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WiSo-HH Working Paper Series
Working Paper No. 27
June 2015

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ISSN 2196-8128

Font used: „TheSans UHH“ / LucasFonts

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Jonas Steeger & Malte Hoffmann

Abstract

Research disputes whether family businesses are more or less innovative than their nonfamily counterparts. So far no consistent results have been achieved. The manifold attempts to investigate the matter foremost concentrated on R&D expenditures, often sampled publically listed (large) companies, used varying definitions for family firms, and frequently lacked key moderators to explain innovation. This study follows the Oslo Manual and uses product innovation output as a measurement for innovativeness instead. The data are a large cross sectional sample offering – next to numerous moderators commonly used in innovation research – several family firm definitions. Drawing upon the resource based view, agency theory, and the ability and willingness paradox in family firm innovation, it finds able and willing family firms to be less innovative.

Keywords: innovation; family business; agency theory; ability and willingness paradox

JEL: M21; O32; G32; L26

Acknowledgements: *We are thankful for the helpful and numerous comments, just as well as for the useful advice on using CIS data provided by Sarah Gottschalk and her colleagues at the Centre For European Economic Research. We further like to thank the anonymous reviewers of the IFERA 2015 Conference and the participants of CISS Conference held in Marmaris in summer 2014.*

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Introduction

Research on family businesses, which historically particularly concentrated on the family's impact on a company's performance and the differences to nonfamily businesses, is increasingly concentrating on innovation, too (López-Fernández, Serrano-Bedia, & Pérez-Pérez, 2015; Vecchiarini & Calabrò, 2014). Extant research is in an early stage and yields equivocal results. It is yet to resolve whether family businesses are more or less innovative than comparable nonfamily businesses (Cassia, De Massis, & Pizzurno, 2011; Chrisman, Chua, De Massis, Frattini, & Wright, 2015; De Massis, Frattini, & Lichtenthaler, 2013; De Massis, Frattini, Pizzurno, & Cassia, 2015; Kotlar, De Massis, Frattini, Bianchi, & Fang, 2013).

To our knowledge, only a few studies find family firms to be more innovative (e.g. Classen, Carree, Gils, & Peters, 2014; Huang, Masa, Zhang, & Hsu, 2014; Matzler, Veider, Hautz, & Stadler, 2015). These studies tend to argue for a specific set of resources that arises in the overlap between the family and the business system and which promotes innovation (Vecchiarini & Calabrò, 2014). The majority of literature is however finds family firms to be less innovative (De Massis, Frattini, & Lichtenthaler, 2013; Vecchiarini & Calabrò, 2014) and associates the findings to risk aversion and the longing to preserve socioemotional wealth (SEW) (Block, 2012; Chen & Hsu, 2009; Gomez-Mejia et al., 2013; Gomez-Mejia, Haynes, Núñez-Nickel, Jacobson, & Moyano-Fuentes, 2007, Kotlar et al., 2013, 2013; Munoz-Bullon & Sanchez-Bueno, 2011; Sciascia, Nordqvist, Mazzola, & De Massis, 2015).

A meaningful moderator in this relationship seems to be the overlap of family wealth and family equity. It appears that the greater this overlap, the greater the longing for control and SEW preservation. The intuitive reasoning behind this finding is the following: The greater the share of

wealth invested in one firm, the more cautious the investor is going to conduct the venture (Sciascia et al., 2015).

Likewise, and on a more personnel level, CEO risk taking propensity is argued to be moderated by high family ownership (Kraiczy, Hack, & Kellermanns, 2015). However, this relationship may be reversed. Among others, Chrisman and Patel (2012), Gomez-Mejia et al. (2013), and Kotlar et al. (2013) find family firms to temporarily change their risk-averse behavior towards a more risk-inclined conduct, when the situation calls for it (e.g. performance below aspiration levels, or increasing supplier bargaining power).

Several authors tried to explain the conflicting findings. The vast majority of studies share a few common denominators: (1) Although family firms tend to be smaller or medium sized firms, the studies incline to concentrate on large listed firms (Sciascia et al., 2015). However, family influence can impact smaller firms more intensely than in larger and listed firms, which often bring along complex organizational structures (Kraiczy et al., 2015). (2) The studies often concentrate on R&D-expenditures to measure innovativeness and neglect outcome related measurements (Classen et al., 2014; De Massis, Frattini, & Lichtenthaler, 2013), which may be suitable to analyze innovativeness directly rather than indirectly (Smith, 2005). (3) They use numerous family firm definitions with differing family impact on the firm and do not account for family firm heterogeneity (Vecchiarini & Calabrò, 2014). (4) And lastly, they often neglect moderators which might explain differences in innovativeness better than the mere differentiation in family and nonfamily firms (Chrisman et al., 2015; Chua, Chrisman, Steier, & Rau, 2012). This in turn threatens representativeness.

This study attempts to remedy the pitfalls above and contributes to the literature in several ways. (1) It extends the research from mainly publically listed and large companies to a large sample of German small and medium sized enterprises (SME). (2) It follows the Oslo Manual Guidelines for Collecting and Interpreting Innovation Data (OECD, 2005) in using product innovation output as an endogenous variable to measure innovativeness directly. (3) It draws upon the recently introduced perspective of willingness and ability, and operationalizes commonly used family firm specific measures (self-assessment-, ownership-, and management-criterions) to better understand what drives innovativeness in family firms. (4) And lastly, it rigorously controls for a great number of variables often associated with innovation.

The study is structured as follows: The next section introduces the theoretical framework, which is also the base for two hypotheses. Then the data set used and the endogenous and exogenous variables are presented. The consequent methodology is described. The empirical results are reported and discussed. Finally, the study concludes with a brief discussion of shortcomings and suggestions for future research.

