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Family firms and environmental performance: A meta-analytic review

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Family firms and environmental performance: A meta-analytic review

Abstract

This paper critically reviews and meta-analyzes the environmental performance of family firms. Using a sample of 40,910 firms covering a 12-year period, we conclude that the average effect of family involvement on environmental performance is negative, albeit small. This negative effect is more pronounced in primary studies that measure environmental performance via the environmental **operational** practices adopted, and in those that define family business using the family ownership and management criteria. Our findings suggest that from an agency perspective, and compared to non-family firms, the negative view of the environmental performance of family firms prevails over the positive view.

Keywords: family firms, environmental performance, review, meta-analysis

Introduction

Family firms (FFs), the most ubiquitous form of business organization globally (La Porta, Lopez-De-Silanes, & Shleifer, 1999), are a particularly interesting testbed to study environmental performance (EP). Compared to non-family firms, FFs are characterized by their behavior anchored to idiosyncratic family goals and vision (Chua, Chrisman, & Sharma, 1999; De Massis, Kotlar, Mazzola, Minola, & Sciascia, 2018), and their desire to retain managerial discretion and control of the firm (Berrone, Cruz, & Gómez-Mejía, 2012; Gómez-Mejía, Haynes, Núñez-Nickel, Jacobson, & Moyano-Fuentes, 2007). Their prioritization of family goals, long-term orientation, market self-identity, and higher risk aversion compared to non-family firms have led scholars to explore the behavior of FFs in relation to environmental issues.

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3 In the last decades, many scholars have emphasized that the adoption of environmental
4 operational practices may lead to a reduction in costs or an increase in revenues (Ambec & Lanoie,
5 2008; Rousseau, Berrone, & Gelabert, 2019). Due to these benefits, pursuing a competitive
6 advantage is considered one of the main drivers of organizational commitment toward improving
7 EP (Figge & Hahn, 2012; Testa & Iraldo, 2010).
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12 Numerous empirical studies have sought to understand whether FFs excel in their
13 environmental performance (EP) in North America (Berrone, Cruz, Gómez-Mejía, & Larraza-
14 Kintana, 2010; Delmas & Gergaud, 2014; Kim, Fairclough, & Dibrell, 2016), Europe (Arena &
15 Michelin, 2018; Uhlaner, van Goor-Balk, & Masurel, 2004), and Asia (Dekker & Hasso, 2016;
16 Dou, Su, & Wang, 2017; Huang, Ding, & Kao, 2009). However, the direction and magnitude of
17 the effect of family involvement on EP remain unclear, creating a significant problem for the
18 theoretical advancement of family business theories and environmental management models.
19 Indeed, the findings from prior studies on the topic are largely controversial. For instance, while
20 Berrone et al. (2010) find a positive effect of family involvement on EP, Dekker and Hasso (2016)
21 document the opposite, and Uhlaner, Berent-Braun, Jeurissen, and de Wit (2012) do not find any
22 link between FF and EP.
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40 Two competing logics emerge in the FF context, namely the agency and stewardship
41 perspectives (Madison, Holt, Kellermanns, & Ranft, 2016), leading to ambiguous empirical
42 findings. Furthermore, unlike the large body of meta-analytical research on the financial
43 performance (O'Boyle, Rutherford, & Pollack, 2010; Wagner, Block, Miller, Schwens, & Xi,
44 2015) and innovation performance of FFs (Duran, Kammerlander, Van Essen, & Zellweger, 2016),
45 the EP research strand has not yet benefited from a systematic discussion and review of the major
46 theoretical and empirical contributions through meta-analytic methods. An in-depth analysis of the
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3 empirical evidence on the relationship between FF and EP can help improve environmental
4 policies and regulations for firms with concentrated ownership. In addition, the implications for
5 managers and investors interested in the EP of FFs could be significant, particularly as
6 environmental concerns are central in the World Economic Forum's (Reed, 2020) agenda with
7 global environmental investments reaching \$30.7 trillion in 2018 (Global Sustainable Investment
8 Alliance, 2018).
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11 We critically review the literature on the environmental behavior of FFs and perform a meta-
12 analysis of prior research on the link between family involvement and EP. Using a sample of
13 40,910 firms (202,402 observations) covering a 12-year period (2009-2020), we examine the
14 strength and direction of the effect of family involvement on EP and the potential moderating
15 conditions of the EP measurement and family business definition. In so doing, we advance the
16 ongoing debate on the EP of FFs by drawing on the empirical evidence for theory and practice,
17 presenting evidence-based recommendations to guide future studies on the EP of firms with
18 concentrated ownership.
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21 Our meta-analytical review of the literature on the environmental behavior of FFs contributes
22 in three main ways. First, it provides a clear answer to the question of whether FFs outperform,
23 underperform, or have the same levels of EP as their non-family counterparts. Our study also
24 substantially expands and enriches prior research by comprehensively portraying the
25 environmental results achieved by FFs through one single construct that exclusively considers
26 environmental aspects as opposed to the aggregation of different non-financial practices. Adopting
27 an umbrella construct that blends different non-financial practices (i.e., governance, operational,
28 environmental, internal and external stakeholder engagement) makes it difficult to isolate the pure
29 effect of EP. Instead, a construct that methodically portrays the EP of FFs allows avoiding the loss
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3 of valuable information and limits potential bias (Griffin & Mahon, 1997; McWilliams, Rupp,
4 Siegel, Stahl, & Waldman, 2019). In addition, we explicitly consider the heterogeneity of EP
5 outcomes (Endrikat, Guenther, & Hoppe, 2014; Hart & Milstein, 2003), omitted variable bias (van
6 Essen, Engelen, & Carney, 2013; van Essen, Otten, & Carberry, 2015), and a large window of
7 time.
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15 Second, our study helps reconcile the mixed findings on why and when FFs have higher or
16 lower EP compared to their non-family counterparts by examining the impact of moderating
17 contingencies on the FF-EP relationship. In so doing, we substantially enrich and extend current
18 theorizations of family business and general environmental models (Ardito, Messeni Petruzzelli,
19 Pascucci, & Peruffo, 2019; Feranita, Kotlar, & De Massis, 2017). Our work is also of relevance to
20 general management researchers, since FFs constitute the most ubiquitous organization type
21 around the world (Barontini & Caprio, 2006; Holderness, 2009; La Porta et al., 1999).
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31 Finally, most current models of environmental behavior typically assume that firms engage in
32 a homogenous set of environmental actions (Endrikat et al., 2014). However, correctly accounting
33 for different types of firms (FFs and non-FFs) and different dimensions of EP (environmental
34 operational practices and environmental communications), our work improves the accuracy of
35 estimates and provides a holistic view of the environmental behavior of firms. This has become
36 imperative at a time when global environmental changes are extremely costly for both current and
37 upcoming generations (European Environmental Agency, 2019; Hollis, 2019; United Nations,
38 2019).
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50 51 **Theory and Hypotheses Development**

52 ***Disentangling the Relationship between Family Firms and Environmental Performance***

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In this section, we develop and draw on arguments of the EP of FFs from the prevalent agency and
stewardship perspectives. The direction of family influence, that is, whether it will have a positive
or negative bearing upon EP, will depend very much on whether families adopt the agency versus
stewardship view (Miller & Le Breton-Miller, 2014). According to Madison, Holt, Kellermanns,
and Ranft (2016), these extremely influential views in family business research are particularly
useful for examining performance outcomes of family businesses (Craig & Dibrell, 2006; Dyer,
2006; Eddleston, Kellermanns, & Sarathy, 2008; Miller & Le Breton-Miller, 2006).

Agency Perspective

Although the traditional agency perspective posits low principal-agent costs for owner-run
businesses, such as FFs (Fama & Jensen, 1983), many studies suggest that these firms experience
significant principal-principal agency costs, as family members, particularly in publicly traded
firms, appropriate private benefits from the business (Morck & Yeung, 2004; Villalonga & Amit,
2006). Private benefits take various forms, including nepotism, favoritism, and entrenchment when
unskilled top managers are not replaced following their poor performance (Bertrand & Schoar,
2006; Pérez-González, 2006). This appropriation limits the financial resources available to the
firm to fund environmental activities.

