THE INFLUENCE OF FAMILY BOARD INVOLVEMENT ON WORKING CAPITAL MANAGEMENT

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Abstract

While research on long-term capital structures of family and non-family firms is well established, differences in current assets- and liabilities-management are largely under-researched. The aim of the study is to examine whether the type and degree of family involvement in the firm affect the efficiency of working capital management. Employing a partially hand-collected panel of 278 listed firms from 2000–2013 this paper analyzes the impact of family shareholders as owners, managers, and supervisors on working capital handling in Germany. The results show that primarily the share of family members in the executive board increases the length of the cash conversion cycle (CCC), particularly in smaller and non-service firms. Most notably, family management increases the inventory period (DIO). The higher average equity ratio of family firms suggests that family firms may face reduced financing pressure to address such inefficiencies in current assets and current liabilities management. Furthermore, family-managed firms may be less professional in their working capital management. The findings contribute to the literature by showing that in a country with a less investor-friendly corporate governance system, family influences on working capital management are primarily due to management presence, not plain shareholder influence. The results stress the need for researchers to consider the degree of family management involvement when analyzing the financial aspects of family firms.

Keywords: Working Capital Management, Cash Conversion Cycle, Corporate Governance, Family Firms, Family Ownership, Board Composition

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1. INTRODUCTION

The German economy is largely based on listed and privately held family firms (Faccio & Lang, 2002; Achleitner, Kaserer, Kauf, Günther, & Ampenberger, 2019; Gottschalk, Lubczyk, Hauer, & Keese, 2019). Family shareholders represent a unique type of shareholder (Andres, 2008), as they often have a significant amount of family assets invested in the firm (Anderson & Reeb, 2003), want to keep the firm in the family across generations (Arrondo-García, Fernández-Méndez, & Menéndez-Requejo, 2016) and are frequently present on the management boards (Achleitner et al., 2019). Due to their

ownership structure, family firms differ from non-family firms in various financial aspects (Filbeck & Lee, 2000; Michiels & Molly, 2017; Motylska-Kuzman, 2017). Family firms in Germany are found to be less leveraged (Schmid, 2013), have a higher operative and market performance (Andres, 2008; Franzoi & Mietzner, 2021a), differ in their earnings management techniques (Achleitner, Günter, Kaserer, & Siciliano, 2014) and in their behavior towards other stakeholders such as employees (Mietzner & Tyrell, 2012).

Working capital management is a key instrument to utilize internal financial resources and create shareholder value while avoiding short-run liquidity needs (Richards & Laughlin, 1980; Shin & Soenen, 1998; Boisjoly, Conine, & McDonald, 2020). Analogous to the differences in other financial aspects between family and non-family firms mentioned above, various arguments suggest that one may also expect such differences in the handling of working capital. As family shareholders, for example, are often also appointees in the boards of the firm in Germany (Franzoi, Mietzner, & Thelemann, 2021), they have a superior ability to control managers in executing efficient working capital management. Further, the lower leverage ratio in family firms might increase the importance of internal financing sources such as optimized cash-to-cash cycles (Baños-Caballero, García-Teruel, & Martínez-Solano, 2014). The long-term orientation (Gómez-Mejía, Haynes, Nuñez-Nickel, Jacobson, & Moyano-Fuentes, 2007; Block, 2009), risk-aversion (Anderson, Duru, & Reeb, 2012), and social endowment of family firm owners (Miller, Le Breton-Miller, & Scholnick, 2008; Mueller & Philippon, 2011; Chua, Chrisman, Kellermanns, & Wu, 2011) might, on the other hand, also lead to less efficient working capital handling as family shareholders, for example, may prefer higher levels of inventory or offer more generous payment conditions to customers. Another reason for the lack of efficiency could be that the natural succession in family firms results in less suited managers holding key positions (Bennedsen, Nielson, Perez-Gonzalez, & Wolfenzon, 2007). Therefore, the main purpose of this paper is to examine whether the type and degree of family involvement affect the efficiency of working capital management exchange-listed firms in Germany.

While various financial peculiarities of family firms are well-represented in literature, academic emphasis on the management of current assets and liabilities in family firms is rather weak (Autukaite & Molay, 2013; Motylska-Kuzman, 2017). At the same time, working capital management becomes increasingly important: firstly, production, procurement, and delivery processes in economies worldwide became more interwoven and streamlined while working capital efficiency tended to decline (Windhaus et al., 2018). Secondly, the economic impact of the global COVID-19 pandemic increased pressure specifically on manufacturing and retail firms to maintain effective working capital management (Hofmann & Wetzel, 2020; Zimon & Tarigi, 2021; Kortman et al., 2021). This is particularly severe in Germany, as the economy is based on family firms in the building, manufacturing as well as trade sector and the largest part of the listed firms belongs to the manufacturing sector (Gottschalk et al., 2019; Achleitner et al., 2019). Thirdly, as German firms are typically bank-financed (Gorton & Schmid, 2000) and the corporate sector's access to financing is increasingly affected by regulations and capital requirements (Fidrmuc, Schreiber, & Siddiqui, 2015), internal sources of financing become more important.

Summary statistics of studies on other financing means or on working capital handling in general indicate differences among family and non-family firms in Germany (Eiben & Redlefsen, 2006; Sure, 2014; Holzamer & Wendt, 2018; Ahrens et al., 2019). Yet, no article has shed an empirical spotlight on these differences. In addition to the general lack of research, it is particularly under-researched by which means family shareholders might influence working capital management. Germany, for example, has a specific corporate governance framework for public companies in which the influence of shareholders is largely limited to the annual general meeting, where shareholders appoint parts of the supervisory board that subsequently names and controls the executive board (Gorton & Schmid, 2000; Franzoi & Mietzner, 2021a). Research on the long-term financing structure of family firms, for example, already shows that it is particularly influenced by the involvement of the family in management (Ampenberger, Schmid, Achleitner, & Kaserer, 2013). As working capital handling is, even more, subject to day-to-day decisions in management, this study expects that the effective influence of family shareholders may be primarily executed through family member presence in the executive board.

This article investigates the influence of family ownership and management involvement on working capital efficiency in 278 listed German firms. The empirical models apply the cash conversion cycle (CCC) and its components of days inventory outstanding (DIO), days sales outstanding (DSO), and days payables outstanding (DPO) as proxies for the working capital management efficiency among firms. The observation period from 2000 to 2013 excludes major effects on the financing of companies and current assets due to the EU capital requirement directive (Basel III) coming into effect in 2014. The study contributes to the literature by showing that family shareholders indeed determine working capital management. The empirical models, however, show that not family ownership, but the degree of family influence in management increases the CCC. Against the backdrop of the German corporate governance system, the results are reasonable as the day-to-day working capital management is expected to be influenced mainly via the executive board. The effects are mainly observable in non-service firms and smaller companies and are primarily caused by slower inventory turnover (more DIO) in family-managed firms. The paper follows that these effects may be less due to risk aversion of families but more due to a lower level of professionalization in the working capital management of family-managed firms. Furthermore, due to the higher equity ratio of family firms, these firms may face less pressure to address, for example, inefficiencies in inventory management.

The structure of this paper is as follows. Section 2 reviews the literature and formulates hypotheses while Section 3 explains the methodology. The results of the study are presented in Section 4. After the discussion in Section 5, Section 6 concludes the findings.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Working capital management

A static view on working capital comprises the difference between a firm's current assets and current liabilities (Richards & Laughlin, 1980; Autukaite & Molay, 2013). By contrast, an operating cash-flow-oriented perspective on working capital focusses on the time span from expenditures for the purchase of materials to the collection of payments for the sale of finished products — thereby covering the flow of cash from suppliers to inventory to accounts receivable and back into cash (Richards & Laughlin, 1980; Shin & Soenen, 1998). A popular measure of working capital in this sense is the cash conversion cycle (CCC) (Gitman, 1974; Deloof, 2003). Working capital management of days inventory-, sales- and payables outstanding (CCC) may therefore be described as the trade-off between the dual goals of working capital, i.e., liquidity (e.g., to buy inventory/pay trade liabilities) and profitability (e.g., avoiding unnecessarily deployed cash that needs to be financed) (Shin & Soenen, 1998).

Despite other financial factors such as the capital structure policy of the firm, the working capital management policy is among the most important factors directly impacting the financial performance as well as shareholder wealth (Gill, Flaschner, Mann, & Dana, 2014). Different publications find a negative (Shin & Soenen, 1998; Deloof, 2003; García-Teruel & Martínez-Solano, 2007), a positive (Gill, Biger, & Mathur, 2010), or a concave/convex relationship between net trade cycle or CCC and corporate performance (Baños-Caballero, García-Teruel, & Martínez-Solano, 2012; Afrifa, 2016). Furthermore, efficient management of working capital appears to have a positive impact on (firm) market value for both large corporations (Wang, 2002), as well as small and medium-sized enterprises (SMEs) (Afrifa, 2016). According to Gill (2013), the same holds for family businesses in Canada, in particular. For Germany, two publications confirm a positive relationship between DIO and profitability (Meyer & Lüdtke, 2006) as well as between the net trade cycle and profitability (Wöhrmann, Knauer, & Gefken, 2012).