Theoretical Framework

Hülsbeck, Lehmann, Weiß, and Wirsching (2011) highlight what appears to be counteracting phenomena: On the one hand, family businesses seem to bring along a certain entrepreneurial spirit that enables them to be more innovative than comparable nonfamily businesses. On the other hand, the common absence of separation between ownership and control, the lack of diversification among the owners, and especially risk aversion seem to entail a lack of innovation willingness and thus innovation itself. As such it might not be surprising that the findings in this field are mixed. Vecchiarini and Calabrò (2014) argue that the underlying reasons for the

innovation related differences between family and nonfamily businesses can loosely be divided into resources and capabilities, and agency issues and innovation strategies. In the following we will scrutinize these subjects in some more detail, and moreover draw upon the recently introduced ability and willingness perspective to develop two hypotheses.

Resources and Capabilities

The Resource-Based View (RBV) implicitly assumes that resources and capabilities are those that underlie and determine a firm's capacity to innovate (Kostopoulos, Spanos, & Prastacos, 2002). It culminates in the notion that different resource endowments differently impact innovation – and hence performance (Carnes & Ireland, 2013). Prior studies that made use of the RBV lens discovered a particular set of resources – the umbrella concept of familiness (De Massis, Frattini, Pizzurno, & Cassia, 2013; Zellweger, Eddleston, & Kellermanns, 2010; Irava & Moores, 2010; Tokarczyk, Hansen, Green, & Down, 2007). Among others things, it is associated with a unique family business-culture (Zahra, Hayton, & Salvato, 2004; Zahra, Hayton, Neubaum, Dibrell, & Craig, 2008,) commitment to intergenerational wealth, little transaction cost due to high levels of trust, and flexible organizational structures (Zahra et al., 2008).

Familiness is understood to foster innovation (Kellermanns, Eddleston, Sarathy, & Murphy, 2012). Just as the elements of familiness are highly diverse, scholars bring forward multiple lines of thought how the umbrella concept impacts innovation. Carnes and Ireland (2013), for example, argue that familiness results in deeper tacit knowledge developed in the overlap of the family and the business system that may be utilized to identify and exploit innovation opportunities ahead of competitors. Zahra et al. (2004) similarly proclaim that family business-culture fosters recognizing entrepreneurial opportunities. Zahra et al. (2008) come to the conclusion that – compared to nonfamily businesses – the trust inherent in the culture of a family

business increases employee engagement, employee autonomy and independence and thus lowers transaction costs. It is further argued that a family's commitment to the business and a stewardship orientation enables family businesses to pursue new prospects more easily by enhancing flexibility and organizational responsiveness (Craig & Dibrell, 2006; De Massis, Frattini, Pizzurno et al., 2013), which generally is argued to entail the ability to adapt to changes in the environment and adopting emerging technologies quickly (Mintzberg, 1979).

In summary, the RBV lens suggests a set of preponderantly intangible resources, related to the capability of adopting an entrepreneurial behavior that fosters innovation. As such, the RBV and associated frameworks (such as the Social Capital and Stewardship lenses) offer valid reasons to believe that family businesses are more innovative than their nonfamily counterparts.

Agency Issues and Innovation Strategy

Sirmon and Hitt (2003) however criticize the RBV for not accounting for managerial elements – i.e. utilizing and deploying the resources available – since the capacity to deploy the set of resources transfers into the actual capabilities. Regarding this aspect, Hülsbeck et al. (2011) find family businesses to have difficulties to put their potential advantage to use. They argue that agency issues in family businesses are greater than in nonfamily businesses, result from the concentration in ownership, and lastly impact innovativeness aversely.

This stands in clear contrast to the original theory of agents and principals as proposed by Jensen and Meckling in 1976. Following the logic of the theorem, agency issues arise if a self-interested individual (the principal) delegates some decision-making to another possible self-interested individual (the agent) and their interests do not fully overlap. The delegation is theorized to be in a situation of moral hazard and information asymmetries which may lead to behavior such as

free-riding and shirking – and thus ultimately lead to agency costs. These issues are argued to arise when deciding to invest into uncertain projects – such as R&D or innovation – especially (Block, 2012; Holmstrom, 1989). Since Jensen and Meckling conclude that agency costs are lowest when owners directly participate in the management, privately held (family) owner managed firms could be expected to suffer less from agency issues (Steijvers & Voordeckers, 2009) and thus to be more innovative (Chen & Hsu, 2009).

Bammens, Voordeckers, and van Gils (2011), however, argue that there are indeed agency issues that accrue in family businesses in particular. According to them, the main sources are the owning family's pursuit of its own economic and non-economic interests, nepotism, and potential emerging nuclear families pursuing individual and thus possibly conflicting interests. Chen and Hsu (2009) put it differently, stating that when family members own large parts of the shares, they may try to utilize the power to pursue their own goals ahead of the company's goals. In line with this reasoning, family businesses seem subject to the potentially clashing goals of economic efficiency and the family's social interest and longing for SEW.

It might ultimately be this SEW perspective that clarifies why family businesses may not be as innovative as suggested by their level of organizational flexibility and employee commitment (Block, Miller, Jaskiewicz, & Spiegel, 2013; Miller & Le Breton-Miller, 2014). This perspective suggests that family businesses incorporate emotional values in their profit function, like the desire for status and reputation, careers for future generations, and constant control over the company (Cennamo, Berrone, Cruz, & Gomez-Mejia, 2012). Moreover, family firms are found to be driven by enhanced concerns for survivability, and a preference for the status quo and tradition (Carnes & Ireland, 2013; Gomez-Mejia, Cruz, Berrone, & Castro, 2011; Gomez-Mejia et al., 2007; Miller & Le Breton-Miller, 2014). This in turn is believed to lead to fewer

investments in innovation and a preference for conservative strategies (Bammens et al., 2011; Block, 2012; Chrisman & Patel, 2012; De Massis et al., 2015; Kellermanns et al., 2012).

Conservative and risk eschewing strategies may preserve SEW, but at the same time limit the resources available to invest in uncertain innovation related projects (Block et al., 2013). The longing to stay in control may thus lead to financial constraints as external financing may dilute desired control. It is therefore not surprising that Bloom and van Reenen (2006) and Nieto, Santamaria, and Fernandez (2013) find agency issues moderating the type of innovation family businesses are willing to engage in. They discover that family businesses are more likely to pursue reactive rather than proactive innovation endeavors. Correspondingly, De Massis, Frattini, and Lichtenthaler (2013) and more recently De Massis et al. (2015) find that family businesses seem to favor incremental over radical innovation.