Furthermore, agency costs can arise in FFs from asymmetric altruism of family members
(Chrisman, Chua, & Litz, 2004). Given that goals and interests of different members of the
controlling family are quite heterogenous (Chrisman, Sharma, Steier, & Chua, 2013; Chua,
Chrisman, De Massis, & Wang, 2018), multigenerational FFs can be particularly vulnerable to
agency problems. Specifically, parental altruism can lead to detrimental organizational outcomes
when descendants lack necessary skills and experience to run the firm (Schulze, Lubatkin, & Dino,

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3 2002, 2003; Schulze, Lubatkin, Dino, & Buchholtz, 2001). In FFs with high agency costs
4 associated with parental altruism, employees might be less motivated and productive in their
5 organizational activities, including the environmental ones, compared to those in non-family firms.
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7 This negative effect can be even more pronounced if employees' environmental activities are not
8 directly related to their job tasks and duties (Sendlhofer, 2020).
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15 Agency costs arising between the controlling family and lenders is another important
16 problem (Chrisman et al., 2004). In the context of FF-lender conflict, agency problem requires
17 lenders to establish costly measures and methods to monitor borrowers, control interest rates and
18 set up collection systems. These costs can be particularly severe for publicly traded family firms
19 that often require large amounts of external capital to finance their growth and expansion activities
20 (Cirillo, Huybrechts, Mussolino, Sciascia, & Voordeckers, 2020).
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28 Overall, different types of agency costs arising in FFs can negatively affect their EP. In
29 fact, several studies confirm the agency behavior of FFs toward the natural environment (Dal
30 Maso, Basco, Bassetti, & Lattanzi, 2020; Rees & Rodionova, 2015; Richards, Zellweger, & Gond,
31 2017).
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38 39 ***Stewardship Perspective***

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41 The stewardship perspective presents a contrasting view of the EP of FFs. Miller et al. (2008), and
42 Le Breton-Miller and Miller (2006) suggest that FF managers are good stewards of their business
43 because they wish to preserve it for the family and later generations. They generously invest in the
44 future of their firm, placing great emphasis on the environmental dimension (Huang et al., 2009;
45 Le Breton-Miller & Miller, 2016; Neubaum, Dibrell, & Craig, 2012). In other words, they are
46 likely to favor long-term sustainability over short-term profits. Stewardship proponents suggest
47 that FFs embrace a long-term orientation (De Massis, Audretsch, Uhlaner, & Kammerlander,
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3 2018; James, 1999; Kappes & Schmid, 2013; Lumpkin & Brigham, 2011; Miller & Le Breton-
4 Miller, 2005a) by investing in environmental activities, strengthening relationships with
5 employees (Huang et al., 2009; Le Breton-Miller & Miller, 2016), and building long-term, flexible
6 relational connections with outside stakeholders, such as suppliers and customers (Neubaum et al.,
7 2012; Orth & Green, 2009). As predicted by the proponents of the stewardship view, some research
8 confirms that environmental activities are of high importance to FFs (Graafland & Smid, 2017;
9 Maloni, Hiatt, & Astrachan, 2017; Samara, Jamali, Sierra, & Parada, 2018).

19 20 *A Dominant Perspective*

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22 The two aforementioned perspectives on the EP of FFs lead to opposite conclusions regarding the
23 strength and direction of the average effect of family involvement on EP. We suggest that agency
24 arguments predicting the lower EP of FFs vs non-family firms will dominate over the stewardship
25 arguments. Availability and access to financial and human resources are prerequisites for a firm to
26 excel environmentally (Clark, Reed, & Sunderland, 2018). Their internal financial constraints
27 (Amit & Villalonga, 2020), limited access to external financial capital (Chua, Chrisman, De
28 Massis, & Wang, 2018; Wu, Chua, & Chrisman, 2007), and appropriation of private benefits of
29 control (Morck & Yeung, 2003; Villalonga & Amit, 2006) make it more difficult for FFs to
30 environmentally outperform other firms. In addition, the lack of human capital to successfully plan
31 and implement environmental activities (Bertrand & Schoar, 2006; Mehrotra, Morck, Shim, &
32 Wiwattanakantang, 2013; Miller, Xu, & Mehrotra, 2014), aggravated by nepotism and favoritism
33 (Pérez-González, 2006), are also likely to negatively influence the EP of FFs. Even though some
34 FFs are exceptional environmental performers and take stewardship of the natural environment
35 (Graafland & Smid, 2017; Maloni et al., 2017; Samara et al., 2018), we argue that this good
36 behavior is rather rare among family firms. Therefore, as the agency perspective predicts, we
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3 expect that the average effect of family involvement on EP will be negative. Formally stated:
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5 *H1. Family firms on average have lower EP than non-family firms.*
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8 9 ***Moderating Conditions***

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11 Several key moderating factors may significantly condition our baseline hypothesis, that is,
12 stimulating or inhibiting the agency behavior of FFs toward the natural environment. These factors
13 include the EP measurement and family business definition. Our conceptual model is presented in
14 Figure 1. In all instances, these variables may affect the degree to which high agency costs affect
15 the extent to which family-oriented priorities for the business are likely to prevail in their behavior
16 toward the natural environment. Indeed, these factors might substantially shape the strength of the
17 link between FF and EP.
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31 Scholars have used a variety of different proxies to estimate a firm's EP. Some focus on the
32 adoption of operational practices along the entire supply chain (i.e., pollution prevention, green
33 supply chain management, and green product development) or on environmental releases or
34 withdraw (i.e., CO₂ emission, pollutant releases in water or atmosphere, water consumption or use
35 of natural resources, etc.); others on initiatives designed to communicate a firm's commitment to
36 environmental issues (i.e., publishing environmental report, signing public declarations etc.)
37 (Delmas & Toffel, 2004). Environmental operational practices are activities that a firm undertakes
38 with the aim of reducing its environmental footprint (Mauch, Stolfus, & Weiner, 2006; Ortiz-de-
39 Mandojana & Bansal, 2016). Such practices have become increasingly important, as they represent
40 the remarkable ways in which firms can contribute to mitigating several environmental problems,
41 including climate change (Bansal & DesJardine, 2014; European Environmental Agency, 2011;
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UN-DESA, 2013). Environmental communications allow firms to meet the expectations of external stakeholders, such as customers, suppliers, NGOs, regulators, and communities, leading to improving the firm's legitimacy and reputation (Darnall, Henriques, & Sadosky, 2010; Sharma & Sharma, 2011). Such practices, as empirically found by numerous scholars (see for instance Bansal, & Clelland, 2004; Bansal, & Kistruck, 2006; Boiral, 2013; Diouf & Boiral, 2017), do not always reflect the adoption of real actions or performance of an organization but are instead typically used for projecting a positive image of a company towards external stakeholders. In other words, a firm might selectively disclose only good environmental indicators (if not greenwashing) about its actual performance (Marquis, Toffel, & Zhou, 2016; Ramus & Montiel, 2005). While some studies have established that operational practices and communications capture a firm's EP (Delmas & Toffel, 2008; Kim & Lyon, 2011; Walker & Wan, 2011), the effects of differences in the definition of EP and the FF-EP relationship remain largely unexplored. In this context, we argue that FFs acting as agents concerned with the business and controlling family's reputation are likely to be good green marketers in their environmental communications compared to actual environmental operational practices. In fact, the discrepancy between environmental communications and operational practices is a widespread phenomenon in the corporate landscape around the globe (Clark, 2019; Kim & Lyon, 2014; Testa, Miroshnychenko, Barontini, & Frey, 2018). In this context, studies measuring the effect of family involvement on EP using environmental communications as a proxy of EP are likely to underestimate the true negative link between FF and EP compared to studies that operationalize EP with the help of environmental operational practices reflecting the firm's real environmental actions. Thus, the negative effect of family involvement on EP is likely to be lower in studies measuring EP as environmental communications vs. those that adopt environmental operational practices as the proxy of EP.