2.2. Family firms and working capital

Few studies on working capital in Germany distinguish between family and non-family firms. Some recent publications, however, hint at differences in working capital handling. Sure (2014), for example, finds deficits in family firms, especially in small-sized enterprises. A survey-based study by Eiben and Redlefsen (2006) shows that only half of the responding family firms applies active working capital management. Holzamer and Wendt (2018, p. 18) find that family firms in Germany have 14 days longer CCC than their non-family counterparts, whereas in the industrial segment the CCC is even 23 days longer than in non-family firms.

The long-term orientation of family firms (Block, 2009; Lumpkin & Brigham, 2011) and their given incentive structure provide indications for different working capital management compared to non-family firms. Business interaction with customers and suppliers, in general, can be seen as one of the key parts of stakeholder management (Freeman, 1984; Hill & Jones, 1992). Family firms are perceived to possess superior stakeholder and network management (Zellweger & Nason, 2008). The credibility and long-term commitment in their stakeholder management also affect suppliers and customers (Cornell & Shapiro, 1987) and hence trade working capital management. Family firms may be motivated to hinder working capital practices that are economically efficient in the short-term, like collecting receivables fast or paying suppliers with delay (Gill et al., 2014), but might damage long-term business survival and their socioemotional wealth (Gómez-Mejía et al., 2007) or that are too risky in terms of their supply chain anyways (such as minimal stock holdings to avoid warehouse costs).

Consequently, Gottardo and Moisello (2014) find significantly higher inventory levels in the case of Italian family firms. Among less professionalization, they attribute this finding to a more conservative risk behavior of family firms regarding their supply chain and inventory. In Germany, the Institute for SME Research observes similar effects: family firms exhibit higher working capital ratios than non-family firms and this is mainly due to higher levels of inventory (Ahrens et al., 2019). In addition, their study argues that the higher asset coverage ratio and the higher level of general liquidity they observe may be potential signs for increased risk aversion and for the family's desire to keep their firm flexible.

2.3. Corporate governance and working capital

Recent publications indicate that not only the ownership structure but also corporate governance aspects may influence working capital practices. Akram, Shahzad, and Ahmad (2018) find evidence that the specific national and firm-individual corporate governance framework such as the number of independent directors on the board has an impact on the general efficiency of working capital handling. Findings come from Canada show that board composition regarding CEO duality or gender may affect working capital management practices in small family businesses (Gill & Biger, 2013; Gill et al., 2014). Fiador (2016) provides an additional indication, that board size, board independence, and CEO duality affect working capital efficiency assessed by the CCC. Regarding Germany, there is only one publication suggesting similar results for the general level of liquid assets. In their descriptive study comparing two economically strong regions, the authors find a higher level of liquidity in firms with family management (Ahrens et al., 2019).

Though the literature review suggests structurally different working capital management in family firms, no other studies on the corporate governance influence of family members via ownership, management, and control on working capital are available. With regards to the German economic structure, legal system, and the specific corporate governance framework the aim of this paper is to gain a deeper understanding by which means of influence family shareholders affect working capital management in listed family firms.

2.4. Hypotheses

Due to the economic environment of low shareholder protection (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998), German firms are typically bank-financed (Gorton & Schmid, 2000). The economic desire to safeguard invested assets and mitigate agency problems (Shleifer & Vishny, 1997) results in an increased ownership concentration (Becht & Boehmer, 2003). The prominent ownership and management influence of families thereby substantially influences the financial decisions (Schmid, 2013; Ampenberger et al., 2013) as well as the corporate performance of family firms (Kaserer & Moldenhauer, 2008; Andres, 2008; Mazzi, 2011).

Based on the premises of Germany and the idiosyncratic features of family shareholders it is expected that family ownership significantly influences working capital management. The undiversified concentration of invested family wealth and the superior knowledge of family members in their firm (Anderson & Reeb, 2003) equals a large incentive and ability to control managers (Demsetz & Lehn, 1985; Andres, 2008) in their management of short-term assets and liabilities. Inefficient working capital handling may equal a higher dependence on external financing (Baños-Caballero et al., 2014; Afrifa & Padachi, 2016). Since family firms in Germany exhibit a lower level of leverage too, this may imply stricter working capital management, as family blockholders tend to avoid too much control by external debtholders (Schmid, 2013). Furthermore, lower levels of working capital to be financed equals the risk-averse attitude of family firms (Andres, 2008) in reducing bankruptcy risks (e.g., efficient cash collection from customers) and financing costs (e.g., for trade credits or inventory storage costs).

By contrast, various arguments also suggest less efficient working capital handling. Higher levels of working capital generally correspond with the assumed risk-aversion of families. For example, conservative handling of inventory may prevent disruptions in the supply chain and production as well as negative price fluctuations through more available stock. As a second aspect, the instant payment of trade liabilities might decrease financing costs through discounts and avoid additional external financing of family firms by banks. With regards to the different stakeholder management of family firms that accounts for the long-term orientation and socioemotional wealth of family shareholders (Gómez-Mejía et al., 2007), aggressive management of trade receivables towards customers or trade payables towards suppliers appears less likely (Gill et al., 2014). In summary, the incentive structure of family shareholders, their risk aversion, financing preferences as well as their stakeholder orientation suggest significant effects on the working capital handling of these family firms. Hence, hypothesis 1 assumes:

H1: Family and non-family firms differ in their working capital management.

As revealed by the literature review, the first results indicate that the specific corporate governance influence of family firms may as well determine working capital handling. In Germany's mandatory corporate governance framework for stock-corporation law, the governance of companies is split into an executive/management board (i.e., for day-to-day active management) and a controlling supervisory board. Against this backdrop and the German co-determination system, the influence of shareholders (and therefore also families) is mainly limited to the annual shareholders' meeting (Gorton & Schmid, 2000; Mietzner & Schweizer, 2014; Franzoi et al., 2021). Successfully influencing the financial decisions of firms, therefore, requires family appointees in the executive board. Hence, in Germany, a high share of family members in family-owned firms belong to the executive board (Achleitner et al., 2019). Accordingly, Ampenberger et al. (2013) show that the influence of families on the capital structure is primarily executed via management involvement.

Working capital management is largely due to day-to-day management decisions in the firm. These decisions affect all aspects of working capital including negotiations with suppliers, purchasing, stockpiling, changing invoice payment terms and granting cash discounts to customers, collecting cash from overdue trade receivables outstanding, or executing optimization measures (e.g., warehouse optimizations). If family ownership of firms matters with regards to working capital all these factors may be primarily influenced by family members being appointed to the executive board. Consequently, if family members succeeding their predecessors through nepotism may be less qualified to lead the company (Burkart, Panunzi, & Shleifer, 2003; Bennedsen et al., 2007; Eugster & Isakov, 2019), working capital management may be directly affected. Following these arguments, hypothesis 2 assumes that:

H2: Working capital management is affected by the share of family members in the executive board.

In the German corporate governance system, the supervisory board is in charge of appointing and controlling the executive board as well as approving certain strategic decisions of the executive board. Therefore, the direct influence of supervisory board members on daily working capital decisions is rather limited. Nevertheless, it may affect guidelines and major decisions in working capital management such as the change of strategic suppliers or the approval of larger efficiency or restructuring programs to be executed by the executive board (such as improved procurement processes or investments in warehousing). Though listed, many firms listed on the German stock exchange are small- or medium-sized (Achleitner et al., 2019) with family members appointed to the supervisory board (Franzoi & Mietzner, 2021a)[1]. Hypothesis 3 therefore assumes that:

H3: Working capital management is affected by the share of family members in the supervisory board.

[1] Current challenges of digitalization, more efficient supply chains or working capital financing tools might be too difficult to handle for family members in the executive board. Filbeck and Lee (2000) support this argument by finding larger family businesses with non-family members in the financial decision-making role more likely than their smaller counterparts to employ sophisticated financial management techniques (including working capital management).

3. METHODOLOGY

3.1. Data

Previous publications apply surveys (Eiben & Redlefsen, 2006), interviews (Holzamer & Wendt, 2018), or case studies (Sure, 2014) as research methods to investigate working capital management practices in German family firms. The current study broadens existing research by applying a quantitative panel regression methodology and differentiating ownership and management influences of families. To investigate the hypotheses the analysis is based on a largely hand-collected panel data set that is also used by Franzoi and Mietzner (2021a, 2021b) and Franzoi et al. (2021)[2]. The dataset contains 278 randomly chosen firms listed at the German stock market (CDAX-index, general and prime standard) covering a period from 2000 to 2013[3]. The specific time frame of the panel dataset allows to exclude major organizational and regulatory effects on working capital/current asset management. As shown by Boisjoly et al. (2020), the year 2000 marks a cornerstone in a two-decade previous improvement of current asset and working capital management (e.g., six sigma or lean management). On the other hand, by the effect of January 2014, the EU issued its capital requirement directive on the implementation of Basel III and other financial regulations, thereby affecting lending access and conditions for the financing of companies (Fidrmuc et al., 2015) and current assets.

As listed firms are forced to regularly publish financial and firm information, the ownership and management structure of these firms has been manually collected for every firm and year from annual reports/financial statements and publicly available information. Financial and insurance firms are excluded from the sample and the ownership data covers common stock holdings (no preferred shares). All financial information has been collected from Standard & Poor's Capital IQ platform[4].