In summary, innovative behavior – although potentially enhancing competitiveness – may challenge family financial and managerial control. Family businesses are thus expected to generally opt for projects of little uncertainty and threat to SEW (Block et al., 2013). Agency issues and the desire for control and SEW-preservation may lead to risk aversion which in turn negatively moderates innovativeness in family businesses especially.

Ability and Willingness

A crucial element in this discussion was recently introduced with the ability and willingness paradox in family firm innovation. De Massis, Kotlar, Chua, and Chrisman (2014) initiated this theorem. They propose that ability without willingness is insufficient to produce particular idiosyncratic behavior (Chrisman et al., 2015; De Massis et al., 2014). Ability is defined as the family owner's option to add, allocate, and direct the firm's resources (discretion to act). The

authors define willingness as the disposition of the family owners to engage in idiosyncratic behavior (disposition to act). The owner's discretion is claimed to be due to the formal status within the firm.. Both conditions alone do not suffice to constitute particularistic family oriented behavior. In layman terms, if a family is willing (able) to impact a business, but not able (willing), no family firm specific behavior may arise.

However paradoxically, family firms are generally associated with a high ability to innovate but found to be reluctant put their ability to use (Chrisman et al., 2015; De Massis et al., 2014). Family firms, by definition, have higher discretion to act due to elements such as personalized control, majority shares, little bureaucracy, patient capital, and long term investment horizons. Yet they invest less in innovation since these investments might put SEW and status quo at risk. The paradox hence comes down to family firms generally innovating less despite having resources and capabilities to actually outperform their nonfamily counterparts (Chrisman et al., 2015; De Massis et al., 2014).

Operationalizing the intertwined variables is of another matter. The disposition to act and the ability to act may vary greatly among family firms, and over time. A central role in such attempts is attributed to the ownership structure of the firm (De Massis et al., 2014). Researchers have shown that a company's type of ownership influences not only risk aversion (Gomez-Mejia et al., 2013; Gomez-Mejia et al., 2011; Gomez-Mejia et al., 2007; Hiebl, 2013; Miller & Le Breton-Miller, 2014), but also long-term goals and investments horizons (Kotlar et al., 2013; Zellweger, 2007; Zellweger & Sieger, 2012), and innovation strategy (Craig & Moores, 2006; De Massis et al., 2015). In fact, De Massis, Frattini, and Lichtenthaler (2013) find the degree of family influence to be one of the key moderating effects on innovation. Here, it is argued that majority family owners "may work against the interests of nonfamily owners – particularly where the

endowment they are attempting to preserve is of a SEW nature – for example, preserving family control" (Miller & Le Breton-Miller, 2014, p. 713).

In line with this reasoning, scholars – implicitly or explicitly – arguing along the line of the upper echelon theorem find that successful innovation is correlated with the appointment of nonfamily managers and hence less family influence (De Massis, Frattini, Pizzurno et al., 2013.; Block et al., 2013). Hülsbeck et al. (2011) find that not only family managed family businesses seem less innovative than a family businesses managed by nonfamily managers, but that a family's retreat from management into the supervisory board has a positive effect on innovativeness. More recently, Kraiczy et al. (2015) contribute to this discussion in finding that a high upper management risk-taking propensity has a positive effect on product portfolio innovativeness, but that this relationship is moderated by the amount of family ownership.

Innovation and family firm studies tend to explicitly incorporate the ability condition by measuring ownership and management but implicitly assume the family's willingness to engage in idiosyncratic behavior (Chrisman et al., 2015). Yet, if the first sufficiency condition (ability) is met, how may one operationalize the second (willingness) condition? The answer to this question requires an operational definition for family businesses that does not only identify suitable companies according to the theoretical considerations, but also creates a suitable comparison group. De Massis et al. (2014) compiled a sample of willingness related measures of family involvement. The set comprises variables related to the intention toward transgenerational succession, a family's commitment to the business, and other variables such as the fraction of the owner's wealth invested in the business. The measures aim at securing that the owning family wants the firm to be a family firm. The data used does not provide the measures in the proposed form. We instead make use of self-assessment. We assume companies identifying themselves to

be a family firm to execute willingness in the sense proposed by Chrisman et al. (2015). That is, we assume firms having the intention toward transgenerational succession, and family commitment to the business, to have a higher propensity to understand a firm as a family firm – regardless of the ownership structure. Given the intertwined nature of ability and willingness (De Massis et al., 2014), this separation is rather an approximation to the exact measure (if it exists at all). However, it allows us to at least take a closer look at the ability condition.

We postulate that a certain level of ownership and influence must be given to enable the willing family – i.e. the self-assessed family firm – to impact the firm noticeably and innovation decision especially in order to pursue their longing to preserve SEW. For a suitable ability threshold we operationalize the ownership and management structure of the firm. We formulate the following hypothesis:

Hypothesis 1: Willing and able family firms are less innovative nonfamily firms.

Vice versa, we argue that a minority interest thwarts ability and thus the spillover of agency issues stemming from the family system. In fact, given that both conditions – willingness and ability – must be given to detect characteristic family firm behavior, we argue that the willing but unable family firm will not differ to nonfamily firms in terms of innovation output.

Hypothesis 2: Willing and unable family firms are as innovative as nonfamily firms.

Research Method

For the empirical analysis, the Mannheimer Innovation Panel (MIP) as part of the fourth German Community Innovation Survey executed in 2007 under the supervision and coordination of the Statistical Office of the European Commission (Eurostat) is used. Following the OECD Oslo

Manual (OECD, 2005) for conducting innovation data, firms were questioned whether they introduced product innovation during the last three years (2004-2006). The data conducted are based on a three-year reference period, for the reason that innovation activities often exceed a calendar year and since innovation activities may be undertaken at different times during the year. Therefore a multi-annual approach is necessary (Aschhoff et al., 2013; Schmidt & Rammer, 2007).