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3 **H2.** *The negative effect of family involvement on EP will be more pronounced when*
4 *environmental operational practices are used as a proxy of EP.*
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8 The family business field has traditionally employed several influential FF definitions (Chua,
9 Chrisman, & Sharma, 1999; De Massis, Sharma, Chua, & Chrisman, 2012). Given that varying
10 degrees of family ownership and management can be an important contingency of performance
11 outcomes (Le Breton-Miller & Miller, 2016; Miller, Le Breton-Miller, Lester, & Cannella, 2007;
12 Villalonga, 2018), we next discuss the family business definitions capturing ownership,
13 management, or both.
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22 One research stream defines FFs according to the degree of involvement in ownership, as this
23 allows the family to control the firm and exert influence on the firm's strategic decisions and
24 operations (Barontini & Caprio, 2006; Claessens, Djankov, & Lang, 2000; Faccio & Lang, 2002).
25 Some operationalize FFs by analyzing the presence of family members in the firm's top
26 management, arguing that it allows a family to exert stronger influence on the firm's strategic
27 decisions and operations than ownership (Bozzi, Barontini, & Miroshnychenko, 2017; Kotlar, De
28 Massis, Frattini, Bianchi, & Fang, 2013; Sanchez-Bueno, Muñoz-Bullón, & Galan, 2019). Another
29 influential research stream operationalizes FFs by considering both family ownership and
30 management (Anderson & Reeb, 2003; Muñoz-Bullon, Sanchez-Bueno, & Suárez-González,
31 2018; Yu, Lumpkin, Sorenson, & Brigham, 2012), claiming that absolute control over the firm is
32 a fundamental element of family influence (Zellweger, Kellermanns, Chrisman, & Chua, 2011)¹.
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47 We argue that these family-controlled firms (FCFs) are more cautious than others when
48 considering risky long-term investment strategies, preferring stability, preserving capital, and
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54 ¹ Some scholars advocate that FFs should be defined by operationalizing the family goals and vision (Chua et al.,
55 1999; De Massis et al., 2018), albeit highly correlated with the extent of family involvement in ownership and
56 management (Chrisman, Chua, Pearson, & Barnett, 2012; Chrisman & Patel, 2012).
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3 staying faithful to their core competencies (Block, 2012; Chrisman & Patel, 2012; Patel &
4 Chrisman, 2014). Thus, FCFs may avoid risky environmental activities even more than other firms,
5 especially if threatening family control (Le Breton-Miller & Miller, 2016; Rees & Rodionova,
6 2015; Richards et al., 2017). Moreover, the absence of non-family managers in FCFs might
7 exaggerate this risk-adverse behavior due to absolute control over the firm. In addition, FCFs
8 might be also exposed to higher agency costs related to severe principal-principal problems and/or
9 asymmetric altruism, and, thus, will not be able to excel environmentally, as compared to others.

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11 Thus, we argue that the restrictive forces shaping the EP of FFs are likely to be more severe in
12 FCFs than family-owned firms, suggesting that FCFs will have lower EP compared to these firms.
13 Therefore, our third hypothesis posits:

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26 *H3. The negative effect of family involvement on EP will be more pronounced when family*
27 *involvement in ownership and management is used as a proxy of FF.*

30 Data

31 Search Process

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33 We designed our search process so as to ensure that all relevant studies could be identified using
34 explicit and reproducible selection criteria.

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Initially, we searched the SCOPUS, Business Source Elite (EBSCO), ISI Web of Knowledge,
and Google Scholar databases for studies that examine issues related to the EP of FFs using the
following search terms: *family business, family control, family-controlled firm, family-controlled
business, family firm, family firm behavior, family ownership, family management, family
influence, family involvement, family business group*, in combination with these key terms:
*environment, environmental actions, environmental management system certification,
environmental performance, environmental practice, environmental product, environmental*

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3 *product development, environmental supply chain management, environmental service, green*
4 *action, green practice, green product, green service, green supply chain management, green*
5 *product development, green management system certification, pollution, pollution prevention,*
6 *pollution control, sustainability, sustainability practices, sustainability action, sustainable*
7 *product, sustainable product development, sustainable management system certification,*
8 *sustainable service.* Then, we supplemented the electronic search with an issue-by-issue search of
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10 study abstracts published in the same journals before 2020. Next, we manually searched 21 leading
11 family business and management journals². Thereafter, we checked the proceedings of some
12 important conferences in the family business field (*Academy of Management, International Family*
13 *Enterprise Research Academy, and Family Enterprise Research Conference*). Finally, using the
14 entrepreneurship division mailing list of the *Academy of Management and Family Enterprise*
15 *Research Conference*, we asked for in-progress or unpublished studies on the EP of FFs.

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The aforementioned search strategies helped us identify over 500 articles for potential inclusion. All the authors were involved in the data search up to the end of February of 2020. Following the Lipsey and Wilson's (2000) recommendation, we developed a coding protocol for extracting the data related to all the relevant variables, including effect and sample sizes. One of the authors coded all the effect sizes.

Inclusion Criteria

We adopted three main inclusion criteria. The first criterion required the inclusion of a regression

² List of family business and management journals: Academy of Management Journal, Strategic Management Journal, Administrative Science Quarterly, Organization Science, Journal of Management, Journal of Management Studies, Environment and Planning A: Economy and Space, Environment and Planning D: Society and Space, Asia Pacific Journal of Management, Corporate Governance: An International Review, Entrepreneurship Theory and Practice, Family Business Review, Journal of Business Venturing, Journal of Family Business Strategy, Small Business Economics, Journal of Environmental Management, Business Strategy & the Environment, Business & Society, Organization & Environment, Journal of Cleaner Production, Journal of Environmental Management and Economics.

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3 analysis to predict the value of the dependent variable (EP) from the independent variables (FF
4 variable defined using ownership, management, or other definitions). This step eliminated around
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6 375 studies. The second criterion required the inclusion of reporting the EP outcome (e.g.,
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8 pollution reduction, green supply chain management, green product development, green
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10 certifications etc.) that we extracted either from the study itself or from the author by directly
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12 contacting her/him. This procedure reduced our sample by another 45. The third criterion required
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14 using non-family firms as a reference category, precluding the possibility of a range restriction
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16 issues (Raju & Brand, 2003). When multiple measurements of the focal effect were reported in a
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18 study, we used the average of the multiple effect sizes, as Borenstein et al. (2009) suggest.
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24 Therefore, our finale sample comprises 26 primary studies (see Appendix A) covering 40,910
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26 firms (202,402 observations) and a 12-year period (2009–2020).
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29 ***Final Sample***

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31 As Figure 2 shows, interest in studying the relationship between FF and EP was relatively scarce
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33 in the first decade of the 2000s. This may be because in this period, most of the attention was
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35 dedicated to understanding the causes of, and potential recovery from, the two global financial
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37 crises. Thereafter, a fluctuating but overall growing trend of research output in the FF-EP domain
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39 emerged. The highest number of studies were published in 2014, 2018, and 2019 (46% of the
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41 sample). Interestingly, the 2014 research peak in the FF-EP research domain occurred when the
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43 US and China, two economic superpowers, announced joint actions on global warming (Landler,
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45 2014).
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53 The breakdown of our sample by source (Figure 3) shows that the majority of studies were
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55 published in business and management journals (65% of the sample) mirroring the increasing
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3 interest of the business community in environmental issues (Reed, 2020). In particular, the *Journal*
4 *of Business Ethics* and *Business Strategy & the Environment* are the most common publishing
5 outlets for studies on the EP of FFs (19% and 19% respectively). Around 23% of studies in our
6 sample are unpublished (working papers, conference papers, and papers under review). The
7 minority of studies in our sample (around 12%) are published in economics and finance journals.
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17 Table 1 shows the distribution of our sample studies by firm type, industrial sector, geographic
18 location, data source, sample type, and endogeneity check. Typically, studies focus on the EP of
19 publicly traded FFs (Panel A: 73%), in a multi-industry context (Panel B: 89%), using longitudinal
20 data (Panel E: 62%). This may be because most FF-EP studies use secondary data (Panel D: 69%),
21 as this is more convenient and cost-effective, while primary data on private FFs are extremely
22 difficult to gather and/or access.
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34 Panel C shows that most studies in the EP- FF domain are single-country studies (58%).
35 Interestingly, the majority of single-country studies use either North American or Asian firms as
36 the study context, while European firms are studied rather rarely despite that Europe is considered
37 at the forefront of environmental management initiatives worldwide (European Environmental
38 Agency, 2019).
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45 However, endogeneity concerns, known to be rife in both the family business and
46 environmental management research domains (Abdallah, Goergen, & O'Sullivan, 2015; Evert,
47 Martin, McLeod, & Payne, 2016; Pindado & De la Torre, 2004), are neglected in more than half
48 the studies on the FF-EP relationship (54%). This finding mirrors the overall reluctance to correct
49 for endogeneity in the management field (Hamilton & Nickerson, 2003).
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Meta-Analysis

HOMA procedure

We adopted a Hedges and Olkin-type meta-analytic (HOMA) approach (Hedges & Olkin, 1985) to reveal the overall strength and direction of the FF-EP relationship following prior family business meta-analyses (Arregle, Duran, Hitt, & van Essen, 2017; Carney, Van Essen, Gedajlovic, & Heugens, 2015; Wagner et al., 2015). Specifically, we used the partial correlation coefficients $r_{xy.z}$ (calculated from the degrees of freedom and the t-statistics, as reported in primary studies) as the effect size (Aloe & Becker, 2012)³. These coefficients allow capturing the strength of the FF-EP relationship, accounting for the impact of other variables (Thompson & Higgins, 2002), deriving comparable estimates across heterogeneous regression specifications (Aloe, 2015; Aloe & Becker, 2012), and are commonly used to rule out alternative explanations of the results⁴. To account for heterogeneity in accuracy across different effect sizes, we weighted the effect sizes by their inverse variance weight (Hedges & Olkin, 1985). In addition, we adopted these weights to estimate the standard error of the average effect size and its confidence interval. For the HOMA meta-analysis, we used the *meta-essentials* tool (Suurmond, van Rhee, & Hak, 2017).