3.2. Model specification and dependent variables

The main focus of this paper lies in the analysis of the family influence on the efficiency of the trade working capital management. Analogous to other publications (Baños-Caballero, García-Teruel, & Martínez-Solano, 2010; Fiador, 2016), this study applies the CCC as a proxy to identify differences in working capital efficiency between family-owned/managed and non-family affected firms. The CCC is defined by the net of days inventory outstanding (DIO, i.e., Inventory/Cost of goods sold (COGS) * 365) plus days sales outstanding (DSO, i.e., Trade receivables/Total sales * 365) minus days payables outstanding (DPO, i.e., Trade payables/COGS * 365). The model also employs a working capital efficiency measure that is more robust to individual annual outliers, the two-year average CCC (t_1 and t_0) as provided by Capital IQ as a default variable output option. The fully detailed definition of the average CCC can be found in Table A.7 (see Appendix). As governance influences in firms may affect parts of the CCC differently (Fiador, 2016), the individual components of the CCC are also estimated separately. The following general regression model is applied (for individual model specification please refer to respective regression results table):

$$WC_{it} = \alpha + \beta_1 Family_{it} + \beta_2 Mgmt\ Family_{it} + \beta_{3-7} Shareholders_{it} + \beta_8 Board\ Size_{it} + \beta_j Controls_{it} + e_{it} \quad (1)$$

where, *WC* refers to the working capital measures of: a) the CCC; b) the two-year average cash conversion cycle, and the CCC components; c) DIO; d) DSO, and e) DPO (as well as the two-year averages of the components). Following the results of the F-test and Breusch-Pagan test (fixed/random effects vs. pooled OLS) and the Hausman test (fixed vs. random effects), the study applies a fixed-effects regression model. The fixed-effects regression method allows the applied models to control for firm-specific time-invariant firm heterogeneity. All models apply robust standard errors to account for heteroscedasticity and autocorrelation.

3.3. Independent variables

While the variable *Family* in equation (1) refers to the percentage of family stock ownership, *Mgmt Family* captures: a) the family management influence via dummy variable (presence of family members on the boards) as well as b) the share of family members on the board. To control for the influence of other large shareholders besides *Shareholders* equals a vector of the ownership variables covering shareholdings of *Other corporations*, *Banks*, *Financial institutions*, *Employees,* and the *Government*. As in the case of family ownership, every shareholder with an ownership stake of > 5% is identified.

Some of the existing publications on governance influences show that board size may affect the CCC (Fiador, 2016). Hence, *BoardSize* (i.e., the number of board members) controls for the fact that, on the one hand, larger boards may increase control over single-manager decisions in working capital handling and that, on the other hand, smaller boards may be more effective in decision-making processes and controlling (Gill & Biger, 2013).

The vector of *Controls* in equation (1) accounts for the following independent variables: firm size may positively affect working capital management by lowering financial constraints through better access to different forms of financing, lower financing costs, and higher market power, for example, towards suppliers (Baños-Caballeros et al., 2014; Warner, Montanus, & Stolte, 2019; Boisjoly et al., 2020). Hence, *MCap* (market capitalization) accounts for size. *Age* accounts for firm age. Older firms may have better relationships with stakeholders (Petersen & Rajan, 1997; Niskanen & Niskanen, 2006; Zellweger & Nason, 2008) and

[2] These publications address different research questions. While the former two investigate the impact of family influence on stock market performance, the latter examines earnings management practices in family firms.

[3] The 278 sample firms were randomly chosen among all firms listed in the General and Prime Standard of the CDAX-index. Covering more than half of all firms, the sample is regarded as representative to listed firms in Germany (478 at period-end of the investigation). The number of employed firms is limited by the extremely time-costly hand-collection process of required, reliable governance data over all time periods of the panel (such as investigating every single management or supervisory board position or every shareholder holding more than 5% of the voting rights in every firm year).

[4] As analysis and results may potentially be affected by outliers, data for financial variables are winsorized at the 1% and 99% level, analogous to other publications (Troilo, Walkup, Abe, & Lee, 2019; Ampenberger et al., 2013).

better access to external financing (Baños-Caballero et al., 2010). On the other side, older firms might be inflexible in applying advanced financial management techniques (Filbeck & Lee, 2000).

Among corporate earnings and other financial institutions (e.g., trade credits), bank financing may influence working capital levels/management (Troilo et al., 2019). The debt-to-equity ratio (*DebtEqu*) is expected to have a negative influence on working capital management. Even during low-interest rates, already highly leveraged firms may be forced to squeeze-out internal financial resources such as working capital. Under imperfect market conditions, costs of funding for CCC may be higher for firms with larger leverage as they have to pay higher risk premiums (Baños-Caballero et al., 2010). In order to account for the ability to generate financial resources, the model includes the cash flow margin (*CF*). Higher cash flows are expected to increase the CCC as firms may be less likely to face financial constraints in working capital management (Baños-Caballero et al., 2014; Afrifa, 2016).

Firm performance may affect working capital management by extended access to external financing or higher market dominance and connected bargaining power (Baños-Caballero et al., 2010). The model accounts for this influence via return on assets (*ROA*). Furthermore, the model controls for a company's *Growth* in sales. While with regards to expected future growth companies might stockpile additional inventory, for example, such growth phases might also be accompanied by larger trade credits to boost sales levels (Baños-Caballero et al., 2010; Elbadry, 2018). Lastly, the model controls for fixed tangible assets (*PPE*). Firms with more *PPE* may have difficulties in financing current assets in finically distressed phases (Fazzari & Petersen, 1993). On the other hand, firms with more tangible instead of intangible assets may profit from fewer information asymmetries and lower funding costs (Baños-Caballeros et al., 2010).

4. RESULTS

4.1. Descriptive statistics

Table 1 describes the summary statistics of the main governance variables. In more than half of the companies, a family held more than 25% of the voting rights. Under German stock corporation law shareholders larger than this threshold have a blocking minority for most of the relevant decisions of the shareholder's committee (such as appointing managers or family members to the boards). The high prevalence of family shareholders is even more crucial as in nearly every third company 50% or more of the voting rights are attributable to a family. The family stake amounts to 28% (median) of the voting rights.

As shareholder influence is limited in Germany, family managers are present in 35% of all executive boards. About 18% of executive board positions are occupied by family members and even in the supervisory board, nearly 10% of all positions belong to family members. The high level of active management involvement by family shareholders in Germany matches with the findings of other publications (Achleitner et al., 2019; Franzoi et al., 2021).

Table 1. Descriptive statistics on governance variables

	Family ownership			*Family management*			*Board size*	
	25%	***50%***	***Avg.***	***Dum***	***ExBo (%)***	***SupBo (%)***	***ExBo***	***SupBo***
Mean	0.53	0.32	0.31	0.35	0.18	0.09	3.32	6.99
Median	1.00	0.00	0.28	0.00	0.00	0.00	3.00	6.00
SD	0.50	0.47	0.29	0.48	0.29	0.16	1.71	5.37
N (firm years)	2936	2936	2936	2917	2917	2889	2917	2905

Notes: This table presents the mean, median, standard deviation, and n of the main governance variables of interest across the sample from 2000 to 2013. A list of all variables can be found in the Appendix.

Turning to working capital management, Figures 1a and 1b illustrate the CCC of the family- and non-family-firms (by ownership and management) over time. The general length of the CCC in the sample decreased over time, suggesting improvements in working capital management. In line with other observations in Germany (Ahrens et al., 2019) the CCC of the sample firms appears to be higher in family-influenced firms at most points in the observation period. Especially family-managed firms (executive board) exhibit a similar or higher level of CCC since 2006.

Table 2 reports the summary statistics and differences in means/medians of family/non-family firms by family executive board management presence (dummy). Variations in the number of firm years (N) compared to governance statistics in Table 1 are due to the availability of respective accounting data[5]. Family-managed firms appear to have a slower mean turnover in inventory (DIO), days sales outstanding as well as days payables outstanding. Temporal trends were neglected, the overall picture of pooled summary statistics provide a first (albeit significant) indication that the CCC of firms with family management is about six days longer than without family management both in (both mean and median). Interestingly and in line with theory, a significant difference in the CCC could however only be found with regards to family management, not family ownership (Table A.1 in the Appendix).

[5] The availability of respective accounting data for the research purpose of this study is not affected by the application of different accounting standards. The general impact of accounting standards is addressed in the robustness section.

Figure 1a. CCC by ownership and year

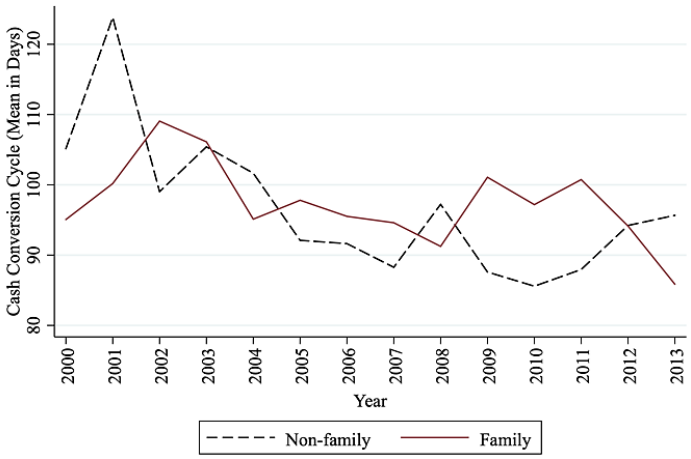

Figure 1b. CCC by management and year

Notes: The graphs present the annual CCC by ownership (min. 25% blocking minority by families) and family management presence (dummy) in executive boards.