Defining Family Firms

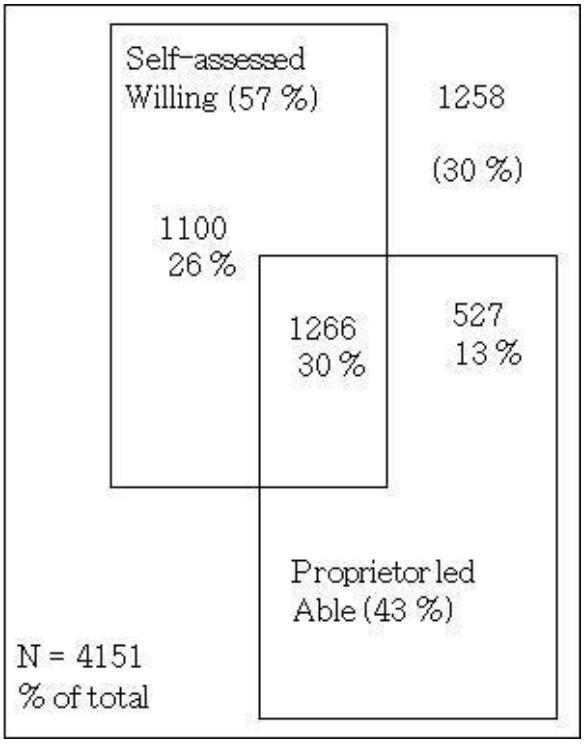
Of prior interest is obviously the classification into family and nonfamily firms – and in particular the differentiation into willing and able family firms, and firms that do not suffice both conditions. Astrachan, Klein, and Kosmas (2002) however argue that a dichotomous differentiation can merely enforce a hypothetical separation. It may not fully capture the underlying reasons for potential differences. The used MIP is prone to such critique as it only differentiates between family and nonfamily businesses by asking the companies in question what they consider themselves to be. Ultimately, the decision is up to the judgment of the interviewee – usually a member of the top management. In addition to some arbitrariness and hence measurement error, the self-assessment brings about quite a few limitations. These include not ensuring actual family impact, not accounting for possible family businesses-heterogeneity, and not controlling for founder-led firms. The latter is particularly important when assessing innovation. Among others, Block et al. (2013) display that founder-led firms often show greater entrepreneurial orientation, seek outside investment and thus willingly reduce control when it aids the desire to grow a prosperous firm. Moreover, founder-led firms may be entirely separated from any family influence – and thus from potential agency issues stemming from the family

system. Merely identifying family firms via the means of a sole ownership criterion may thus confound effects unique to founder-led firms with effects true to family businesses.

However, distinguishing between family and nonfamily businesses remains difficult if no dichotomization is brought forward (Schröder & Westerheide, 2010). As such it is not surprising that a great variety of articles relies on this technique. In the field of innovation related literature, Vecchiarini and Calabrò (2014) discover that the most commonly used definitions are a majority ownership criterion, and a self-assessment. This illustrates a major pitfall in the field of family businesses research at large: The lack of a unified definition (Dyer, 2006).

To somewhat reduce the negative side-effects of a self-identification and in order to introduce a variable capturing the discretion to act, we decided to pool data from the Mannheimer Unternehmer Panel (MUP). It offers the chance to identify able (family owned and managed) family firms (proprietor led businesses). One could suppose that all proprietor led businesses assess themselves to be family businesses in the first place. However, our investigation shows that this is not the case. Figure 1 illustrates the issue.

Figure 1: Overlap between self-assessed and proprietor led family firms



Although the Venn diagram might come across as rather tame and simple, it bears some difficulties and rather severe implications. The diagram is based on a sample of 4151 German companies from the MIP. Roughly 30 percent, namely about 1258 companies are neither proprietor led nor self-assessed family businesses. They are the nonfamily businesses. Vice versa, the remaining 70 percent and thus about 2893 companies belong to one or both of the bespoke family firm categories. However, roughly 26 percent are pure self-assessed family business and 13 percent are pure proprietor led companies. Merely 30 percent are both. This calls using purely family ownership to identify family firms into question since ownership apparently does not necessarily constitute a congruent self-understanding. It hence substantiates the importance of the ability and willingness discussions. It seems likely that a self-understanding is necessary to argue for the presence of familiness and the longing to preserve SEW. In fact, and tying in well with the proposed ability and willingness perspective proposed by Chrisman et al.

(2015), it is appropriate to operationalize family ownership and management involvement as suitable variables to meet the first sufficiency condition ability (De Massis et al., 2014). But it seems even the more necessary to incorporate a congruent self-understanding to attempt to incorporate willingness as well.

We thus not only define the self-assessed willing family businesses as the focus group. However, we also introduce family-controlled family businesses that are defined as companies with a maximum of six family shareholders (respectively three family shareholders for non-private companies) holding at least 50% of the shares and are led by a singly family member (proprietor led). For our analysis we create four groups: (1) the entire group of self-assessed family businesses, among this group the subsets (2) self-assessed and family controlled family businesses, and the (3) self-assessed and nonfamily controlled family businesses, and lastly the control group – (4) the nonfamily businesses. We label the subset of self-assessed family firms that are further family controlled as the willing (W) and able (A) family firms ($W \cap A$). Contrariwise, we label self-assessed family firms that are not family controlled, as the willing but unable family firms ($W \setminus (W \cap A)$).