MARA procedure

We then adopted the meta-analytics regression approach (MARA) to test the possible moderating effects of the FF and EP definitions on the overall relationship between family influence and EP.

MARA is a weighted least squares technique that estimates the relationship between effect size

³ An alternative is bivariate correlation, but this is subject to the omitted variable problem and rarely used in the organization sciences (Aguinis, Pierce, Bosco, Dalton, & Dalton, 2011).

⁴ Fisher's z-transformation has not been applied in our research setting because it is incorrect in small samples (Ogus, Yazici, & Gurbuz, 2007), and its adoption does not provide an estimation accuracy advantage over correlations (Shadish & Haddock, 1994).

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3 and moderator variables (Thompson & Higgins, 2002) to understand whether one or more
4 moderators can explain between-study heterogeneity. Specifically, we used a random effects
5 model in our main analysis to account for residual heterogeneity (Kisamore & Brannick, 2007). In
6 addition, this model is more conservative than the fixed effects model and is a common standard
7 in the meta-analytic family business behavior literature (O'Boyle, Pollack, & Rutherford, 2012;
8 van Essen, Otten, & Carberry, 2012; Wagner et al., 2015). For MARA, we used the *meta regress*
9 command in STATA (Harbord & Higgins, 2008).

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12 To investigate the impact of differences in the definitions on the focal relationship, we estimated
13 the following equation:

$$r_{xy.z} = b_0 + b_1(EP \text{ definition}) + b_2(FF \text{ definition}) + u_i$$

14
15 where $r_{xy.z}$ is the partial correlation between FF and EP, *EP definition* is a dummy variable that
16 equals 1 (0) if environmental operational practices (communications) are used as the EP
17 definition⁵, FF definition is a dummy variable that equals 1 (0) if a combined measure based on
18 family ownership and management (family ownership) is used, and u_i is the random component.
19 Appendix B provides a detailed description of all the variables used in the analysis.

20 21 22 **Results**

23 24 ***Preliminary Analysis***

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26 The summary statistics for the whole sample are provided in Table 2 reporting that around 69% of
27 primary studies in our sample show a negative family involvement effect (Panel A). This number
28 reduces to around 62% when a practice-based definition of EP definition is used (Panel B), and
29 further reduces to 42% if an ownership-based definition of FF is adopted (Panel C).

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⁵ The EP definition does not encompass environmental investments because these may not necessarily translate into environmental operational practices or communications. We thank an anonymous reviewer for this insightful suggestion.

(Insert Table 2 about here)

Furthermore, to assess heterogeneity in the effect size distributions, we constructed a funnel plot (see Appendix C). The spread of the effect sizes is relatively large, varying from -0.25 to 0.17, occupying broad zones on the left and on the right from zero. Given the funnel plot characteristics, a meta-analytic synthesis of the results is needed to resolve the theoretical and empirical contradictions in the FF-EP research domain (Geyskens, Krishnan, Steenkamp, & Cunha, 2008).

We also examined the plausibility of publication bias in our meta-analytic estimates using the Egger regression-based test of the slope of the effect sizes on their standard errors in a weighted regression (Egger, Smith, Schneider, & Minder, 1997). The results of the Egger's test are below any conventional threshold of statistical significance ($p < 0.922$), rejecting the presence of publication bias.

Main Effect and Moderators

The HOMA results for the measure of the relationship between FF and EP are reported in Table 3. We find that FFs underperform environmentally with respect to non-family firms, albeit with rather small economic significance. The average $r_{xy.z} = -0.024$ ($k=26$), and the confidence interval does not include zero ($-95\% = -0.038$; $95\% = -0.011$), suggesting statistical significance of the overall effect (Hedges & Olkin, 1985). These results are similar across different definitions of FFs, thus providing strong empirical support for H1.

We further document substantial between-study heterogeneity in our sample, since the result of the I^2 test is 77.52% (Higgins, Thompson, Deeks, & Altman, 2003), and the Q test value is also highly statistically significant ($p < 0.000$) (Hedges & Olkin, 1985). The negative EP of FFs holds

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3 for studies using environmental operational practices as the measure of EP ($r_{xy.z} = -0.028, p <$
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5 0.000), but not for those adopting environmental communications as their measure.
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9 (Insert Table 3 about here)

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11 The MARA results of the effects of differences in the definitions adopted on the focal FF-EP
12 relationship are reported in Table 4. We estimate our explanatory model as follows: Model (1)
13 includes only the *EP definition* variable; Model (2) adds the *FF definition* variable, considering
14 the two moderating variables simultaneously.
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20 Looking at Model (1), we find that the EP definition significantly strengthens the negative
21 relation between FF and EP ($\beta = -0.028, p < 0.067$). Moreover, this negative effect is also
22 confirmed in the full model (Model 2: $\beta = -0.051, p < 0.001$). In other words, FFs have even lower
23 EP in those studies that base their EP definition on environmental operational practices compared
24 to those that define EP using environmental communications, confirming H2. Furthermore, we
25 observe that Model (1) explains around 65% of the proportion of variance in our dependent
26 variable, the FF-EP relationship. However, the heterogeneity statistic equals 55%, suggesting some
27 missing moderators explain between-study heterogeneity in our sample (Higgins et al., 2003).
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39 (Insert Table 4 about here)

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41 Model (2) adds the second variable of interest, FF definition. The regression coefficient of the
42 *FF definition* variable is negative and highly statistically significant ($\beta = -0.024, p < 0.013$),
43 implying that the negative effect of family involvement on EP is significantly larger when studies
44 base their FF definition on ownership and management rather than on only ownership⁶, as
45 predicted in H3. Also, important to note is that including the FF definition considerably increases
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55 ⁶ Adopting the categorical variable distinguishing between family ownership, family ownership and management, and
56 self-reported definitions of FF does not alter our main findings.
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3 the R^2 (92%). Moreover, the between-study heterogeneity statistic greatly drops to around 21%,
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5 suggesting very low heterogeneity in our sample (Higgins et al., 2003).
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8 In brief, the overall effect size of family involvement on EP is negative, albeit small, and largely
9
10 dependent on the definitions of EP and FF adopted⁷.
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12 13 ***Robustness Tests***

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15 To verify the sensitivity of our findings to outliers and alternative estimation techniques, we
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17 performed several checks. First, after the visual inspection of potential outliers, we re-ran our
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19 explanatory model excluding 1 (3) outliers (effect sizes outside the interval of -0.2 and 0.2 (-0.1
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21 and 0.1)). Second, we re-estimated our explanatory model using winsorized effect sizes (at the 5%
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23 and 10% level). Third, although the sample characteristics across Rees and Rodionova's (2013–
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25 2015) studies differ substantially, thus highlighting their non-duplicate status (Wood, 2008), we
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27 also re-estimated our main explanatory model keeping only their 2013 study and excluding their
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29 2014 and 2015 studies from our sample. Fourth, we re-ran our main explanatory model accounting
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31 for potential sampling and measurement errors using the method that Schmidt and Hunter (2015)
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33 propose. Finally, we re-estimated our explanatory model using the fixed-effect estimator assuming
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35 that different studies have different effect sizes, and that these are of fixed quantities (Thompson
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37 & Higgins, 2002). The results of all the aforementioned checks largely support our main findings
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39 (see the Supplemental document).
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46 47 ***Post-Hoc Analysis***