Table 2. Summary statistics and differences in means by management type

Variables	*Family management*			*Non-family management*			*Sign. of dif.*	
	Mean	*Median*	*N*	*Mean*	*Median*	*N*	*Mean*	*Median*
CCC	102.18	90.63	858	94.02	84.22	1732	**	**
DIO	91.90	85.50	866	90.80	75.62	1742	n.s.	n.s.
DSO	72.51	59.05	1012	62.12	56.99	1853	***	***
DPO	71.27	45.54	1003	64.42	45.98	1830	n.s.	n.s.
ExBoSize	2.95	3.00	1033	3.53	3.00	1884	***	***
SupBoSize	4.81	3.00	1024	8.19	6.00	1876	***	***
MCap	407.26	64.24	901	4,153.01	256.69	1582	***	***
DebtEqu	0.80	0.32	886	0.78	0.48	1650	n.s.	***
Age	43.19	23.00	1033	61.93	37.00	1884	***	***
ROA	0.03	0.03	1001	0.03	0.04	1834	**	**
CF	0.01	0.02	961	0.02	0.03	1762	*	***
Growth	0.12	0.06	1000	0.08	0.05	1826	***	**
PPE	0.17	0.12	1015	0.21	0.18	1862	***	***

*Notes: This table presents the summary statistics for the variables employed in the main regression models (pooled). The significance of differences is based on the t-test (means) and the Wilcoxon/Mann-Whitney test (median). A list of all variables can be found in the Appendix. Significance of differences at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.*

Regarding other variables, family-managed firms are significantly smaller (*MCap*) and are 14 years younger (median). While their cash flow margin amounts below non-family-managed firms, sales growth rates are higher. The level of *PPE* is lower in family-led firms in the sample. Summary statistics furthermore confirm that the leverage of German family firms is significantly lower (Schmid, 2013). Figure A.1 in Appendix plots the median debt-to-equity-ratios (*DebtEqu*) of family/non-family-owned firms (continuous lines) and family/non-family-managed firms (dashed lines) over time. While the overall average level of leverage is decreasing over time, the sample supports the findings of other studies, that at least long-term financing decisions in family firms are substantially driven by family management involvement (Ampenberger et al., 2013). Against the general trend of the sample, firms with family management involvement exhibit a similar or lower median debt-equity-ratio over the years.

The correlation matrix is presented in Table A.2 in Appendix. As assumed the influence of families is correlated with working capital key performance indicators (KPIs). While family ownership only exhibits a significant correlation with DSO, the management influence of family members in the executive and supervisory board is positively and significantly correlated with the CCC. In the case of family managers on the executive board, this correlation is also significant in the case of DIO and DSO. As expected, size and the debt-to-equity ratio both show a significant negative correlation with the CCC.

4.2. Regression results

Table 3 reports the results of the regression models on the CCC and the influence of the family as shareholders and as executive board members. Models 1 and 4 focus on the ownership structure and do not show a significant effect on the length of the CCC. A constant significant impact of family shareholding cannot be observed as only two of the six models exhibit a positive influence on a 10% level. By contrast, the presence of family managers on the executive board (Models 2 and 5) significantly increases the (average) CCC confirming the results of previous differences in means-testing. Models 3 and 6 reveal that not only the presence of family managers, but more strongly, the share of family delegates among the members of the executive board significantly increases the length of the CCC. This finding is found to be robust on a 1% level and supports *H2*.

The size of the executive board did not reveal any stable, significant results. The finding of negative coefficients by Fiador (2016) and Gill and Biger (2013) could not be confirmed for Germany. Regarding control variables, leverage (*DebtEqu*) has a negative effect in all models, however, only significant in the case of the average CCC. The negative effect of *ROA* supports other publications that assume an increased bargaining power against customers/suppliers in case of increased profitability (Baños-Caballeros et al., 2010; Shin & Soenen, 1998). The negative effects of sales growth support the notion, that fast-growing companies follow aggressive working capital policies (Baños-Caballeros et al., 2010; Elbadry, 2018).

Table 3. Cash conversion cycle (Executive board)

Variables	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
	CCC	*CCC*	*CCC*	*Avg. CCC*	*Avg. CCC*	*Avg. CCC*
Exec Family (Dum)		19.76**			19.13***	
		(8.60)			(7.18)	
Exec Family (%)			53.06***			44.66***
			(20.32)			(15.78)
Family (%)	25.02	27.72	28.26	13.91	15.80*	16.52*
	(22.32)	(23.56)	(23.66)	(9.69)	(9.16)	(9.39)
Corporation (%)	33.61**	26.63*	28.30*	23.10**	17.38	18.44*
	(15.69)	(15.45)	(15.45)	(11.07)	(11.00)	(11.12)
Bank (%)	18.59	14.05	15.21	-12.75	-16.87	-15.72
	(58.38)	(60.06)	(59.82)	(54.11)	(54.29)	(54.04)
Finance (%)	13.02	9.347	9.719	1.276	-1.067	-0.688
	(14.78)	(14.94)	(14.76)	(13.20)	(13.89)	(13.72)
Employees (%)	39.30	26.59	26.39	13.36	8.708	9.465
	(37.38)	(39.25)	(37.73)	(32.24)	(32.01)	(30.77)
Government (%)	27.66	43.32	46.60	13.27	33.89	35.92
	(56.23)	(50.76)	(50.56)	(35.36)	(28.71)	(29.05)
Exec Board Size		1.925	3.120**		1.435	2.495*
		(1.43)	(1.56)		(1.25)	(1.36)
MCap	2.490	0.697	0.577	2.017	-0.0416	-0.0884
	(2.56)	(2.78)	(2.77)	(2.37)	(2.45)	(2.45)
DebtEqu	-0.242	-0.661	-0.748	-0.260	-0.654*	-0.695*
	(0.47)	(0.50)	(0.51)	(0.39)	(0.38)	(0.39)
Age	-7.971	0.677	1.878	-9.808	0.442	1.058
	(11.91)	(12.26)	(12.05)	(11.53)	(10.65)	(10.44)
ROA	-27.83	-7.798	-13.58	-99.68***	-91.27**	-95.12**
	(38.10)	(41.14)	(40.86)	(34.91)	(37.52)	(37.12)
CF	-33.29*	-31.47*	-31.89*	4.115	12.55	12.04
	(17.89)	(16.94)	(17.04)	(17.25)	(14.15)	(14.23)
Growth	-8.457*	-10.10*	-9.604*	-12.24***	-14.41***	-13.96***
	(4.56)	(5.42)	(5.45)	(3.83)	(4.72)	(4.74)
PPE	-4.160	-3.565	-6.928	17.01	14.41	11.50
	(34.70)	(38.19)	(38.71)	(22.57)	(24.36)	(24.93)
R^2	0.0320	0.0374	0.0457	0.0392	0.0512	0.0563
R^2 (Adj.)	0.0257	0.0299	0.0382	0.0329	0.0437	0.0488
N	2030	1942	1942	1996	1911	1911
FE	Yes	Yes	Yes	Yes	Yes	Yes
Robust	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: This table presents the regression results of the cash conversion cycle (CCC) fixed-effects regression models. Models apply robust standard errors, include a constant and cover the period from 2000 to 2013. Standard errors are presented in parentheses. A list of all variables can be found in the Appendix. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.*

Table 4 presents the regression results on the CCC components. As reported by Models 1 and 4, the positive influence of family management on the CCC appears to be due to slower inventory management. In both models, DIO increases with the share of family managers. Model 6 suggests that firms with more family managers also exhibit more days payables outstanding (DPO)[6]. This effect is only observable on the two-year average length of

[6] While the dummy variable for family management has a significant positive effect on the CCC (see Table 3), in case of the CCC components it only reveals a significant positive influence on average DSO and DPO.

the CCC. Since the effect is smaller than in the case of DIO, the overall increase in CCC reported in Table 3 appears therefore reasonable. As presented in Models 2 and 5, the share of family management does not have any significant effect on the days sales outstanding (DSO). Notably, family ownership has no significant effect on the components of the CCC either.

Table 4. CCC components (Executive board)