Dependent Variable

A typical indicator for innovativeness is the amount of R&D expenditures (Aschhoff et al., 2013). And in fact one finds several articles investigating the impact of family ownership on R&D investments (compare De Massis, Frattini, and Lichtenthaler (2013), Hiebl (2013), or Vecchiarini and Calabrò (2014) for systematic reviews). Generally, investment in R&D is associated with the advancement of corporate innovation and competitive advantage (Chen & Hsu, 2009). However, it also poses a potentially risky long-term investment and sunk costs (Kor, 2006). As such, R&D investments, while capturing the extent to which extent a firm

embarks on explorative endeavors to create new products and processes, increase strategic risk (Kotlar, De Massis, Fang, & Frattini, 2014). It is thus not surprising that R&D investments are typically used as a proxy for studying risk behavior in family firms (e.g. Chen & Hsu, 2009; Chrisman & Patel, 2012; Hiebl, 2013). Kotlar et al. (2014) summarize why that is the case: At first, R&D investments entail a high risk of bankruptcy and thus the loss SEW (Gomez-Mejia et al., 2007). Moreover, R&D investments tend to require external financing. Family firms however are found to shy away from external financing since higher leverage usually comes along with reduced control over the firm (Schulze, Lubatkin, Dino, & Buchholtz, 2001). Additionally, R&D investments may require the family to disclose the strategic outset of the firm to external professionals (Kotlar et al., 2014). And lastly, the close identification with the family firm's initial product set and tradition may present a hazard when deciding for investing in R&D (Kotlar et al., 2014; Kotlar et al., 2013). As such, R&D investments cause a variety of risks related to not only the firm's performance, but also non-economic goals (Kotlar et al., 2014).

Hence, it seems reasonable that potentially risk-averse family businesses shy away from investing into R&D in particular. However, identifying R&D with innovation neglects other modes of innovation (Smith, 2005). Additionally, R&D is particularly important for large firms in high-tech industries, (Hagedoorn & Cloodt, 2003). Using R&D-expenditures as the sole method to measure innovativeness may thus cause a certain selection bias when assessing particularly the often smaller and medium sized family businesses (Rammer, Czarnitzki, & Spielkamp, 2009; Sciascia et al., 2015). Therefore identifying innovation with R&D is not necessarily adequate to measure if there are truly differences in innovation across firms (Kochhar & David, 1996; Song, Wei, & Wang, 2015), and between family and nonfamily firms in particular.

To approximate innovativeness, we depart from mere input focused innovation mediations, follow the Oslo Manual (OECD Guidelines for Collecting and Interpreting Innovation Data), and capture the concrete outcomes of firm innovation instead. We analyze product innovation output as the dependent variable. Identifying product innovation is rather straightforward. It stands to reason that a new (i.e. new to the market and/or new to the firm) product is developed to entice the customers to buy. Measuring the success of product innovation may thus be undertaken by relating the share of turnover attributable to new products to the entire turnover (OECD, 2005).

Moderators

Chua et al. (2012) point out that it is the great heterogeneity of family businesses which calls for adopting a wide spectrum of exogenous variables. We try to follow this advice and trail Classen et al. (2014) with a majority of variables used for investigating family businesses by the means of the MIP. Table 1 gives an overview and a description of all variables put to use. The set of variables contains elements such as size indicators, and industry. For the latter, we cluster 22 industries available in the MIP by research-intensity and further separate them into services and industries. Moreover, we regard variables more closely related to innovation and family businesses in particular. A few measurements types stand out in particular: (1) *Radical Innovator*. The agency related theoretical argumentation brought forward suggests that family businesses might adhere to responsive innovation strategies. To control for this strategy type, we introduce a dummy variable that identifies whether radical products – i.e. products new to the market – were introduced in the period between 2004 and 2006.

Table 1

Set of variables

Display name	Explanation
Product innovation output	Sales from product and/or services introduced new to the firm or new to the market between 2004 and 2006
W	Self-assed (willing) family firm (=1, if yes)
A	Family controlled firm (able) (=1, if yes)
W∩A	Self-assed (willing) and family controled (able) firm (=1, if yes)
W\(W∩A)	Self-assed (willing) and nonfamily controled (unable) firm (=1, if yes)
R&D-Intensity	Research and development expenses in thousand Euro in 2006 scaled by average sales in thousand Euro between 2004 and 2006
Radical innovator	Introduced market novelties between 2004 and 2006 (=1, if Yes)
Group	Company part of enterprise group (=1, if yes)
Innovation hindered	Innovation project not started between 2004 and 2006 due to internal and/or external hindrance (=1, if yes)
Product abortions	Product innovation project aborted between 2004 and 2006 (=1, if yes)
Process abortions	Process innovation project aborted between 2004 and 2006 (=1, if yes)
D/E-Up	Increase in debt-to-equity-ratio from 2004 to 2006 (change positive)
D/E-Down	Decrease in debt-to-equity-ratio from 2004 to 2006 (change negative)
Firm Size	Average revenue between 2004 and 2006 (log.)
Age	Age of enterprise in years (log.)
Labor productivity	Labor productivity (average revenue by average number of employees between 2004 and 2006)
National group	Dummy variable (=1, if the firm is part of a regional enterprise group)
International group	Dummy variable (=1, if the firm is part of a multinational enterprise group)
Training intensity	Average expenses attributed to training of employees by average revenue between 2004 and 2006 (log.)
Export intensity	Average revenue generated with exports by average total revenue between 2004 and 2006
Price competition	Intensity of price competition within enterprise's main sales market (0=low, 1=high)
Quality competition	Intensity of quality competition within enterprise's main sales market (0=low, 1=high)
Product competition	Intensity of product competition by the means of frequency of new product launches within enterprise's main sales market (0=low, 1=high)
Customization competition	Intensity of customization competition of products and services (0=low, 1=high)
Industry	Division of 22 industries into four clusters (research intensive, and other industries; research intensive, and other services)

(2) *Debt-to-equity and R&D*. We follow the argumentation of other authors (compare Hiebl, 2013 for systematic review) who operationalize a firm's capital structure and its R&D-expenses to assess the current attitude towards risk. We do so by using the change in the equity-ratio overtime (2004 to 2006) and the current R&D-intensity (R&D 2006/Sales 2006). Family businesses are expected to generally opt for low debt-to-equity-ratios (Mishra & McConaughy, 1999) and low levels of R&D-intensity (Hiebl, 2013). Moreover, we introduce several indicators

for competition intensity. With this conglomerate of variables, we aim to follow the tenets of Gomez-Mejia et al. (2007) by controlling for the situational context to which family and nonfamily businesses are exposed.