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49 Thus far we have shown that the family involvement effect on EP is negative. This effect is more
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51 pronounced in studies that use environmental operational practices as the EP proxy and base their
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55 ⁷ The negative family involvement effect is also more pronounced in studies using secondary data compared to those
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57 relying on primary data.
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3 FF definition on both family ownership and management criteria. In this section, we further check
4 the role of other possible conceptually- and methodologically-based moderating contingencies
5 commonly used in the literature (Sharma & Sharma, 2011; Sharma, 2000).
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10 First, we examined whether the EP of FFs varies among publicly traded and private firms
11 insulated from financial markets and characterized by a different set of goals and business
12 objectives (Carney et al., 2015; Sharma & Carney, 2012). To do so, we included the dummy
13 variable *listed firms* (equal to 1 if the study uses a sample of listed firms, 0 otherwise) in our
14 explanatory model. However, the regression coefficient of this dummy variable does not differ
15 from zero.
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20 Second, we checked whether studies using multi-industry vs. single-industry data produce
21 different results of the FF-EP relationship (De Massis, Kotlar, Wright, & Kellermanns, 2017;
22 Lucas & Noordewier, 2016), as industry-specific factors might affect the FF-EP relationship. To
23 do so, we re-ran our explanatory model with the dummy variable *multi-industry* (equal to 1 if the
24 study uses multiple industries as a study context, 0 otherwise), and did not find any statistically
25 significant effect.
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30 Third, we focused on cross-country differences pertaining to the institutional and legal
31 environment (Banalieva, Eddleston, & Zellweger, 2015; La Porta, Lopez-de-Silanes, & Shleifer,
32 2008). To do so, we re-ran our explanatory model only on single-country studies in our sample
33 ($k=15$) using the dummy variable *common-law country* (equal to 1 if a study analyzes a common-
34 law country, 0 otherwise). We find weak evidence that the negative effect of FF on EP is stronger
35 for common-law countries than for civil-law countries at the 10% significance level, however, this
36 result should be taken with caution, as the overall R^2 of the model is rather low.
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41 Fourth, longitudinal studies might be able to better capture the EP dynamics and the complexity
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3 of business behavior than a cross-sectional research design allows. Thus, we checked whether the
4 dummy variable *longitudinal sample* (equal to 1 if a study analyzes a longitudinal sample, 0
5 otherwise) affects the FF-EP relationship. However, we did not find empirical evidence supporting
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7 a moderating effect pertaining to the nature of the sample.
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12 Finally, given the importance of the endogeneity issue in family business research (Abdallah et
13 al., 2015; Evert et al., 2016; Pindado & De la Torre, 2004), we focused on studies controlling for
14 the endogeneity problem vs. those that neglect it. The moderating effect of the *endogeneity check*
15 variable (equal to 1 if the study checks for possible endogeneity of the FF-EP relationship, 0
16 otherwise) is not significantly different from zero in our explanatory model.
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24 25 **Discussion**

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27 Using a sample of 40,910 firms (202,402 observations) covering a 12-year period (2009-2020),
28 our meta-analytic review shows that the overall relationship between FF and EP is negative, albeit
29 small. This finding suggests, as we had hypothesized, that the negative view of the EP of FFs,
30 according to the agency perspective, seems to prevail over the positive view when compared to
31 non-family firms. Although FFs are viewed as more socially responsible than other types of firms
32 (Campopiano & De Massis, 2015; Canavati, 2018; Samara et al., 2018), apparently this does not
33 translate into extraordinary EP. A possible explanation for this puzzling finding is that FFs can be
34 simultaneously responsible and irresponsible (Cruz, Larraza-Kintana, Garcés-Galdeano, &
35 Berrone, 2014), scoring extremely high on some social dimensions – i.e., employee-related (Kang
36 & Kim, 2020) or diversity-related (Block & Wagner, 2014) – and extremely low on others
37 (environmental dimension). According to the seminal work of Miller and Le Breton-Miller (2020),
38 FFs tend to “gravitate toward the extreme tails of a variety of outcome distributions” depending
39 on their temporally and socially extended vs. restricted business priorities. In other words, studies
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3 focusing solely on the average family involvement effect on EP, subsequently used in this meta-
4 analytical work, allows us to provide important insights about the average environmental behavior
5 of FFs, albeit without capturing possible deviations. Therefore, a more fine-grained answer to the
6 question of which theoretical explanation prevails over others can only be given when scholars
7 consider the whole distribution of the EP of FFs.
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14 In this context, our meta-analytical study has completed the first step in this research journey
15 that should be complemented by future meta-analytical work of quantile intervals as the research
16 field matures (Ozturk & Balakrishnan, 2020), explicitly accounting for the non-normal distribution
17 of the EP of FFs.
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24 The moderating effect of EP definition on the FF-EP relationship is also an important finding.
25 It appears that the negative effect of family involvement becomes even stronger in studies that use
26 environmental operational practices as the measure of EP compared to those that measure EP
27 through environmental communications. This is probably because environmental operational
28 practices require an investment decision, whereas communication initiatives can contribute to
29 improving external legitimacy, and consequently, the firm's image (Arena & Michelon, 2018).
30 This underestimation of the EP of FFs in studies using environmental communications can be
31 explained by their high level of opacity in information disclosure (Bianco, Bontempi, Golinelli, &
32 Parigi, 2013; Schmid, Achleitner, Ampenberger, & Kaserer, 2014). In addition, the deliberate
33 understatement of EP (de Freitas Netto, Sobral, Ribeiro, & Soares, 2020; Testa, Miroshnychenko,
34 Barontini, & Frey, 2018) might also be diffused among FFs.
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49 Furthermore, it appears that the family ownership and management definition increases the
50 negative effect of family involvement on EP, compared to firms owned wholly by the family. The
51 weakening effect of the FF definition, based only on the ownership dimension, is probably due to
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3 the ownership definition capturing professionalized FFs whose environmental behavior partly
4 resembles the environmental behavior of non-family firms that are also run by professional
5 managers.⁸
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10 11 **Contributions**

12 13 *Theoretical Contributions*

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16 Our first theoretical contribution is to the growing literature on the role of FFs in environmental
17 sustainability (Le Breton-Miller & Miller, 2016; Sharma & Sharma, 2019; Sturdy et al., 2019).

18 While this literature stream has argued for the great potential and efforts of FFs in embracing
19 environmental sustainability (Arena & Michelon, 2018; Dal Maso et al., 2020; Richards et al.,
20 2017), it has not provided a clear answer to the fundamental question of whether FFs excel in their
21 EP compared to their non-family counterparts. To our best knowledge, ours is the first study to
22 apply a variety of the most acknowledged meta-analytical techniques to the largest body of
23 empirical research on the EP of FFs ever assembled, and to document that FFs have worse EP than
24 their non-family counterparts, even if the magnitude of this effect is small. In so doing, we
25 challenge existing theories predicting the higher environmental sustainability of FFs and call for
26 their revision by acknowledging the overall reluctance of FFs to consider the natural environment.
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41 We also extend prior knowledge on the governance antecedents of environmental operational
42 practices and communications (Aguilera, Aragón-Correa, Marano, & Tashman, 2021) by
43 demonstrating the importance of family influence in the environmental strategy of a firm.
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48 By examining a range of various conceptual- and methodologically-based moderating
49 contingencies, our study encourages a shift away from questioning the overall FF-EP relationship
50 to exploring the role of moderating contingencies in establishing this relationship. Accordingly,
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56 ⁸ We thank an anonymous reviewer for this valuable contribution.
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3 we advance a contingency-based framework that helps predict family business behavior toward
4 the natural environment and respond to recent calls in the family business literature to investigate
5 the importance of contingency factors to predict the consequences of family influence on firm
6 behavior and outcomes (Graafland, 2020; Le Breton-Miller & Miller, 2016; López-González,
7 Martínez-Ferrero, & García-Meca, 2019; Miller & Le Breton-Miller, 2020). We hope this study
8 will trigger future research aimed to better understand the environmental strategies of publicly
9 traded firms with concentrated ownership structures considering the role of potential
10 contingencies.
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21 This study also contributes to the growing literature on the pros and cons of the
22 professionalization of FFs (Chrisman, Chua, Kellermanns, & Chang, 2007; Tabor, Chrisman,
23 Madison, & Vardaman, 2017). An open question in the family business literature is whether family
24 involvement in the firm's management is beneficial or detrimental to firm performance. Some
25 scholars suggest that family managers do not have the same level of experience and business skills
26 as professional managers (Barontini & Caprio, 2006; Pérez-González, 2006; Villalonga & Amit,
27 2006), while others argue that family managers' strong emotional attachment to the firm could
28 lead to extraordinary results (Minichilli, Corbetta, & MacMillan, 2010). Our study reveals that FFs
29 with family members involved in running the business have worse EP compared to professionally-
30 run FFs. In so doing, we highlight the need to study how professional managers can reduce the
31 reluctance of FFs to embrace environmental sustainability in their daily operations.
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49 ***A Framework of Family Business Environmental Performance***

50 We now present an integrated EP-FF framework based on our findings. The basis of our framework
51 derives from a theoretical abstraction of our findings.
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(Insert Figure 4 about here)

The main effect and moderating contingencies that influence the EP of FFs identified in our study are marked in bold in Figure 4. Next, additional moderating contingencies that represent promising areas for future research have been identified via abstracting from our findings. The proposed framework, depicting key constructs and links that offer a coherent explanation of the EP of FFs is a starting point for future research on the FF-EP link.

