1.205	0.627	−0.007	2.015	0.997
Capex/Assets	1.553	1.313	0.239	8.649	2.101	0.000***
Constant	1.067	0.538	0.05*	−0.685	0.628	0.277
R square	0.953			0.756		

* $P<.05$,
** $P<.01$,
*** $P<.001$.

their *socioemotional* wealth first (Gómez-Mejía et al., 2007). However, the behavioral agency theory was first conceived to anticipate managerial risk-taking concerning financial wealth (Wiseman and Gómez-Mejía, 1998; Hoskisson et al., 2017; Hu et al., 2022b), and the family (and its SEW) is but *one* reference frame to inform the family firm's strategic decision-making. We focus on what boundary conditions may shift managers' reference points from a loss frame to a gain frame and *vice versa* to theorize why R&D intensity may increase or decrease firm value and what concurrent strategic actions may affect rewards to firm value. Our analysis reveals two key findings: (1) R&D intensity is negatively related to family firm value in a recession period but, unexpectedly, has no significant effect during normal times; (2) outward-looking CSR positively moderates the relationship between R&D intensity and firm value during recessionary times, while inward-looking CSR efforts have no significant impact in either period.

A danger in applying behavioral agency theory is a tendency for reduction: any conceived threat to 'wealth' (perceived wealth-at-risk) will always activate loss aversion that discourages managerial risk-taking (Hoskisson et al., 2017) and, somewhat inevitably, reduces innovation. But family firms can innovate well with less (Duran et al., 2016), do not suffer the same impediments (Soluk and Kammerlander, 2021), exhibit different innovation strategies (Scholes et al., 2021), and not all instances of investing in R&D are inherently threatening to SEW (Soluk et al., 2021). For this reason, Bamberger and Fiegenbaum (1996) differentiate between managers in gain frames *versus* managers in loss frames.

In attempting to understand when family managers oscillate between the gain frame and loss frame, we suggest that in stable economic times, the outcomes of R&D investments are relatively more stable and relatively less risky, presenting fewer dangers to SEW. Notwithstanding, our findings show that R&D investments do not reward firm value in normal (stable) economic periods. By contrast, we find that recessionary economic conditions act as a boundary condition that negatively affects firm value pay-offs from R&D investments for family managers. In our theory, economic conditions shift the reference frame family managers use to make decisions. While we do not doubt SEW informs strategic decision-making, its weighting as a ballast change appears to change given the effects reported in our study and sensitive to the family firm being under economic conditions that are stable or recessionary. This shift activates the primacy of a loss frame over a gain frame or *vice versa*. For instance, fewer economic uncertainties mean fewer threats to the family firm's immediate viability and SEW (Zellweger et al., 2012; Chua et al., 2018). During recessions, the probability of losing SEW is far greater due to economic threats to firm survival (Sun et al., 2019) and resource constraints (Srinivasan and Lilien, 2009; Hoffmann and Lemieux, 2016). Therefore, our findings add nuance to refining the behavioral agency theory of family firm innovation and break the assumption that

any threat to SEW, however little, initiates cautious behavior and helps reconcile competing findings about family firm innovation, R&D activity, and wealth.

Family firms are renowned survival artists (Hadjielias et al., 2022), but why this remains shrouded in much mystery. Our work reveals that outward-looking CSR activities can help family firms protect and maintain the value of R&D during recessions and reverse the otherwise negative effect recessionary periods have on the R&D–firm value relationship. However, while outward-looking CSR activities can help family firms during recessionary periods, investments in inward-looking CSR are neither competitive nor complimentary. These findings are important because behavioral agency theory has somewhat overlooked how multiple strategic choices interact in determining strategic decisions when faced with apparent risk (Hoskisson et al., 2017). R&D (Matzler et al., 2015; Sciascia et al., 2015), SEW (Gomez-Mejia et al., 2014), economic conditions (Sun et al., 2019), and CSR (Jo and Harjoto, 2012) are all symptomatic of conditions prioritizing different goals, and explanations for family firm heterogeneity often lie in the multiple goals that family firms must pursue (Soluk et al., 2021). Financial and socioemotional goals are not mutually exclusive because threats to financial viability threaten SEW. Hoskisson et al. (2017) note that extant studies of family firm behavioral agency overlook the magnitude of loss or gain. In a recession, the potential magnitude of financial and SEW loss is much greater, causing family firms to act in risk-averse to preserve SEW. Our study reveals that acting by concurrently investing in outward-looking CSR protects the firm's relationships with outside stakeholders in its environment, community, and product supply chains and market that augment a relationship between R&D investment and firm value. Conversely, there is no benefit or gain in terms of firm value from R&D investments to concurrently investing in inward-looking CSR. Economic crises carry expectations of socially responsible behavior (Kramer, 2020) brought on by societal pressures for businesses to bear part of the responsibility (Lins et al., 2017; Bae et al., 2021), and our findings reinforce the need for outward-looking CSR activities in particular at these times, revealing economic condition to be an important (but overlooked) reference frame for family decision-making.