Methodology

The endogenous variable is specified in percentages. The variables' values are bounded below from zero and bounded above from 100 by definition. Such a structure can imply pileups of observations at the beginning and at the end of the spectrum, so-called corner solutions, with a roughly continuous distribution in between. The data structure leads to the use of a TOBIT Type 1 model as OLS estimates suffer from bias and inconsistency (Tobin, 1958). In practice, the observed distribution of the variable is highly skewed to the right with little variation between 80 and 100. Nonetheless, we apply the TOBIT model with corner solutions at the lower and the upper bound (Wooldridge, 2012). We thereby follow several authors such as Song et al. (2015).

Descriptive Statistics

The MIP is constructed using a stratified random sampling method (size, east/west Germany, and industry) and contains data for companies with five employees or greater. The gross sample comprises about 5400 companies. For our analysis we excluded companies with implausible age-statements and companies with missing values in the endogenous variable. Combined with several missings in the exogenous variables, this led to a sample of about 1200 companies that entered the actual regressions. Table 2 displays the key descriptive statistics for the gross sample and the used sample (in parentheses).

Table 2

Descriptive Statistics[1]

	Observations	Mean	Median	Minimum	Maximum
Product innovation output	5409	12.8 (16.31)	22.03 (24.25)	.0 (.0)	100.0 (100.0)
W	4151	.570 (.577)	.50 (.49)	.0 (.0)	1.0 (1.0)
W∩A	5409	.234 (.333)	.42 (.47)	.0 (.0)	1.0 (1.0)
W\(W∩A)	5409	.203 (.244)	.40 (.43)	.0 (.0)	1.0 (1.0)
R&D-Intensity	4217	.024 (.045)	.11 (.15)	.0 (.0)	2.39 (2.39)
Radical innovator	5364	.23 (.30)	.42 (.46)	.0 (.0)	1.0 (1.0)
Group	4029	2.05 (2.05)	.22 (.22)	2.0 (2.0)	3.0 (3.0)
Innovation hindered	3762	.42 (.48)	.71 (.74)	.0 (.0)	2.0 (2.0)
Product abortions	4907	.04 (.06)	.20 (.23)	.0 (.0)	1.0 (1.0)
Process abortions	4907	.02 (.02)	.14 (.15)	.0 (.0)	1.0 (1.0)
D/E-Up	3439	.41 (.42)	.49 (.49)	.0 (.0)	1.0 (1.0)
D/E-Down	3439	.13 (.13)	.34 (.34)	.0 (.0)	1.0 (1.0)
Firm Size (log.)	5238	1.99 (2.51)	2.05 (1.87)	-3.49 (-1.78)	11.37 (9.34)
Age (log.)	4504	2.99 (3.06)	.88 (.87)	.0 (.0)	5.33 (5.25)
Labor productivity	5187	.39 (.36)	1.25 (.67)	.0 (.01)	66.42 (15.85)
National group	4207	.45 (.50)	.50 (.50)	.0 (.0)	1.0 (1.0)
International group	4207	.17 (.22)	.37 (.41)	.0 (.0)	1.0 (1.0)
Training intensity (log.)	3047	-7.44 (-7.47)	1.25 (1.26)	-12.60 (-12.42)	-.70 (-2.23)
Export intensity	4491	.16 (.21)	.28 (.30)	.0 (.0)	3.0 (1.90)
Price competition	4067	.73 (.74)	.44 (.44)	.0 (.0)	1.0 (1.0)
Quality competition	4052	.76 (.78)	.43 (.41)	.0 (.0)	1.0 (1.0)
Product competition	3883	.21 (.22)	.41 (.42)	.0 (.0)	1.0 (1.0)
Customization competition	3992	.61 (.62)	.49 (.49)	.0 (.0)	1.0 (1.0)

[1]Figures in parantheses are based on used sample (1211 observations each)

It goes to show that the used sample and the gross sample are similar regarding the respective means. Table 3 shows the pairwise correlation between the variables used. Again, and although the correlation between the self-assed family businesses and proprietor led businesses is rather high (0.60), it could have been expected even higher. In the light of the argumentation brought forward by Block (2012), namely that founder-led companies are particularly different from family businesses, it remains questionable what family business definition is suitable.