In this study, we have uncovered the relationship between family involvement and EP using several definitions and identifying moderating contingencies affecting this relationship. Our theoretical framework encourages researchers to further consider family management, generational involvement, and combinations of family ownership, management, and generational involvement. These aspects of family involvement can help uncover the transgenerational effect of family involvement on EP, known to strongly influence the strategic behavior of FFs (Miller & Le Breton-Miller, 2005b, 2014). One promising avenue for research in this area will be to understand how EP of FFs change across generations and across different stages of firm development. It might be also useful to consider the role of non-family members such as employees, independent board members and/or top managers in the environmental behavior of FFs.

Our framework further cautions scholars to expand the range of EP definitions by also considering the (mis)alignment between environmental operational practices and environmental communications, found to be widespread among businesses (Berrone, Fosfuri, & Gelabert, 2017; Bowen, 2014; Marquis et al., 2016; Terrachoice, 2009). In addition, our framework suggests expanding the contingencies identified in our study by also considering sector-based entrepreneurial capabilities (e.g., the processes and routines of entrepreneurial actors) (De Massis

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3 et al., 2017), institutional and legal environments (e.g., common-law vs. civil-law countries) (La
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5 Porta, Lopez-de-Silanes, & Shleifer, 2013), and business cycle types and phases (e.g., normal
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7 economic period vs. recession period) (Parker, 2012). These contingencies depict the role of
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9 industry-, country- and time-specific factors that might shape the EP of FFs.
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14 ***Contributions to Practice***

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17 This review also has important implications for family business owners and consultants.
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19 Specifically, it provides practitioners with a list of important drivers of environmental activities in
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21 FFs. The recognition of the various family business types along with different types of
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23 environmental activities and their interplay could substantially improve environmental investment
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25 efficiency, as well as the impact of the firm's environmental activities.
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29 Furthermore, several important areas that deserve the attention of policymakers also emerge
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31 from this meta-analytic review. Our findings suggest that the complex nature of the FF-EP
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33 relationship calls for a long-term policy approach to environmental strategies. It can be highly
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35 beneficial for policymakers to consider environmental operational practices, environmental
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37 communications, and different types of FFs when developing such strategies.
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41 ***Limitations and Future Research***

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43 As for any empirical study, our meta-analytic review has some limitations that offer opportunities
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45 for future research.
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49 First, the effect sizes found in our study are rather modest, although in line with other FF meta-
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51 analytic studies (Arregle et al., 2017; Duran et al., 2016; Wagner et al., 2015). Second, we were
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53 able to collect and assess only 26 studies on the FF-EP topic. We recognize the limitations of this
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55 sample size, however, using the thresholds that Valentine, Pigott, and Rothstein (2010) propose,
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3 our meta-analysis achieves relatively good statistical power of around 0.50 (0.80) in the context of
4 the random (fixed) effects model (Cohen, 1988). In addition, various influential meta-analytical
5 works have been conducted with similar sample sizes in top management journals (Junni, Sarala,
6 Taras, & Tarba, 2013; Lagasio & Cucari, 2019; Yorio & Ye, 2012). However, since the
7 combination of conflicting institutional logics affecting the FF-EP relationship can vary across
8 contexts and time, for instance, when pressures on the firm's environmental commitment become
9 more pervasive (Testa et al., 2018a), scholars could explore in future studies how FFs adjust their
10 environmental activities considering these competing logics. We also believe that it would be
11 fruitful for future research to examine and compare the role of institutional entrepreneurship in
12 explaining the EP of FFs.
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26 Third, we were able to examine only two important aspects of EP: environmental operational
27 practices and environmental communications. As research on the FF-EP relationship evolves over
28 time, we encourage future studies to examine in more detail the differential effects of diverse
29 environmental operational practices (environmental product development, pollution prevention,
30 environmental supply chain management, environmental certifications), different environmental
31 communications (environmental disclosure, environmental rhetoric and discourse), and
32 combinations of environmental operational practices and communications capturing the
33 heterogeneity of EP (Endrikat et al., 2014; Testa et al., 2018b). It is particularly important to
34 understand the link between family influence and greenwashing as the research line on the
35 discrepancy between operational practices and communications of family business passes its
36 nascent phase (de Freitas Netto et al., 2020; Kim, Fairclough, & Dibrell, 2016). We also encourage
37 future studies to examine brownwashing strategies of FFs that can potentially hide and/or
38 underreport their environmental actions, as compared to their non-family counterparts.
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3 Another limitation of our study is the heterogeneity of FF definitions used to measure the impact
4 of family involvement. We aimed to address this issue by focusing on two of the most influential
5 definitions of family business, but potential differences among the studies, such as the minimum
6 ownership threshold used, might still impact our findings. We were also not able to examine the
7 potential effect on EP of lone-founder or presence of family members on the board, although these
8 aspects have been shown to affect the strategic behavior of FFs (Anderson & Reeb, 2004; Cannella,
9 Jones, & Withers, 2014; Miller, Le Breton-Miller, & Lester, 2011). Therefore, we encourage future
10 scholars to examine whether more fine-grained taxonomies and typologies of FFs (Chua,
11 Chrisman, Steier, & Rau, 2012; Daspit, Chrisman, Sharma, Pearson, & Mahto, 2018; Neubaum,
12 Kammerlander, & Brigham, 2019), apart from those captured in this study, affect the strength and
13 the direction of the FF-EP relationship.
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28 Finally, while most family business research has been focused on the family business or, at best,
29 on the family controlling the operational business(es), we acknowledge that entrepreneurial
30 families can use different family boundary organizations (De Massis, Kotlar & Manelli, 2021)
31 besides the operational businesses – such as family foundations, family business foundations or
32 family offices – to conduct environmentally-oriented activities and establish environmental
33 performance. We thus encourage future scholars to extend the scope of research beyond the family
34 business by considering this wider ecosystem of family boundary organizations that can be
35 strategically used by an entrepreneurial family to conduct activities directed towards the
36 environment.
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52 **Conclusion**

53 While numerous studies have analyzed the effect of family involvement on EP, a clear answer to
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whether FFs care more about the natural environment than non-family firms does not emerge. Our meta-analytic review helps to resolve this debate by showing that FFs have worse EP than their non-family counterparts. Moreover, this negative effect is stronger in studies using environmental operational practices as a proxy of EP and in those that define FFs using both family ownership and management criteria. To conclude, we hope that this work will serve as a point of departure in advancing theories of environmental activities in family business.

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For Peer Review

Table 1. Sample description

	Number of articles	% of the sample
<i>Panel A: Firm type</i>		
Publicly traded	19	73.1%
Private	3	11.5%
Both	4	15.4%
<i>Panel B: Industrial sector</i>		
Manufacturing	1	3.8%
Tourism and hospitality	1	3.8%
Wine	1	3.8%
Multiple sectors	23	88.5%
<i>Panel C: Geographic location</i>		
Asia	6	23.1%
North America	6	23.1%
Europe	3	11.5%
Multiple countries	11	42.3%
<i>Panel D: Data source</i>		
Primary source	8	30.8%
Secondary source	18	69.2%
<i>Panel E: Sample type</i>		
Cross-sectional	10	38.5%
Longitudinal	16	61.5%
<i>Panel F: Endogeneity check</i>		
Yes	12	46.2%
No	14	53.8%
Total no. of articles	26	100%

Table 2. Summary statistics

	Number of effects	% of positive effects	% of negative effects
<i>Panel A. Whole sample</i>			
	26	30.77%	69.23%
<i>Panel B. Primary studies by environmental performance definition used</i>			
Environmental operational practices	22	23.08%	61.54%
Environmental communications	4	7.69%	7.69%
<i>Panel C. Primary studies by family firm definition used</i>			
Family ownership	15	15.38%	42.31%
Family ownership and management	11	15.38%	26.92%