Recent critiques of CSR have drawn attention to how firms still know little about where to devote their social efforts (Wang et al., 2020), a decision made more complex when crises present multiplex demands for socially responsible behavior from stakeholders (Kramer, 2020). Family firms are not immune to this pressure (Cruz et al., 2014; Mariani et al., 2021). Economic crises deplete the resources available to the firm, creating inevitable trade-offs that apply equally to CSR initiatives (Wang et al., 2020) and R&D (Sun et al., 2019) as strategic choices. To date, scholars have shown how economic crises may alter R&D investment behavior (Sun et al., 2019), extending behavioral agency theory views built around loss aversion and myopic loss (Chrisman and Patel, 2012; Patel and Chrisman, 2014). Our findings extend this conversation by revealing how outward-looking CSR, as a concurrent investment, acts as a SEW-protecting behavior (because it maintains the reputation and external relationships of the family) while also benefiting the R&D–firm value relationship crucial to restoring financial wealth as an indirect way of preserving SEW. For example, recent studies highlight how many family firms remain highly innovative (Röd, 2016) even in the face of severe adverse economic circumstances (Leppäaho and Ritala, 2021). On the understanding that family firms innovate well with less (Duran et al., 2016), our findings add fresh insights into the rewards to family firms from R&D intensity by revealing how concurrent outward-looking CSR investments offset the negative effect of economic recession on the R&D–firm value relationship and support efforts to restore the health and vitality of the family firm. That current investments in inward-looking CSR have no bearing on this relationship suggests that inward-looking CSR investment is neither complementary nor competitive and can take place independently of R&D with its own range of effects (e.g., Mariani et al., 2021).

6.1. Contribution to literature

Our findings generate two important contributions to the theory on the role of R&D in family firms. Our first contribution provides a theoretical argument for when R&D intensity is (and is not) beneficial for firm value in family firms. Innovation activities, such as R&D, are essential for family firms to gain competitive advantages that grow and renew their market position (De Massis et al., 2013; Leppäaho and Ritala, 2021). The focus of much research is on why family firms avoid risk-taking and encourage them to innovate. Driven by behavioral agency theory, scholars expect family firms to be risk-averse, and studies of the value of R&D investments and boundary conditions to its effects remain scarce (Soluk et al., 2021; Soluk and Kammerlander, 2021). Because of this, the belief that family firms' strategic plans are driven by

preserving SEW emphasizes loss aversion regardless of context and what conditions might give rise to a gain frame over a loss frame. We extend behavioral agency theory by providing new insights into why family firms make strategic choices to protect or weaken R&D investments in economic recessions (called for by Sun et al., 2019). Economic instability degrades the R&D–firm value relationship among family firms. However, treating the economic circumstance as a boundary condition in isolation from concurrent investments provides an incomplete theoretical understanding of the problem, as investments in outward-looking CSR can reverse this dampening effect. Thus, while economic recessions ostensibly place family managers in a loss frame, concurrent actions to preserve SEW (create a gain frame) can benefit the R&D–firm value relationship. We urge scholars using behavioral agency theory to consider carefully how contingency factors such as ours weave together to inform decision-making. It stands, then, that developing a contingent behavioral agency theory is worthwhile for understanding family firm success.

Our second contribution to theorizing around family firms surrounds inward-looking and outward-looking CSR as boundary conditions alleviating dangers to firm value that can arise from continued intense investments in R&D in economically turbulent times. We embrace efforts to disentangle CSR into inward-looking and outward-looking forms (Cruz et al., 2014) to consider whether both, quite different, CSR activities help reset managers' reference points for strategic decisions. We introduce a timing element into the utility of specific CSR investments in affecting the R&D–firm value relationship by considering economic circumstances. It is necessary to distinguish between inward-looing and outward-looking CSR as supporting mechanisms for maintaining SEW in family firms (Cruz et al., 2014) because economic crises heighten stakeholder expectations while intensifying resource constraints. Indeed, this dilemma has escaped theoretical consideration, as firms 'still struggle to figure out where, how, and when to devote their social efforts', leading to accusations that CSR research is undertheorized (Wang et al., 2020, p. 1). By grounding CSR choices in behavioral agency theory and tying these choices to economic circumstances, we show that investments in outward-looking CSR and R&D are complementary when economic conditions are recessionary. Moreover, we show that inward-looking CSR holds no benefit nor cost for the R&D–firm value relationship regardless of economic circumstances. We do not question the utility of inward-looking CSR; we merely conclude there is an ambivalence to its value for generating firm value from R&D activity. These insights advance a behavioral agency theory of family firm innovation and R&D by providing insights into how loss aversion under one condition can be offset by gain under another, which may preserve strategic choices that otherwise appear risky (e.g., to invest in R&D under economic recession). Our findings provide a fresh basis to understand when family firms continue to innovate instead of retreating toward more cautious behavior expected under a behavioral agency treatment that overlooks the interactions among boundary conditions.