Variables	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
	DIO	***DSO***	***DPO***	***Avg. DIO***	***Avg. DSO***	***Avg. DPO***
Exec Family (%)	49.08**	9.914	15.94	37.38**	8.272	21.72***
	(19.85)	(12.77)	(16.52)	(17.40)	(10.18)	(8.22)
Family (%)	18.49	-8.700	1.061	12.44	-5.422	7.965
	(13.30)	(8.27)	(13.14)	(10.15)	(6.27)	(7.65)
Corporation (%)	16.70	-16.36*	-15.69	14.79	-13.59*	-3.693
	(13.61)	(8.79)	(11.69)	(13.90)	(7.00)	(7.29)
Bank (%)	-30.13	-7.204	-57.67	-44.72	1.680	-15.13
	(42.93)	(17.20)	(35.11)	(42.26)	(18.24)	(21.99)
Finance (%)	18.47	-14.78**	-3.357	16.54	-12.17**	6.559
	(12.05)	(6.39)	(9.36)	(11.57)	(5.97)	(8.32)
Employees (%)	67.87	-68.65**	-14.98	43.11	-41.61	1.855
	(47.04)	(31.44)	(28.82)	(41.19)	(33.76)	(23.99)
Government (%)	12.25	-12.95	-19.43	22.70	25.65	-20.56
	(28.67)	(38.98)	(60.86)	(33.14)	(53.26)	(36.76)
Exec Board Size	-0.0449	1.056	-1.468	1.059	1.017	-0.0723
	(1.00)	(1.18)	(1.28)	(1.07)	(0.81)	(0.77)
MCap	4.344*	-0.0855	0.965	2.978	-0.575	-0.290
	(2.46)	(1.11)	(1.80)	(2.41)	(1.01)	(1.43)
DebtEqu	-0.297	-0.288	-0.489	0.0651	-0.0771	-0.138
	(0.37)	(0.36)	(0.68)	(0.51)	(0.27)	(0.31)
Age	-0.0850	-8.946*	-12.33**	1.364	-6.664	-2.521
	(7.45)	(5.41)	(5.12)	(7.42)	(5.43)	(4.27)
ROA	-76.02*	-34.89*	-93.21***	-107.9***	-95.01***	-78.75***
	(44.25)	(18.78)	(32.50)	(39.12)	(21.08)	(20.22)
CF	-27.71**	-25.12**	-28.31*	-11.15	6.372	-12.11*
	(12.04)	(11.24)	(16.86)	(10.04)	(9.22)	(7.10)
Growth	-6.390	-4.468	-3.928	-16.98***	-15.56***	-13.17***
	(4.77)	(2.80)	(4.88)	(4.85)	(3.23)	(3.51)
PPE	36.44*	-57.85**	-41.35	45.76**	-44.38***	-34.60*
	(20.15)	(24.69)	(27.06)	(21.65)	(15.44)	(19.07)
R^2	0.0520	0.0770	0.0391	0.0880	0.136	0.0892
R^2 (Adj.)	0.0447	0.0702	0.0319	0.0809	0.130	0.0822
N	1950	2052	2039	1930	2051	1977
FE	Yes	Yes	Yes	Yes	Yes	Yes
Robust	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: This table presents the regression results of the cash conversion cycle components (DIO/DSO/DPO) fixed-effects regression models. Models apply robust standard errors, include a constant and cover the period from 2000 to 2013. Standard errors are presented in parentheses. A list of all variables can be found in the Appendix. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.*

The regression results on the supervisory board are shown in Table 5. As reported previously, the share of family ownership has no significant effect in any of the models. Models 1–4 suggest that the size of the supervisory board has a positive effect on the CCC and that this effect is primarily driven by more DIO. The positive effect of the influence of the family in the supervisory board (Model 1) also appears to be driven by the influence of the family in the executive board (Models 2–3). No such CCC-increasing effect of the family-share in the supervisory board could be found regarding DIO, DSO, and DPO. The positive influence of family members in the executive board (as reported by Tables 3–4) remains stable when controlling for supervisory board involvement of family members. Results on the two-year-average CCC and its components are similar and can be found in Table A.3 in the Appendix.

Table 5. Cash conversion cycle/CCC components (Supervisory board)

Variables	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
	CCC	*CCC*	*CCC*	*DIO*	*DSO*	*DPO*
Sup Family (%)	54.00*		63.72**	29.01	9.632	-11.53
	(27.73)		(29.45)	(24.63)	(18.25)	(12.58)
*SuF(%) * Exec(Dum)*		64.65***				
		(20.02)				
Exec Family (%)			56.29***	50.41**	12.63	17.36
			(20.99)	(20.46)	(13.98)	(17.21)
Family (%)	28.34	30.87	24.25	16.06	-10.20	1.305
	(20.94)	(24.22)	(20.58)	(12.19)	(8.56)	(13.40)
Corporation (%)	25.28*	27.07*	27.36*	15.71	-17.11*	-15.94
	(14.96)	(15.69)	(15.19)	(14.02)	(8.88)	(11.81)
Bank (%)	22.34	20.39	18.79	-28.20	-7.177	-57.91*
	(58.00)	(58.62)	(59.19)	(42.25)	(17.34)	(34.86)
Finance (%)	10.71	10.60	10.58	18.41	-14.60**	-2.587
	(14.81)	(15.11)	(14.50)	(11.54)	(6.45)	(9.36)
Employees (%)	19.48	28.03	3.567	55.97	-69.92**	-7.111
	(36.69)	(38.18)	(36.88)	(45.02)	(32.06)	(29.04)
Government (%)	28.88	33.33	42.00	5.077	-10.94	-17.52
	(53.42)	(51.21)	(50.42)	(26.55)	(39.94)	(61.44)
Exec Board Size			3.180**	-0.284	1.192	-1.556
			(1.58)	(1.03)	(1.26)	(1.24)
Sup Board Size	1.984***	1.520**	1.781**	2.122***	-0.564	-0.707
	(0.75)	(0.68)	(0.75)	(0.79)	(0.58)	(0.77)
R^2	0.0366	0.0364	0.0576	0.0599	0.0806	0.0414
R^2 (Adj.)	0.0290	0.0288	0.0491	0.0515	0.0728	0.0332
N	1924	1922	1922	1930	2031	2018
Controls	Yes	Yes	Yes	Yes	Yes	Yes
FE	Yes	Yes	Yes	Yes	Yes	Yes
Robust	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: This table presents the regression results of the CCC fixed-effects regression models. Models apply robust standard errors, include a constant and cover the period from 2000 to 2013. Standard errors are presented in parentheses. A list of all variables can be found in the Appendix. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.*

5. DISCUSSION AND ROBUSTNESS

5.1. Discussion

Results support existing research findings that governance structures in firms do indeed matter with regards to working capital management (Akram et al., 2018; Gill & Biger, 2013; Gill et al., 2014; Fiador, 2016). In his study on capital structures in Germany, Schmid (2013) highlights the influence of families in family firms. The current empirical results on working capital management point in a similar direction. The influence of families appears to be primarily driven by active management involvement and not by ownership. These results appear reasonable with regards to the German corporate governance system that limits the shareholders' influence to the annual shareholders' meeting and the appointment of the supervisory board. Results demonstrate that when family members serve as executives, the working capital efficiency decreases and the length of the CCC increases.

Can this influence be isolated to the lead position in the board(s)? Family CEOs substantially influence many financial aspects in family-owned firms (Anderson & Reeb, 2003, 2004; Villalonga & Amit, 2006; Michiels & Molly, 2017; Andres, 2008). The CEO in general may also be relevant for working capital management (Gill et al., 2014; Fiador, 2016). Table A.4 in the Appendix presents regression models controlling for board-lead positions. Models 1–2 show no significant effect on the CCC in the case of a family-CEO. Model 3 furthermore demonstrates that it does not make a difference in terms of working capital management if the CEO is also the founder of the firm and so does the general involvement of the founder in the board (Model 4). Model 5 shows that it also does not matter whether the chairman of the supervisory board is a family member. The driver with regards to family influence on working capital management appears to be the presence and relative family influence in the executive board.

What are the notable effects of working capital? Firstly, results suggest that the share of family management slows down inventory turnover. This is in line with Holzamer and Wendt (2018) who find higher CCCs for family firms, primarily driven by higher DIO. While Ahrens et al. (2019) find a generally higher inventory intensity (inventory/ total assets) in family firms in Germany, the sample of the present study does not reveal such differences among family-owned/managed firms (results not reported). It appears to be less likely that the higher level of DIO is due to the assumed risk aversion of families (for example, by preventing disruptions in supply chains or price fluctuations through higher inventory levels). It appears more likely that higher DIOs are due to less professional inventory management. Family successors might have gained their position rather through nepotism than by qualification (Burkart et al., 2003; Eugster & Isakov, 2019). This may be supported by findings that only half of the family firms in a survey-based study apply active working capital management (Eiben & Redlefsen, 2006) and that family firms lack professionalization with regards to working capital handling (Sure, 2014). Since family firms have a higher equity ratio, the financial pressure due to financing needs or due to external control by debtholders to address inefficiencies in inventory turnover may furthermore be reduced.

Secondly, estimations reveal a limited effect on the trade payables period, as a positive effect of family management is only significant for the average level of DPO[7]. Generally, more DPO may support finance working capital, as trade payables are settled later. If DPO in family firms is proof to be longer in future publications, one reason could be a superior stakeholder-management of family firms towards suppliers (Zellweger & Nason, 2008), for example, by more generous credit terms. Lappalainen and Niskanen (2013) suggest that family firms generally prefer the use of trade credits as a financing source, which is in line with the avoidance of external financing costs or increased leverage.

Thirdly, family management has no significant effect on DSO. Either the efficiency of credit management is unaffected by family members, or the perception of family firms as more caring towards stakeholders (i.e., customers) cannot be confirmed. If the latter holds to be true in future analyses, this in line with Achleitner et al. (2014) and Franzoi et al. (2021) who find increased real earnings management by discretionary expenses in family firms, but none by boosting sales, for example, through more lenient credit terms to customers.

Empirical findings on the family influence on the supervisory board are rather weak and appear to be driven by the simultaneous executive board presence. No significant effect on any of the CCC components can be observed. This finding is in line with Ampenberger et al. (2013) who could not observe significant effects in the supervisory board on the capital structure in family firms either. While the alignment of interest between family shareholders and the firm increases when family members serve on boards of the company (Fama & Jensen, 1983; Jensen, 1986; Anderson & Reeb, 2003), the results on working capital management show that within the German corporate governance system, families need to be engaged particularly in the executive board to affect financial decisions.