Table 3. HOMA results

<i>Predictor</i>	<i>k</i>	<i>N</i>	<i>ES</i>	<i>z</i>	<i>SE</i>	<i>-95%</i>	<i>95%</i>	<i>Q test (p-value)</i>	<i>I² test (%)</i>
<i>Overall relationship</i>									
Family firm and environmental performance	26	202,402	-0.024	-3.610	0.007	-0.038	-0.011	77.99 (0.000)	77.52
<i>Definition of environmental performance</i>									
Environmental operational practices	22	195,982	-0.028	-7.560	0.004	-0.036	-0.021	62.04 (0.000)	33.50
Environmental communications	4	6,420	-0.008	-0.340	0.022	-0.051	0.035	8.85 (0.031)	63.19
<i>Definition of family firm</i>									
Ownership	15	181,705	-0.025	-8.330	0.003	-0.031	-0.019	33.66 (0.002)	16.00
Ownership and management	11	20,697	-0.037	-1.830	0.020	-0.077	0.003	43.58 (0.000)	84.09

k = number of samples; *N* = total sample size; *ES* = mean effect size; *SE* = standard error of the mean effect size; *CI 95%* = 95 percent confidence interval around the mean effect size; *Q test* = Hedges and Olkin (1985) chi-square test for homogeneity; *I² test* = Higgins et al. (2003) test for homogeneity.

Table 4. MARA results

Model	(1)	(2)
Dependent variable	Relationship between EP and FF	
EP definition	-0.028 (0.067)	-0.051 (0.001)
FF definition		-0.024 (0.013)
Constant	-0.001 (0.970)	0.025 (0.098)
<i>Q res (p-value)</i>	0.000	0.000
<i>I² res (%)</i>	55.15	20.93
<i>k</i>	26	26
<i>R²</i>	64.90	92.38

Q res = homogeneity statistic; *I² res* = heterogeneity statistic; *k* = number of samples. EP definition is a dummy variable that equals 1 (0) if environmental operational practices (communications) are used in the primary study as the EP definition. FF definition is the dummy variable that equals 1 (0) if a combined measure based on the family ownership and management (family ownership) is used in the primary study as the FF definition.

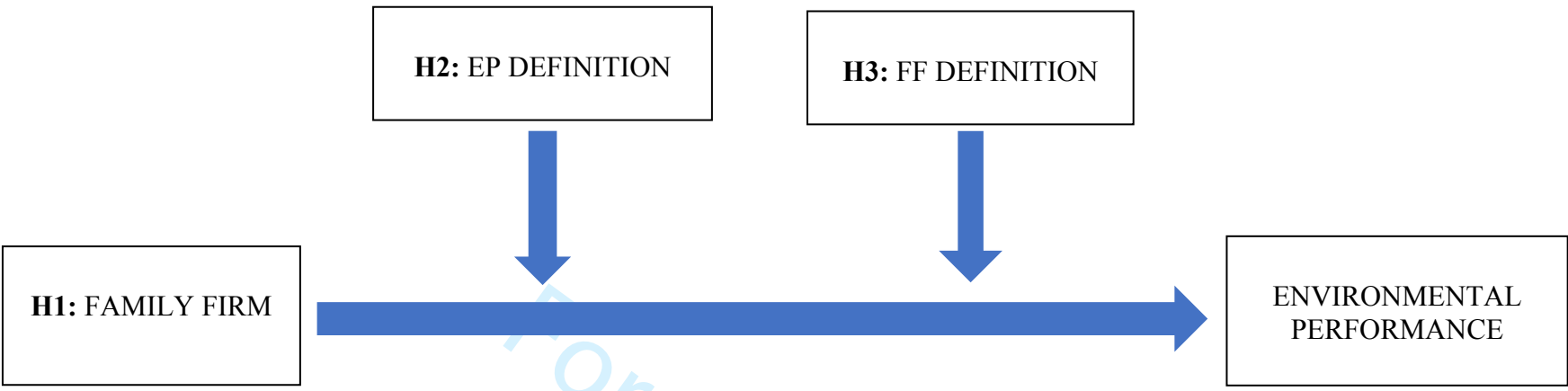


Figure 1. Conceptual model

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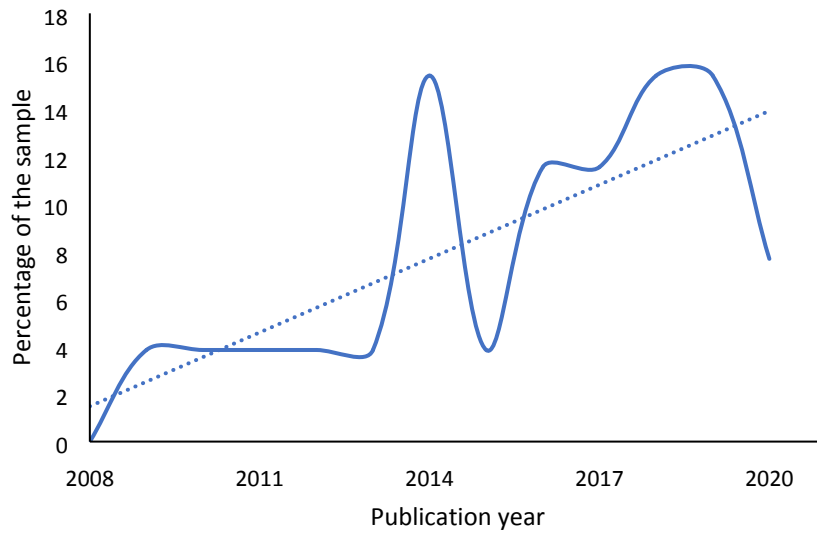


Figure 2. Sample distribution over time (dashed line for illustrative purposes)

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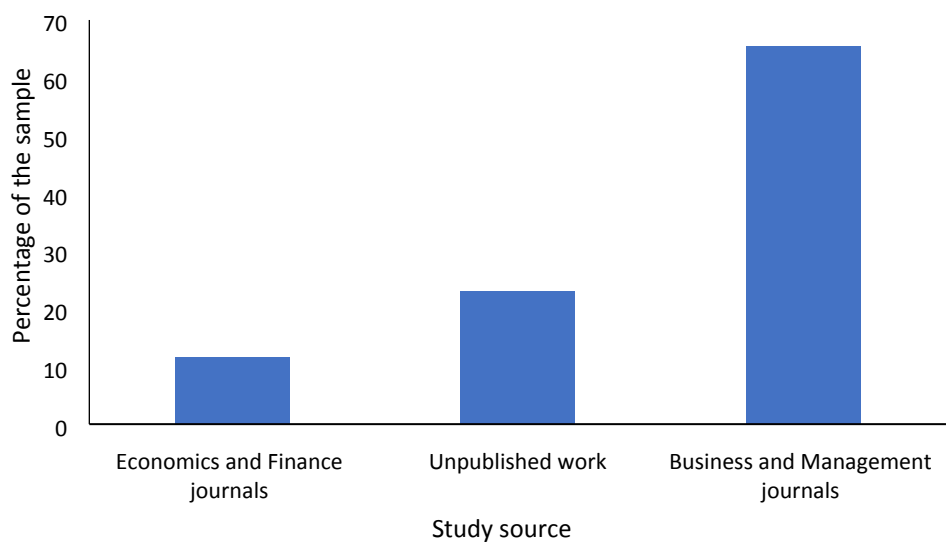


Figure 3. Sample distribution by study source

(Notes: This figure shows the distribution of articles by source categorized using the Social Science Edition of the Journal Citation Reports. Business and Management Journals: ASQ: *Administrative Science Quarterly*; BSE: *Business Strategy and the Environment*; FBR: *Family Business Review*; JBE: *Journal of Business Ethics*; JCP: *Journal of Cleaner Production*; JMS: *Journal of Management Studies*; JMO: *Journal of Management and Organisation*; JST: *Journal of Sustainable Tourism*; O&E: *Organisation & Environment*. Economics and Finance Journals: IJFS: *International Journal of Financial Studies*; JSFI: *Journal of Sustainable Finance and Investment*; CGIR: *Corporate Governance: An International Review*. Work-in-progress includes all the unpublished work.)

