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FAMILY CONTROL AND CAPITAL STRUCTURE: EVIDENCE FROM POLAND

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Purpose: Identification of family firms' debt factors, considering the family's share in ownership, management, and supervision, as well as control factors, including sectoral and internal ones.
Design/methodology/approach: The analysis covered 163 family firms listed on the Warsaw Stock Exchange. For these companies, a linear model of cross-sectional data from 2023 was estimated using the quantile estimation method.
Findings: The relationship between the variables characterizing the family's share in ownership, management and supervision and the structure of capital is both positive and negative, which in both cases is in line with agency theory. The non-debt tax shield (NDTS) exerted a positive, statistically significant impact on all quartiles of total debt and the second and third quartiles of short-term debt. Moreover, the strength of this influence is the greatest among all explanatory variables selected for analysis. The positive relationship between the non-debt tax shield and the capital structure is consistent with the assumptions of agency theory. The influence of family share factors in ownership, management, and supervision was statistically significant for most variables for the first, second, and third quartile of total debt. In the case of short- and long-term debt this impact was statistically significant mainly for the first quartile of debt.
Research limitations/implications: In this study, we used only the listed family firms' data so we can interpret the results only for this kind of firms. We cannot generalize these results on the non-public family firms and specially on SMEs. The research is a contribution to further analyses which covers all types of family firms.
Practical implications: Knowing the characteristics describing the variables characterizing the family's share in ownership, management and supervision, analysts can determine based on estimated models what capital structure is typical for a given family firm.
Originality/value: This study, for the first time, provides comprehensive analyses of the capital structure of public family companies from Poland using unique dataset which highlights the relationship between financial decisions and corporate governance attributes such as family's

share in ownership, management, and supervision. It also considers the impact of sectoral and internal determinants on family firms' capital structure.

Keywords: corporate governance, family firms, leverage, capital structure, agency theory.

Category of the paper: Research paper**.**

1. Introduction

Family firms play a key role in the global economy. These entities are the most common business model in practice. Therefore, they are the driving force that stimulates development processes in individual countries (Tran, Nguyen, 2023). The literature emphasizes that due to the special form of ownership concentration (Wang, Shailer, 2017) and the so-called socio-emotional wealth (Gomez-Mejia et al., 2007), family firms are significantly different from other entities. Previous studies have proven that family firms are characterized by significant risk aversion, strong control incentives and place a high value on their reputation and image, important influences on decisions are not only economic goals but, uniquely, also non-economic ones (Williams, 2018). These unique characteristics of family firms shape the specifics of their activities in various areas (Albinzano et al., 2021). Thus, they influence the financial decisions of these companies, and it can also be said for (Gallo et al., 2004) that these entities follow a special logic of financing. Financial decisions of these entities have been defined by many theories such as trade-off, pecking order and especially agency theory. There are many empirical studies on family firms' capital structure in the literature, mostly from America and Western Europe. This research is inconclusive in terms of the driving factors that influence family firms' financial decisions and heterogeneous characteristics of family firms across different regions and endogeneity issues (Hansen, Block, 2021). Increasingly, the literature indicates that the reason for the different research results is the institutional setting in which family firms operate (Lohwasser et al., 2022). Formal national institutions determine the level of protection of property rights or minority stakeholders and, through this, can influence decision-making on the manner of financing, especially of family businesses. The purpose of the article is to identify the family firms' debt factors, considering the family's share in ownership, management, and supervision, as well as control factors, including sectoral and internal factors in a post-transitional country. The study, for the first time, provides comprehensive analyses of Polish listed family firms' financial decisions using unique dataset which exposes the relationship between capital structure and corporate governance. The research considers the impact of the identified factors on total debt and in terms of long-term and short-term debt. In the literature on Polish family firms, only a few studies on this topic can be found, so this article also aims to fill the gap in this area. In addition, the use of quantile estimation, which is new in this type of analysis, allowed us to identify the significance of individual capital structure factors by their quantile distribution.

The realization of the purpose of the article required the verification of two main research hypotheses:

1. As the family's share in ownership increases, the level of total, long-term and short-term debt changes significantly.
2. Family supervision of the company is the dominant factor in the level of total, long-term and short-term debt.
3. The family firms debt level behaves in accordance with the agency theory.

The verification of the hypotheses required answering questions about the links between the various capital structure factors and the amount of debt. Therefore, the influence of a set of factors reflecting the level of control of the company by family members, the business sector, and determinants of an internal nature on leverage was examined. So that it was possible to determine whether these companies make financial decisions in accordance with the theory of agency, pecking order or trade-off.

The above hypotheses were verified using appropriate statistical tests. The calculations were carried out using the Gretl software. The analysis included 163 family firms listed on the Warsaw Stock Exchange. For these companies, a linear model of cross-sectional data from 2023 was estimated using quantile estimation.

The article consists of an introduction, five parts, a conclusion, and description of future research proposals and limitations. Part one presents views on the family firms' capital structure formation in the light of agency, trade-off and pecking order theories. The second part reviews research on the family firms' capital structure in Poland. Then the methodology, results of the research and discussion are presented, and the conclusion summarizes the research.