Table 3

Spearman Pairwise Correlation Used Sample

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
(1)	Product innovation output	1.00																						
(2)	W	-0.05	1.00																					
(3)	W∩A	-0.07	0.60	1.00																				
(4)	W\(W∩A)	0.02	0.49	-0.40	1.00																			
(5)	R&D-Intensity	0.81	-0.06	-0.06	0.00	1.00																		
(6)	Radical innovator	0.60	0.00	-0.03	0.03	0.58	1.00																	
(7)	Group	0.10	0.01	-0.02	0.04	0.07	0.11	1.00																
(8)	Innovation hindered	0.38	0.03	0.01	0.02	0.39	0.31	0.12	1.00															
(9)	Product abortions	0.20	0.02	0.01	0.02	0.19	0.18	0.11	0.00	1.00														
(10)	Process abortions	0.11	0.03	-0.03	0.07	0.10	0.13	0.01	0.00	0.32	1.00													
(11)	D/E-Up	0.14	0.08	0.05	0.03	0.13	0.12	0.04	0.00	0.05	0.05	1.00												
(12)	D/E-Down	-0.07	-0.12	-0.07	-0.06	-0.10	-0.04	-0.04	0.00	0.03	-0.01	-0.33	1.00											
(13)	Firm Size	0.12	-0.01	-0.20	0.21	0.07	0.15	0.22	0.07	0.07	0.01	0.08	0.00	1.00										
(14)	Age	-0.10	0.26	0.09	0.20	-0.12	-0.04	0.06	-0.03	-0.03	-0.03	-0.03	-0.03	0.35	1.00									
(15)	Labor productivity	0.08	0.00	-0.12	0.14	0.02	0.06	0.09	0.03	0.03	-0.02	0.02	-0.01	0.00	0.00	1.00								
(16)	National group	0.13	0.05	0.02	0.04	0.14	0.05	-0.02	0.10	0.02	-0.02	0.07	-0.03	-0.04	-0.07	0.04	1.00							
(17)	International group	0.27	0.05	-0.04	0.11	0.29	0.28	0.09	0.15	0.09	0.05	0.02	0.00	0.30	0.08	0.21	0.00	1.00						
(18)	Training intensity	0.30	-0.11	-0.04	-0.08	0.31	0.21	0.06	0.16	0.05	0.02	-0.02	-0.05	-0.08	-0.12	0.19	0.05	0.07	1.00					
(19)	Export intensity	0.42	0.12	-0.03	0.17	0.44	0.37	0.10	0.23	0.15	0.06	0.11	-0.01	0.40	0.13	0.32	0.00	0.63	0.00	1.00				
(20)	Price competition	-0.05	0.04	-0.02	0.07	-0.06	-0.06	0.02	-0.03	-0.03	0.00	-0.03	0.01	0.13	0.08	0.06	0.00	0.02	-0.05	0.04	1.00			
(21)	Quality competition	0.11	0.08	0.01	0.08	0.11	0.06	-0.07	0.03	-0.02	-0.02	0.02	0.03	0.03	-0.02	-0.02	0.13	0.08	0.04	0.17	0.00	1.00		
(22)	Product competition	0.29	0.01	0.04	-0.03	0.21	0.18	-0.02	0.08	-0.02	-0.02	0.06	0.01	0.07	-0.02	0.04	0.14	0.04	0.10	0.10	-0.02	0.15	1.00	
(23)	Customization competition	0.16	0.03	0.03	0.00	0.14	0.09	-0.01	0.04	-0.02	-0.04	0.04	-0.01	-0.02	-0.01	-0.02	0.13	0.01	0.09	0.08	0.00	0.25	0.00	1.00

Results

Table 4 shows the regression results. Using the self-assessment as a mode of identification for family businesses yields negative results (Model I) and thus indicates that willing family businesses (regardless of their ability) have lower innovation output. This result is congruent with earlier findings using R&D as a proxy for innovation and self-assessment as mode of identification for family firms. As such, the result could lure into believing that a self-assessment is a sufficient indicator to identify and assess family firms. However, the coefficients indicate that the proposed impact on innovation is smaller and less pronounced than theory might suggest. In fact, elements such as the R&D-Intensity, internationality, and radicalness explain innovation output to a far greater extent. Moreover, the relatively large standard error and the resulting low significance level similarly indicate that self-assessed family firms are potentially not as different from nonfamily businesses in regard to innovation as theorized. Additionally, the interpretation is an average effect for the group of self-assessed family businesses with a particular family involvement. This group might be very heterogeneous though.

In accordance with the theoretical setup, Model II thus divides the self-assessed (willing) family businesses into family controlled and managed (able) businesses, and nonfamily controlled (unable) businesses with a minority interest. At the five percent significance level, willing and able family firms are less innovative than comparable nonfamily businesses. Hypothesis 1 can therefore not be rejected at this significance level. This result suggests that agency related issues stemming from the overlap of the family and the business system are more present in family businesses where the family holds a position of high power and legitimacy: Idiosyncratic behavior arises when both sufficiency conditions – ability and willingness – are fulfilled. Inferably, than the greater sensitivity for SEW preservation impacts product innovation output

negatively. Interestingly, Model II further shows that the results go astray when firms can be considered willing but unable. We find no differences between willing but unable family firms and nonfamily firms and thus confirm Hypothesis 2.

The results leave several options of interpretation. Given the line of argumentation brought forward, one might be intrigued to reason that family firms – impotent to impact the business easily via a position of legitimacy and power – are less or unable to influence innovation. However, another implication may arise from great heterogeneity with the bespoke group (Chrisman et al., 2015). The group may comprise self-assed family businesses with zero percent ownership, and similarly self-assessed family businesses with little less than fifty percent ownership – combined with or without a family member in a management position. This heterogeneity leaves enough arguments to argue in either direction.

Notwithstanding, we evaluated the estimated coefficients of the moderator variables to understand if the models yield reasonable results. Both estimated models show similar results for the parameters of the moderator variables used. Naturally, the level of R&D intensity shows a highly significant and strong impact on product innovation output. Product competition and price competition yield similar results. Companies in markets that are more prone to product competition require higher product innovation: the corresponding results indicate that larger firms are more innovative. This result – cautiously interpreted due to possible endogeneity – seems intuitive too. Economies of scale and smaller relative sunk costs may explain this circumstance. Likewise, international and export intensive firms are found to be more innovative – although the leap from regional to national firms appears to be larger than from national to international. However, older firms seem to be less innovative, which may be explained with a certain level of rigidity and position in the market, which was already indicated by Greiner in 1972.

Table 4

Tobit estimation: coefficients and std. errors for product innovation output

	Model 1		Model 2	
	Coefficient	Std. Error	Coefficient	Std. Error
W	-3.84*	2.04		
W∩A (Hyptothesis 1)			-4.60**	2.28
W\(W∩A) (Hypothesis 2)			-1.75	2.43
R&D-Intensity	49.94***	12.12	50.10***	11.96
Radical innovator	23.21***	2.31	23.12***	2.28
Group	2.88	4.44	1.96	4.31
Product abortions	6.07	3.76	6.0	3.76
Process abortions	5.69	7.35	3.90	7.22
D/E-UP	3.22	2.0	3.13	1.97
D/E-Dowm	-1.81	3.11	-1.44	3.04
Innovation hindered	5.40***	1.17	5.44***	1.16
Labour productivity	-2.34	1.98	-2.20	1.90
Size	.51	.68	.34	0.68
Age	-2.19*	1.17	-2.23*	1.15
International group	9.45**	3.95	9.18**	3.92
National group	13.40***	2.64	13.14***	2.63
Export intensity	15.94***	5.53	15.89***	5.47
Training intensity	4.33***	.88	4.24***	0.86
Quality competition	.71	2.49	.61	2.47
Customization competition	1.74	2.13	1.43	2.10
Price competition	-.11	2.15	-.50	2.11
Product competition	13.65***	2.36	13.77***	2.33
R&D intensive industries	9.39**	3.99	9.64**	3.95
Other industries	2.98	3.69	2.98	3.66
Knowledge intensive services	5.75	3.98	5.93	3.95
Other services	(omitted)		(omitted)	
Cons.	2.30	12.19	4.39	11.93
Obs.	1211		1226	
left censored	551		556	
uncensored	643		653	
right censored	17		17	
Pseudo-R^2	0.10		0.10	

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

Furthermore, the amount of expenses spent on employee development and training shows positive effects on product innovation output. This finding suggests that a company culture prone to employee development – often associated with family businesses (Zahra et al., 2008) – fosters a form absorptive capacity and thus innovation.