6.2. *Managerial implications*

Our results suggest that family firms exercise caution regarding R&D investments during recessionary periods. Continued pushes to increase R&D intensity can destroy firm value and firms' ability to survive and/or grow in recession periods (e.g., by diverting scarce financial resources). This is particularly relevant to family firms facing the economic conditions brought on by Coronavirus and suggests cautioning against heavily incorporating substantive R&D investments in their post-Coronavirus recovery plans. However, where strategic objectives lie away from firm value, or firm value is of lesser concern to the Board (e.g., because family-oriented goals are favored), they can act accordingly. Supposing, however, that family firms need to embrace R&D in recessionary periods, the negative effects of R&D intensity can be countered by sustained efforts at outward-looking CSR through activities such as supporting the local community, increasing environmental concerns, and maintaining quality products. Such behaviors are seemingly appreciated by customers in recessionary times and can ease the negative impacts brought by R&D intensity, leading to increased firm value while the firm maintains or increases its R&D intensity. Finally, these implications are important for R&D managers and family firm leaders to develop a comprehensive R&D investment strategy. Specifically, our findings call for a dialog between R&D and CSR teams to co-lobby for resources to best serve senior management interests around increasing firm value.

6.3. *Limitations and opportunities for future research*

Limitations to our work give rise to future research opportunities. First, we focused on the financial crisis of 2007–2010 as a definable recessionary period. This was a major and severe fiscal event, but other recessions are shorter and may only last a few quarters.

Whether the length or severity of a recession has a role to play needs further investigation. In recessions, our findings imply that a significant shift in strategic behavior is necessary to reduce R&D intensity and increase outward-looking CSR efforts. If the harmful effects of R&D intensity are moderated by the duration of the recession or its severity, this would be strategically valuable information for family firms. The COVID-19 pandemic provides another potential laboratory for such an investigation, as do significant social, climate or technological events that cause crises for firms. Second, our sample is restricted to listed US family firms. While we are confident in the theoretical underpinnings of the hypotheses, there are limitations regarding the identification of listed family firms because family firms often exist over generations, and the names of the families may well change over time. Third, we do not consider the explicit influence of family-oriented goals. Firm value is important for our sampled firms, given their listed status. However, this need not be the case for nonlisted ones. The possibility that a focus on nonfamily goals or nonlisted status might lead to differing findings cannot be ruled out and should be subject to further research. Fourth, there is a difference when a given firm chooses strategically to engage with outward-looking CSR activities than when undertaking activities that create shared value (CSV), such as when a firm chooses to engage with social issues aligned with its value chain. For instance, a supermarket chain investing strategically in collaborative R&D to renew its products' packaging may reduce costs of packaging or transportation, which increases profits, but benefits the environment due to reduced material use (CSV). In both instances, the focal firm creates social value, but they have two different relations with the firm's ability to profit and with the deployment of the firm's R&D capabilities.

Signaling theory is an alternative theoretical lens suitable for examining relationships among R&D investment, CSR behavior, and firm value in future studies. Signaling theory is potentially powerful insofar as it considers that a firm undertakes actions (deliberately or otherwise) in ways that send signals to an anticipated audience (Connelly et al., 2011). A sender's signal(s) is then received, interpreted, and potentially acted on by the receiver. A firm's R&D intensity may represent a signal received and acted on by a receiver. Changes in firm value (Tobin's Q) might be evident that the signal is being received and acted on, where changes in share price reflect investor sentiment in the long-term potential of the business.

To conclude, we reveal the conditions needed to benefit from R&D intensity. This demonstrates that the utility and usefulness of making intense R&D investments among family firms is much more nuanced and complex than a binary analysis of R&D intensity and an outcome variable. In normal economic times, there appears no penalty for increasing R&D intensity or any CSR benefit. However, through behavioral agency theory, we find that continued investment in R&D intensity during a recessionary period sacrifices firm value. This effect among family firms can be countered by investments in outward-looking CSR activities. We call for closer scrutiny of the R&D–CSR interface to understand these effects further.

Ethics statement

Not applicable.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Note

[1]Duran et al.'s (2016) meta-analysis examines the relationship between innovation input and innovation output among family firms. General studies of R&D and firm value are scarce, as revealed in Table 1.

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