5.2. Robustness

The results raise a number of robustness questions. Firstly, regarding the insignificance of family ownership, it might be insufficient to consider ownership stakes held by families in general (including families that acquired but not necessarily founded companies). Founding families, in particular, may be poorly diversified and have a large share of wealth invested in their firm (Anderson & Reeb, 2003). Hence, their influence, motives, and alignment with the company may differ from family investors who seek to diversify on a portfolio level (Zellweger, 2006; Andres, 2008). Results remain insignificant considering solely the ownership shares of founding families. It may as well be relevant from stewardship and agency (Le Breton-Miller, Miller, & Lester, 2011) as well as from a legal and governance perspective (i.e., a family does not always exceed the minority blocking threshold of 25%) if the family is also the largest shareholder. Like before, results show that the shareholder rank has no significant influence on the CCC either. Furthermore, families may also control their shares via family offices or family foundations. Regression results remain largely unchanged when considering these two aspects in addition to the initially applied definition of family ownership.

Secondly, some studies on working capital efficiency apply the net trade cycle (NTC) instead of the CCC as the dependent variable where the denominator if DIO and DPO is sales instead of COGS (Shin & Soenen, 1998; Baños-Caballero et al., 2014). Despite a certain loss in accuracy, this approach has the advantage that it is applicable for companies that adopted total cost accounting in the past (Knauer & Wöhrmann, 2013). Historically, listed companies in Germany were allowed to apply national, instead of international GAAP (i.e., HGB vs. IFRS)[8]. However, the general findings remain unchanged when applying the NTC instead of the CCC. Findings furthermore remain unchanged in additional robustness tests after a) controlling for international accounting standards via IFRS dummy variable, b) cutting off-panel data in the year of the introduction of the respective regulation, or c) generally integrating year-dummies in all fixed-effect models. Finally, results remain stable after applying alternative proxies for size (total assets and revenue), performance (return on equity, EBITDA-margin and net income-margin), or cash flow (levered/unlevered free cash flow and free cash flow excluding change in trade working capital). The results of all robustness tests are available upon request.

Thirdly, working capital management practices may vary across industries (Hawawini, Viallet, & Vora, 1986; Warner et al., 2019). The manufacturing and service industries are among the most common general branches in the CDAX (Achleitner et al., 2019). Based on primary four-digit SIC codes, 55.8% of the firms in the sample belong to the manufacturing industry and 29.5% to the service industry[9]. While regression models already control for firm-specific fixed effects in working capital management, Table A.5 in the Appendix estimates regression models specifically for the largest industries in the sample (analogous to Shin and Soenen, 1998). Models 3–5 further account for the cases that the manufacturing, or the service, or both industries are excluded from the model. The increase in CCC due to additional family managers on the executive board remains significant at least on a 10%-level throughout four of five models. Model 4 demonstrates that the positive influence on the CCC is driven by non-service firms, consistently no significant effect is observable when solely considering service firms. Furthermore, as previously shown, the share of family ownership remains insignificant in all industries.

Fourthly, firm size may affect the governance influence of families: companies listed in the German CDAX in general and family and non-family firms, in particular, differ significantly in size (Ampenberger et al., 2013), as family ownership decreases with size (Faccio & Lang, 2002). As presented

[7] As in case of inventory, trade payables/total assets are not significantly higher in family firms of the sample.

[8] In 2002, the EU adopted a regulation on the application of international accounting standards (No. 1606/2002) for publicly traded, consolidated companies coming into effect in 2005 for the latest. For the sample this may raise misspecification issues regarding asset valuation (i.e., variables based on total assets), cost accounting (e.g., cost of goods sold) or the financial reporting processes (application of international standards).

[9] Branches and industries are not identified on a more fine-graded level because the number of firms would be insufficient for statistically reliable regression estimations.

in Table 2 (and Table A.1, Appendix), family-influenced firms in the sample are significantly smaller. While previous models do not support a general size effect on the CCC, the question arises whether family members might have increased leverage on working capital management in smaller firms. Table A.6 in the Appendix presents results on a sample split alongside median firm size. As Model 1 shows, the family management influence on the CCC is only significant in firms below the sample median size (MEUR 193.6 of revenue). This finding is robust on the other median size measures such as market capitalization (Model 3) and total assets (Model 5) and also holds for DIO (not reported).

6. CONCLUSION

This article contributes to the literature by being among the first to investigate differences in working capital management across family and non-family firms, particularly in Germany. A detailed measure of family influence via ownership, executive board, and supervisory board is provided in order to analyze the means of determination against the backdrop of the specifics of the German corporate governance system. Understanding working capital management in family firms is of crucial importance in Germany as 1) it may increase shareholder value (Shin & Soenen, 1998) and corporate profitability (Meyer & Lüdtke, 2006; Wöhrmann et al., 2012); 2) these firms are regarded to embody the backbone of the country's economy active in working capital-intense sectors (Gottschalk et al., 2019; Achleitner et al., 2019), and 3) effective working capital management can serve as an important source of internal financing (Richards & Laughlin, 1980) in Germany's bank-based financial system.

The empirical models employ a sample of 278 listed firms in Germany from 2000 to 2013. While financial data is retrieved from a database, ownership and governance data is manually collected on a single board-position level. The results reveal that family firms exhibit a significantly longer CCC than non-family firms. Specifically, regression models show that in terms of working capital efficiency, not family ownership, but the involvement of family members and the share of family managers in the executive board is crucial in increasing the CCC. A theoretical explanation for these results is Germany's specific corporate governance system in which shareholders' influences on management are limited. If family ownership matters in terms of shareholder incentives, decision horizons, or just the level of professionalization on financial issues among shareholding family members, the degree of family involvement in management is a crucial factor regarding working capital management in family firms.

Results show that the longer CCC is primarily driven by more DIO (i.e., slower inventory turnover in family-managed companies). The absence of significant differences in total inventory levels between family- and non-family firms suggests that the reason for higher DIO, however, is more lack of professionalization and less due to the assumed risk aversion of families. While no effect on the days sales outstanding (DSO) is observable, the models provide limited results that family management involvement may also increase days payables outstanding (DPO), for example, through more lenient credit terms of suppliers. The latter would be in line with the avoidance of additional external financing by family firms and the superior stakeholder management towards suppliers suggested by the literature. In summary, results further suggest that due to the higher equity ratio of family firms, they may face reduced pressure to tackle inefficiencies in working capital handling.

The findings of this article are relevant for future research as they demonstrate that the degree of family management involvement is a key determinant in the management of working capital. On the other side, the influence of plain family ownership on day-to-day management decisions appears to be limited. Challenges in collecting high-resolution governance data necessary for empirical analyses might explain the relatively low number of publications on working capital practices in family firms. This study is important for future research as it demonstrates that time-costly hand-collection of differentiated governance data on family firms can provide additional insights on operative aspects of corporate management in these firms. It finds that specifically in the case of working capital management the presence of family managers is a crucial driver of firm performance. Hence, with regards to the family business definition dilemma (Mazzi, 2011), the results demand caution in applying plain ownership definitions for family firms when studying current asset management practices. It is highly demanded to enhance controlling for family members in management positions in future publications.

This study has some limitations which could provide additional opportunities for research. As it investigates listed corporations in Germany, the findings are limited to similar corporate governance systems (as, for example, in Austria) and listed family firms. Future research may hence focus on the international comparison of working capital practices in family firms to differentiate the impact of the German corporate governance framework on these findings. Furthermore, non-listed firms need to be analyzed to account for the transferability of the results to non-listed family firms. In addition, the findings on CCC-components need to be confirmed by empirically accessing the drivers of inventory and payables management in family firms.

Lastly, this article has implications for practitioners and investors in family firms. While the results that the longer CCC in family-managed firms is primarily due to a slower inventory cycle (DIO), active working capital management may offer the potential for lower operative and financing costs. Minority investors in family firms may therefore focus on potential hidden firm value in smaller, family-managed firms as optimizing inventory turnover, in particular, has been shown by previous studies to positively influence firm profitability in Germany.

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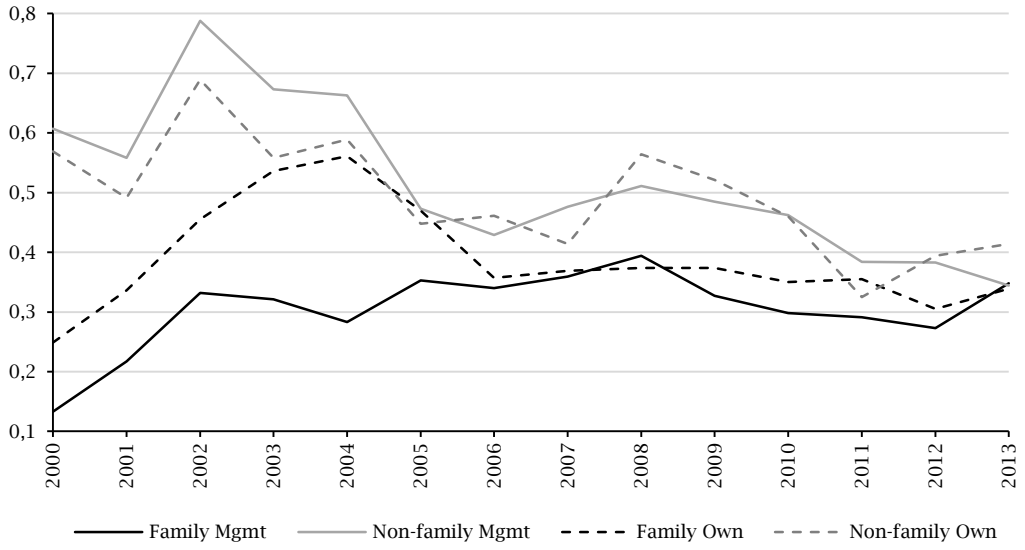
APPENDIX