The outcomes above correspond with theory and have given us some indication on the modes of action on innovation. However, the findings associated with the indicator for hindered innovation seem to protrude. Astonishingly, the coefficient is positive and highly significant. Even more unanticipated is that this result seems to be strengthened by the positive effects due to *Product* and *Process abortions*. At first sight, this seems counterintuitive. However, one possible interpretation may lie in the perception of hindrances and a possible selection bias. Firms that try to innovate may be more sensible to hindrances than firms that simply do not bother. Similarly, only firms seeking to innovate in the first place can abort such endeavors.

Conclusion

Research disputes whether family businesses are more or less innovative than their nonfamily counterparts (De Massis, Frattini, & Lichtenthaler, 2013). So far, no consistent results have been achieved (Vecchiarini & Calabrò, 2014). The manifold attempts to explain the innovative behavior of family firms foremost concentrated on the RBV and agency theories, used R&D expenditures as a measurement for innovativeness, often sampled publically listed (large) companies, used varying definitions for family firms, and frequently lacked key moderators to explain innovation.

The resource related research strand argues for a set of resources unique to family businesses that stems from the overlap of the family with the business system. This resource set – which is often

loosely called familiness – is believed to foster innovation. The agency related research thread instead argues that the simultaneous pursuit of SEW together with the lack of diversification between family ownership and control leads to risk aversion among family business. This risk aversion in turn is argued to negatively affect innovation at large, and to limit innovation strategy to reactive and incremental types. Recently, authors such as De Massis et al. (2014) and Chrisman et al. (2015) expanded the view on this paradox and initiated the willingness and ability discussion. We followed this theory and utilized the level of ownership and control to assess ability, and a self-assessment to indicate willingness. To this end, this study used a large cross sectional sample of German SME offering – next to numerous moderators commonly used in innovation research – several family firm definitions.

From the argument that the lack of diversification of family ownership and control results in risk aversion and little innovation, we argue that a majority ownership combined with a family management allows agency related issues from the family system to spill over on the business system more easily. To assess this issue, we use self-assessed family businesses (willing), group them into majority ownership and proprietor led (able), and minority ownership family business (unable) and compared them to their nonfamily counterparts. Surprisingly, the resulting groups have little quantitative overlap.

As aforementioned, R&D-expenditure is the most common feature used to approximate innovativeness. Yet it entails severe limitations that apply to the often smaller family businesses in particular. We instead concentrated on the output side of the innovation equation and used product innovation output as another proxy valid to shed light on the research void depicted.

Given a sample of roughly 1200 German companies, we find that self-assessed family businesses are less innovative than nonfamily businesses. These findings are congruent to earlier R&D focused research. Moreover, we find that the level of ownership and management seem to play in important role. This result suggests that, indeed, agency related issues stemming from the overlap of the family and the business system are more present in family businesses where the family holds a position of high power and legitimacy. Hence, idiosyncratic behavior arises when both sufficiency conditions – ability and willingness – are fulfilled. Nevertheless, other elements such as the R&D-Intensity, internationality, and radicalness explain innovation output to a greater extent. This indicates that family businesses – and again given the definition used – are potentially not as different from nonfamily businesses in regard to innovation as theorized and points to the need of researching family influence rather than differences to nonfamily firms.

Further Research Suggestions and Limitations

Given the secondary and cross-sectional nature of our data, the study is subject to some limitations. A general limitation – that virtually every study suffers from – is the assumption of family ownership being exogenous. If for example persistent innovation activity were to lead to financial success and if this success was to increase the likelihood of selling the company to nonfamily hands, the results would be biased. Lodh, Nandy, and Chen (2014) point at this limitation and argue that technological progress and expected innovation may influence the ownership structure. In other words, factors that might influence innovation output over time could also influence the desirability of continuing family ownership and control of a firm. Similarly, other explanatory variables – like market share or turnover – are likely to be subject to this issue of endogeneity. Zellweger and Sieger (2012) among others proclaim that innovativeness wavers over time and suggest more intensely incorporating longitudinal studies in

order to truly differentiate between family and nonfamily business. We too suggest longitudinal revisits to the research question. Conditional on the set of moderator variables, we assume exogeneity with respect to our endogenous variable of interest.

Moreover, the family business definitions used here are limited by the aforementioned binary structure which might be too general to grasp finer distinctions. The theoretical and empirical models for example do not account for potential agency issues that may arise from ownership-dispersion in listed companies. In addressing the research gap the findings reveal that definition matters strongly. The still great diversity of definitions used may thus just as well explain how researchers come to conflicting findings. The manifold definitions not only result in hardly comparable focus groups, but on the flipside in little comparable control groups! It remains questionable whether a self-assessment really suffices to assess willingness to impact the business and excludes it in the control group. Similar to Chrisman and Patel (2012) and Dyer (2006), we therefore strongly suggest moderating for family businesses heterogeneity when assessing differences between family and nonfamily businesses. Recent typologies that have a more continuous character – such as the F-PEC scale (Astrachan et al., 2002) – may be more suitable to undergo more fine-grained analyses. These typologies, which are based on clear dimensions, aid in researching family businesses while accounting for family businesses-heterogeneity. Given the little overlap of the self-assessment and the ownership criterion, reexamining the research question under this lens seems particularly promising.

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