Family Business Review

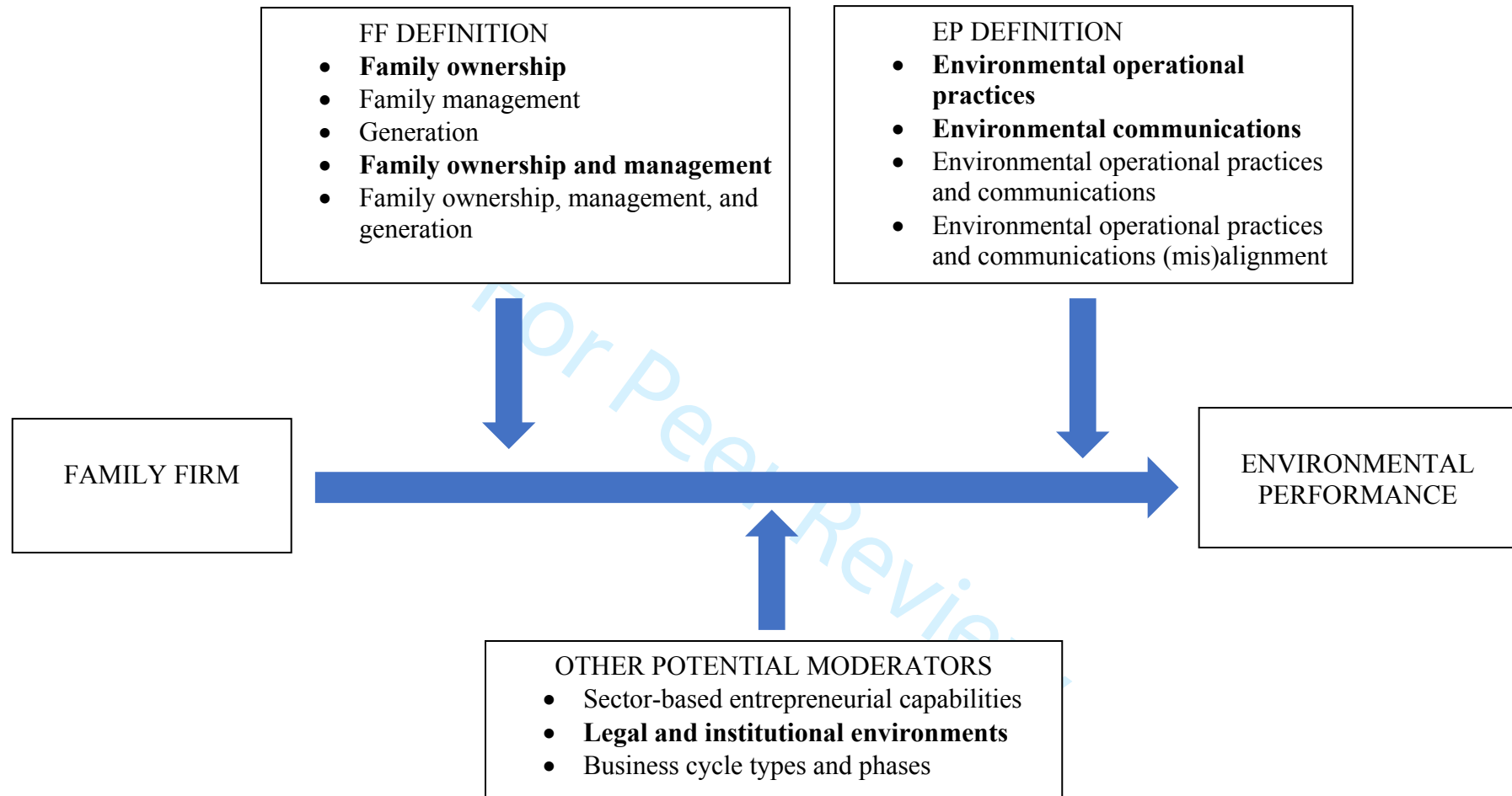


Figure 4. Framework of family business environmental performance

(Note: Non-bold items are outside the scope of the present study and indicate promising aspects for future studies drawing on our framework)

Appendix A. List of studies included in the meta-analysis

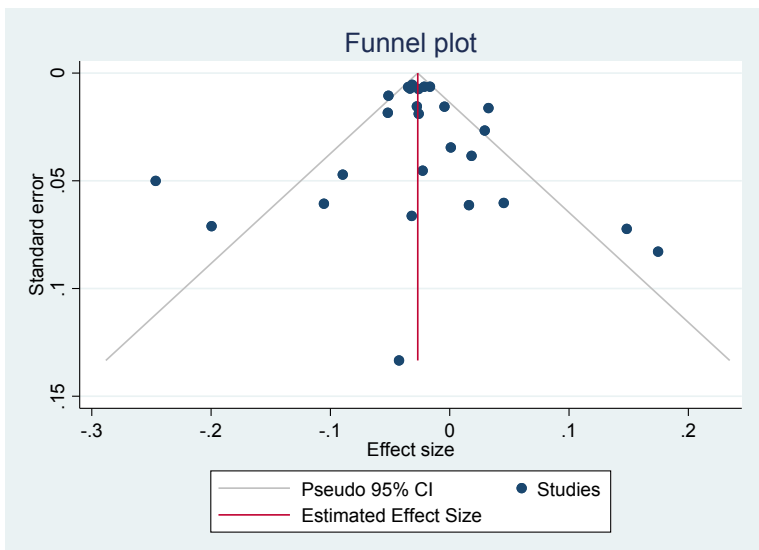
<i>Author name (s)</i>	<i>Journal</i>
Aiello, Cardamone, Mannarino, & Pupo (2019)	Unpublished
Ardito, Messeni Petruzzelli, Pascucci, & Peruffo (2019)	Business Strategy and the Environment
Arena & Michelon (2018)	Business Strategy and the Environment
Berrone, Cruz, Gómez-Mejía, & Larraza-Kintana (2010)	Administrative Science Quarterly
Block & Wagner (2014)	Business Strategy and the Environment
Cu, Ding, Liu, & Wu (2016)	Journal of Business Ethics
Dal Maso, Basco, Bassetti, & Lattanzi (2020)	Business Strategy and the Environment
Dekker & Hasso (2016)	Journal of Business Ethics
Delmas & Gergaud (2014)	Family Business Review
Dou, Su, & Wang (2017)	Journal of Business Ethics
Dyck, Lins, Roth, Towner, & Wagner (2018)	Unpublished
Galbreath (2017)	Business Strategy and the Environment
Gómez-Mejía, Lannelongue, Muñoz-Bullón, Requejo, & Sanchez-Bueno (2019)	Unpublished
Graafland (2020)	Journal of Cleaner Production
Hirigoyen & Poulain-Rehm (2014)	International Journal of Financial Studies
Huang, Ding, & Kao (2009)	Journal of Management & Organisation
Kim, Fairclough, & Dibrell (2016)	Organization & Environment
Memili, Fang, Koç, Yildirim-Öktem, & Sonmez (2018)	Journal of Sustainable Tourism
Miroshnychenko & De Massis (2020)	Unpublished
Rees (2011)	Unpublished
Rees & Rodionova (2013)	Journal of Sustainable Finance & Investment
Rees & Rodionova (2014)	Unpublished
Rees & Rodionova (2015)	Corporate Governance: An International Review
Richards, Zellweger, & Gond (2017)	Journal of Management Studies
Terlaak, Kim, & Roh (2018)	Journal of Business Ethics
Uhlane, Berent-Braun, Jeurissen, & de Wit (2012)	Journal of Business Ethics

Appendix B. Variables used

Variable	Definition
<i>Overall relationship</i>	Effect size reported in the primary study between family firms and environmental performance
EP definition	Dummy variable equal to 1 (0) if environmental operational practices (communications) are used in the primary study as the EP definition
FF definition	Dummy variable equal to 1 (0) if a combined measure based on the family ownership and management (family ownership) is used in the primary study as the FF definition
Listed firms	Dummy variable equal to 1 (0) if the primary study adopts a sample of publicly traded firms (private or mixed sample of firms)
Multiple industries	Dummy variable equal to 1 (0) if the primary study analyzes only multiple industrial sectors (one industrial sector)
Common law country	Dummy variable equal to 1 (0) if the primary study analyzes a common-law country (civil-law country)
Longitudinal sample	Dummy variable equal to 1 (0) if the primary study uses a longitudinal (cross-sectional) sample
Endogeneity check	Dummy variable equal to 1 (0) if the primary study checks (or does not check) possible endogeneity of the FF-EP relationship

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Appendix C. Funnel plot of the study-specific effect sizes



Notes: This funnel plot shows the study-specific effect sizes against the estimated overall effect size