Table A.1. Summary statistics and differences in means by firm ownership

Variables	*Family firms (25%)*			*Non-family firms*			*Diff.*	
	Mean	*Median*	*N*	*Mean*	*Median*	*N*	*Mean*	*Median*
CCC	97.03	85.84	1344	94.49	85.06	1234	n.s.	n.s.
DIO	92.99	79.46	1350	89.39	75.75	1244	n.s.	n.s.
DSO	67.12	58.66	1513	63.60	56.62	1334	**	*
DPO	69.99	46.26	1505	65.07	46.02	1317	n.s.	n.s.
ExBoSize	3.06	3.00	1478	3.62	3.00	1298	***	***
SupBoSize	5.77	4.00	1475	8.47	6.00	1289	***	***
MCap	1520.42	97.39	1360	4323.03	228.62	1117	***	***
DebtEqu	0.76	0.38	1365	0.851	0.47	1169	n.s.	***
Age	49.17	27.00	1558	62.708	36.00	1378	***	***
ROA	0.04	0.04	1505	0.028	0.03	1307	**	***
CF	0.02	0.02	1454	0.012	0.02	1239	n.s.	*
Growth	0.10	0.05	1501	0.089	0.05	1301	n.s.	n.s.
PPE	0.19	0.17	1526	0.201	0.16	1335	n.s.	n.s.

*Note: This table presents the summary statistics for the variables employed in the main regression models (pooled). The significance of differences is based on the t-test (means) as well as the Wilcoxon/Mann-Whitney test (median). Significance of differences at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.*

Figure A.1. Debt-equity-ratio (Median by year)



Notes: This graph presents the annual median debt-to-equity ratio by ownership (min. 25% blocking minority held by families) and family management presence (dummy) in executive boards.

Table A.2. Pierson/Spearman correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
(1) *CCC*		0.799*	0.373*	0.044	0.1*	0.092*	0.095*	-0.134*	0.097*	-0.09*	-0.01	-0.158*	-0.062*	0.014	0.085*	-0.118*	-0.121*	-0.121*	0.123*	0.031	-0.114*	-0.014	-0.029
(2) *DIO*	0.819*		0.074*	0.358*	0.123*	0.058*	0.056*	-0.067*	0.101*	-0.011	0.016	-0.104*	-0.06*	-0.001	-0.054*	-0.077*	-0.027	-0.039	0.199*	0.01	-0.101*	-0.028	0.131*
(3) *DSO*	0.353*	0.085*		0.302*	0.042	0.069*	0.092*	-0.095*	0.001	-0.072*	-0.054*	-0.1*	-0.007	0.052*	0.136*	-0.119*	-0.105*	-0.147*	-0.146*	-0.099*	-0.108*	0.022	-0.351*
(4) *DPO*	-0.12*	0.269*	0.267*		0.154*	0.021	0.031	0.115*	-0.023	0.119*	-0.038	-0.015	-0.023	0.046*	-0.111*	-0.018	0.149*	-0.001	0.021	-0.124*	-0.086*	0.009	-0.08*
(5) *TWC*	0.049*	0.049*	-0.001	-0.034		-0.345*	-0.381*	0.559*	-0.052*	0.556*	-0.224*	-0.096*	0.105*	0.093*	-0.188*	0.217*	0.855*	0.222*	0.464*	0.189*	0.051*	0.042	0.196*
(6) *Exec Fam (Dum)*	0.082*	0.057*	0.108*	0.017	-0.344*		0.974*	-0.162*	0.047*	-0.289*	0.351*	-0.098*	-0.082*	-0.168*	0.089*	-0.111*	-0.342*	-0.134*	-0.171*	-0.053*	-0.102*	0.059*	-0.131*
(7) *Exec Fam (%)*	0.083*	0.08*	0.128*	0.071*	-0.374*	0.841*		-0.247*	0.047*	-0.324*	0.339*	-0.1*	-0.095*	-0.165*	0.088*	-0.106*	-0.386*	-0.114*	-0.192*	-0.072*	-0.11*	0.053*	-0.147*
(8) *ExBoSize*	-0.142*	-0.118*	-0.096*	-0.038	0.589*	-0.195*	-0.304*		-0.076*	0.425*	-0.153*	-0.002	0.092*	0.058*	-0.079*	0.206*	0.612*	0.05*	0.127*	0.092*	0.067*	0.066*	0.102*
(9) *Sup Fam (%)*	0.075*	0.052*	0.003	-0.04	-0.135*	0.034	0.075*	-0.111*		-0.051*	0.399*	-0.152*	-0.114*	-0.134*	-0.032	-0.104*	-0.078*	-0.006	0.115*	0.062*	0.003	-0.013	0.084*
(10) *SupBoSize*	-0.155*	-0.084*	-0.134*	0.018	0.625*	-0.314*	-0.327*	0.566*	-0.213*		-0.248*	0.015	0.137*	0.064*	-0.139*	0.278*	0.511*	0.207*	0.287*	0.043	0.02	-0.035	0.214*
(11) *Family (%)*	0.019	0.036	-0.064*	-0.029	-0.216*	0.339*	0.283*	-0.183*	0.351*	-0.283*		-0.294*	-0.15*	-0.266*	0.013	-0.193*	-0.217*	-0.081*	-0.028	0.075*	0.014	-0.015	0.04
(12) *Corporation (%)*	-0.104*	-0.076*	-0.081*	0.007	-0.073*	-0.104*	-0.098*	-0.016	-0.115*	-0.012	-0.296*		-0.014	-0.082*	-0.007	0.047*	-0.032	0.07*	0.101*	-0.087*	-0.065*	0.006	0.113*
(13) *Bank (%)*	-0.061*	-0.071*	-0.016	-0.007	0.103*	-0.065*	-0.088*	0.196*	-0.097*	0.181*	-0.128*	-0.041		0.145*	0.043	0.117*	0.102*	0.066*	-0.037	-0.05*	-0.009	0.004	0.043
(14) *Finance (%)*	-0.012	-0.008	-0.001	0.001	0.08*	-0.177*	-0.161*	0.034	-0.16*	0.111*	-0.287*	-0.099*	0.075*		-0.012	0.048*	0.041	0.063*	-0.063*	-0.076*	-0.014	-0.026	-0.089*
(15) *Employee (%)*	0.04	-0.055*	0.122*	-0.064*	-0.121*	0.064*	0.033	-0.016	-0.059*	-0.078*	-0.079*	-0.039	0.01	-0.028		-0.048*	-0.158*	-0.195*	-0.191*	-0.024	0.031	0.031	-0.217*
(16) *Government (%)*	-0.092*	-0.08*	-0.092*	-0.03	0.191*	-0.107*	-0.091*	0.225*	-0.08*	0.379*	-0.165*	0.027	0.121*	0.053*	-0.035		0.224*	0.136*	-0.008	-0.107*	-0.05*	0.001	0.016
(17) *MCap*	-0.14*	-0.077*	-0.129*	-0.004	0.867*	-0.349*	-0.401*	0.631*	-0.134*	0.608*	-0.199*	-0.033	0.125*	0.047*	-0.13*	0.21*		0.056*	0.35*	0.344*	0.156*	0.13*	0.189*
(18) *DebtEqu*	-0.073*	-0.049*	-0.071*	-0.008	0.071*	-0.006	0.026	0.057*	-0.017	0.064*	-0.046	0.018	0.058*	0.069*	-0.033	0.11*	-0.046		0.225*	-0.215*	-0.132*	-0.094*	0.329*
(19) *Age*	0.095*	0.126*	-0.167*	-0.123*	0.447*	-0.17*	-0.185*	0.094*	0.031	0.287*	-0.006	0.144*	-0.081*	-0.037	-0.109*	0.008	0.331*	0.036		0.096*	0.024	-0.092*	0.402*
(20) *ROA*	-0.007	-0.029	-0.138*	-0.167*	0.193*	-0.052*	-0.1*	0.073*	0.053*	0.027	0.063*	-0.069*	-0.049*	-0.061*	-0.013	-0.052*	0.326*	-0.115*	0.101*		0.279*	0.331*	0.07*
(21) *CF*	-0.112*	-0.121*	-0.177*	-0.158*	0.049*	-0.083*	-0.089*	0.043	0.003	0.011	-0.01	-0.015	0.024	0.032	0.009	-0.059*	0.094*	-0.03	0.075*	0.239*		-0.059*	-0.062*
(22) *Growth*	-0.049*	-0.032	0.015	0.029	-0.047*	0.092*	0.056*	0.025	0	-0.061*	0.027	-0.049*	0.003	-0.029	0.003	-0.003	0.009	-0.051*	-0.139*	0.16*	-0.142*		-0.054*
(23) *PPE*	-0.129*	0.006	-0.35*	-0.013	0.062*	-0.121*	-0.131*	0.016	0.024	0.175*	0.032	0.175*	0.015	-0.084*	-0.1*	0.062*	0.083*	0.064*	0.344*	0.045	-0.003	-0.071*	

*Note: This table presents Pierson (lower half) and Spearman (upper half) correlation coefficients. Significance at the 5% level is indicated by *.*

Table A.3. Average cash conversion cycle/CCC components (Supervisory board)

Variables	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
	Avg. CCC	*Avg. CCC*	*Avg. CCC*	*Avg. DIO*	*Avg. DSO*	*Avg. DPO*
Sup Family (%)	33.27**		40.25***	3.088	0.295	-11.64
	(13.51)		(14.65)	(21.24)	(11.82)	(11.34)
*SuF(%) * Exec (Dum)*		64.57***				
		(13.64)				
Exec Family (%)			46.18***	36.34**	9.237	20.74**
			(16.25)	(17.95)	(10.90)	(8.59)
Family (%)	16.75*	17.66*	13.35	12.93	-6.135	9.039
	(9.36)	(9.35)	(8.90)	(10.61)	(6.55)	(7.88)
Corporation (%)	15.51	16.95	17.05	14.55	-14.75**	-3.711
	(10.89)	(10.94)	(11.56)	(14.50)	(7.10)	(7.47)
Bank (%)	-10.55	-11.25	-13.54	-44.39	1.424	-15.68
	(53.30)	(53.72)	(53.32)	(42.03)	(18.28)	(21.86)
Finance (%)	-0.370	-0.126	-0.539	16.07	-12.51**	6.507
	(13.76)	(13.95)	(13.49)	(11.13)	(6.03)	(8.35)
Employees (%)	7.919	11.43	-4.435	37.39	-41.68	5.405
	(31.33)	(30.71)	(32.24)	(40.09)	(33.86)	(23.78)
Government (%)	21.80	24.92	32.09	15.99	26.18	-20.51
	(30.05)	(29.60)	(29.02)	(30.10)	(53.19)	(36.79)
Exec Board Size			2.390*	0.747	1.047	-0.126
			(1.36)	(1.08)	(0.83)	(0.77)
Sup Board Size	1.739***	1.541**	1.547**	1.822***	-0.0627	-0.217
	(0.66)	(0.63)	(0.65)	(0.68)	(0.43)	(0.42)
R^2	0.0475	0.0538	0.0661	0.0968	0.138	0.0911
R^2 (Adj.)	0.0399	0.0463	0.0576	0.0887	0.130	0.0832
N	1893	1891	1891	1910	2030	1957
Controls	Yes	Yes	Yes	Yes	Yes	Yes
FE	Yes	Yes	Yes	Yes	Yes	Yes
Robust	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: This table presents the regression results of the CCC components fixed-effects regression models. Models apply robust standard errors, include a constant and cover the period from 2000 to 2013. Standard errors are presented in parentheses. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.*

Table A.4. Cash conversion cycle (CEO/Founder/Chairman influence)

Variables	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*
	CCC	*CCC*	*CCC*	*CCC*	*CCC*
Family CEO	14.62	-2.121			
	(10.18)	(12.02)			
Founder CEO			13.44		
			(15.18)		
Founder Inv				20.72	
				(12.88)	
Sup Family Chair					11.81
					(8.44)
Exec Family (%)		55.27**			
		(25.31)			
Family (%)	29.02	28.30	29.20	28.63	31.06
	(23.73)	(23.68)	(23.90)	(23.73)	(23.66)
Corporation (%)	25.65*	28.34*	25.71*	25.59*	25.60
	(15.41)	(15.43)	(15.50)	(15.47)	(15.57)
Bank (%)	14.08	15.40	13.45	8.590	22.28
	(58.32)	(59.87)	(58.45)	(58.52)	(56.62)
Finance (%)	8.823	9.858	8.861	8.416	10.26
	(14.94)	(14.70)	(14.84)	(14.81)	(15.10)
Employees (%)	25.08	27.26	28.04	23.87	28.87
	(38.22)	(37.98)	(38.58)	(39.00)	(37.96)
Government (%)	39.59	46.71	39.61	43.30	31.10
	(52.09)	(50.62)	(52.00)	(50.55)	(53.19)
Exec Board Size	2.142	3.168**	2.292	2.217	
	(1.49)	(1.53)	(1.52)	(1.47)	
Sup Board Size					1.383*
					(0.71)
R^2	0.0330	0.0457	0.0313	0.0351	0.0318
R^2 (Adj.)	0.0254	0.0378	0.0237	0.0275	0.0242
N	1942	1942	1938	1942	1924
Controls	Yes	Yes	Yes	Yes	Yes
FE	Yes	Yes	Yes	Yes	Yes
Robust	Yes	Yes	Yes	Yes	Yes

*Notes: This table presents the regression results of the CCC fixed-effects regression models on board-lead positions. Models apply robust standard errors, include a constant and cover the period from 2000 to 2013. Standard errors are presented in parentheses. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.*

Table A.5. Cash conversion cycle by largest industries (Executive board)

Variables	(1)	(2)	(3)	(4)	(5)
	Manufacturing	Service	Non-manufacturing	Non-service	Non-manufacturing/ Service
Exec Family (%)	58.71*	31.57	47.06**	69.40***	86.48**
	(30.48)	(30.27)	(23.54)	(24.49)	(33.80)
Family (%)	33.47	-2.338	11.86	37.60	30.44
	(30.95)	(26.11)	(26.35)	(26.26)	(48.50)
Exec Board Size	2.457	5.922*	5.675*	2.573	4.859
	(1.67)	(3.20)	(3.01)	(1.75)	(4.96)
R^2	0.0625	0.0887	0.104	0.0669	0.197
R^2 (Adj.)	0.0505	0.0563	0.0854	0.0575	0.157
N	1186	438	756	1504	318
FE	Yes	Yes	Yes	Yes	Yes
Robust	Yes	Yes	Yes	Yes	Yes
Ownership	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes

*Notes: This table presents the regression results of the CCC fixed-effects regression models by industry. Models apply robust standard errors, include a constant and cover the period from 2000 to 2013. Standard errors are presented in parentheses. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.*

Table A.6. Cash conversion cycle by median size (Executive board)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Revenue		Market capitalization		Total assets	
	< Median	≥ Median	< Median	≥ Median	< Median	≥ Median
Exec Family (%)	81.41***	14.77	61.65**	31.51	75.75**	27.39
	(28.91)	(13.08)	(29.50)	(23.51)	(29.11)	(22.19)
Family (%)	47.48	4.342	51.12	16.19	41.32	21.42
	(44.23)	(8.90)	(43.80)	(10.42)	(48.38)	(14.25)
Exec Board Size	8.289**	1.358	8.120**	1.325	5.102*	1.243
	(3.77)	(1.14)	(3.90)	(1.21)	(2.93)	(1.38)
R^2	0.0978	0.0727	0.106	0.0605	0.0825	0.0536
R^2 (Adj.)	0.0797	0.0608	0.0886	0.0481	0.0638	0.0415
N	763	1179	798	1144	754	1188
FE	Yes	Yes	Yes	Yes	Yes	Yes
Robust	Yes	Yes	Yes	Yes	Yes	Yes
Ownership	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: This table presents the regression results of the CCC fixed-effects regression models of the sample split by size. Models apply robust standard errors and cover the period from 2000 to 2013. Standard errors are presented in parentheses. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.*

Table A.7. Definition of variables

Variables	Definition
CCC	DIO + DSO – DPO
DIO	Inventory / Cost of goods sold + 365
DSO	Accounts receivable / Total revenue * 365
DPO	Accounts payable / Cost of goods sold + 365
Avg. CCC	Avg. DIO + Avg. DSO – Avg. DPO
Avg. DIO	$((\text{Inventory}_{t} + \text{Inventory}_{t-1}) / 2) /$ Cost of goods sold * 365
Avg. DSO	$((\text{Accounts receivable}_{t} + \text{Accounts receivable}_{t-1}) / 2) /$ Total revenue * 365
Avg. DPO	$((\text{Accounts payable}_{t} + \text{Accounts payable}_{t-1}) /2) /$ (Cost of goods sold – $\text{Inventory}_{t-1} + \text{Inventory}_{t}$) * 365
Exec Family (Dum)	Dummy variable that take the value of 1 when a family member belongs to the executive board
Exec Family (%)	Number of family members on the executive board divided by the number of executive board members
Sup Family (%)	Number of family members on the supervisory board divided by the number of supervisory board members
*SuF(%) * Exec (Dum)*	Sup family (%) * Exec family (Dum)
Family (%)	Cumulative percentage of voting rights held by families (excl. family foundations or family offices)
Corporation (%)	Cumulative percentage of voting rights held by corporations
Bank (%)	Cumulative percentage of voting rights held by banks
Finance (%)	Cumulative percentage of voting rights held by other financial institutions
Employees (%)	Cumulative percentage of voting rights held by employees
Government (%)	Cumulative percentage of voting rights held by governments
Exec Board Size	Number of executive board members
Sup Board Size	Number of supervisory board members
MCap	Natural logarithm of the last close shares outstanding * Last close price
DebtEqu	Total debt (excl. current/other liabilities) / Total equity
Age	Natural logarithm of the observation year minus the year of foundation
ROA	EBIT / $((\text{Total assets}_{t} + \text{Total assets}_{t-1}) /2)$
CF	Levered free cash flow / Total revenues
Growth	$\text{Total revenue}_{t} /$ Total revenue_{t-1} – 1
PPE	Natural logarithm of net property, plant and equipment

Notes: This table presents the definitions of the model employed in the general regression models. Variables employed in robustness models are described in the respective section.