2. Family firms' capital structure in the light of agency, trade-off, and pecking order theory

In the light of agency theory, capital structure is shaped under the influence of the so-called agency conflict between company owners, managers, and creditors (Jensen, Meckling, 1976). In other words, the level of leverage is a product of the interaction between these stakeholders. Therefore, according to the agency theory, the level of debt of family firms can be both higher and lower compared to other non-family firms (Hansen, Block, 2021). Jensen and Meckling (1976) state that a firm's ownership structure influences its cash flow. It means that an appropriate mix of debt and equity can reduce overall agency costs. Therefore, family firms with concentrated ownership structures are less susceptible to agency problems than nonfamily firms (Saidat et al., 2019). In family firms, agency costs tend to be lower than in non-family firms, especially if family members hold management positions. Such a situation ensures a congruence of interests between the management and the owners of the firm. Therefore,

family firms with concentrated ownership structure are less susceptible to agency problems than nonfamily firms (Saidat et al., 2019). In addition, owners have a strong incentive to monitor the firm's activities due to the high value of their shares in the firm. This is also true in cases where owners are not actively involved in the management of the firm. Lower agency costs lead to a lower need for debt capital. Therefore, debt ratios are relatively lower in family firms than in non-family firms (Grossman, Hart, 1980). The reasons for low leverage in family firms can also be traced back to behavioural agency theory (Wiseman, Gomez-Mejia, 1998). The level of diversification of the firm's ownership structure is assumed to be positively related to the firm's investment risk (Lyandres et al., 2019). Family firms' owners show low levels of diversification. Moreover, they place a high value on so-called socioemotional wealth (SEW) (Gómez-Mejía, 2007). Higher leverage leads to an increase in the risk of bankruptcy, thus increasing the firm-specific risk. In this situation, the threat to the family's socioemotional wealth increases. The fear of losing SEW discourages family firms' owners from making risky strategic decisions, which explains lower leverage ratios (Jara, Pinto-Gutiérrez, Núñez, 2018). In extreme cases, this leads to a complete abandonment of the use of debt and, therefore, zero leverage (Strebulaev, Yang, 2013). In the context of concerns about the loss of SEW, it is important to mention the high-risk aversion in family firms and the associated reluctance to invest in the high-tech area, which translates into low R&D spending (Chrisman, Patel, 2012). This is tantamount to the fact that family firms prefer traditional activities. The above arguments explain the negative impact of the family status of a company on its leverage level.

Financing patterns in family firms can also be shaped by agency conflict between majority and minority shareholders. When a dominant shareholding is in the hands of a family and its members occupy the positions of chief executive officers (CEOs), there may be a preference for private interests over those of minority shareholders (Shleifer, Vishny, 1997). In an environment of such concentrated power, family members have the exclusive power to determine the strategic direction of the company and are reluctant to relinquish control of the company. In such a situation, taking on debt may be the preferred instrument for financing investment because, unlike issuing new shares, it does not lead to capital dilution and thus allows control of the firm to be maintained. Furthermore, a higher leverage ratio reduces the risk of a hostile takeover (Stulz, 1988). In such a situation family firm status has a positive effect on firms' capital structure.

Taking into account control of the firm, capital structure decisions in family firms can be considered according to the pecking order theory (Myers, 1984; Myers, Majluf, 1984). In this context, family firms, once retained earnings have been exhausted, will turn first to debt and only then to issuing new shares to finance new investments.

In both the trade-off (Jensen, Meckling, 1976; Myers 1977; Haugen, Senbet, 1978) and the pecking order theory, the level of debt is shaped by a range of factors, both internal and external. In this study, profitability, asset structure, liquidity, growth opportunities, risk, depreciation (non-interest tax shield) and company size were selected for empirical verification.

These variables with theoretical predictions as to the direction of their impact on debt ratio, are summarized in Table 1.

Table 1.
Explanatory variables predicted influence on debt ratio

Explanatory variable	Expected influence	
	Trade off-theory	Pecking order theory
TANG (Asset tangibility)	+	-
LIQ (Financial liquidity)	+	-
NDTS (Deprecation)	-	-
ROA, ROE (Profitability)	+	-
GR (Firm growth)	-	+
RISK (Risk)	-	-
SIZE (Firm size)	+	+/-

Source: own study.

3. Empirical studies on the capital structure of family firms in Poland

Only a few studies on Polish family firms' capital structure formation can be found in the literature. Depending on the sample, these studies find contradictory conclusions regarding the size of the debt of Polish family firms. Thus, Winnicka-Popczyk (2008), Stradomski (2010), Kaźmierska-Jóźwiak and Marszałek (2012), and Martyniuk (2015) showed that the debt ratio in family firms in Poland is significantly lower than in other entities. According to the authors, reluctance to debt financing is due, firstly, to fear of reduced financial independence and loss of control over the enterprise. Secondly, possible difficulties in repaying debts may lead to a worsening of the family's situation. Pernsteiner and Węcławski (2016), on the other hand, showed that family firms in Poland finance themselves with equity to a greater extent than non-family firms, but the difference is not large. It is also worth noting that family firms generally prefer to finance their operations and investments from retained earnings, only further opening up to debt financing and, as a last resort, external capital (Kawko, 2019). This means that these companies shape their capital structure according to the pecking order theory.

Hansen, Block (2021) conducted a meta-analysis on 869 effect sizes from 613 studies. They found an overall slightly negative but significant relationship between family firm status and leverage. Their results reveal a large amount of heterogeneity and considerable mean effect size differences across the 48 countries included in the study. According to these authors, in Poland, the family status of a firm has a statistically significant positive impact on the amount of debt. Furthermore, in Poland, family firms have on average higher leverage ratios than nonfamily firms. Similar conclusions were reached by Jewartowski and Kałdoński (2012). The authors proved that public family companies make strategic decisions on diversification of activities in close connection with decisions on capital structure. The primary motive for

decisions regarding both diversification of activities and capital structure is the desire to maintain control over the company while ensuring that activities are financed at a level adequate to the demand resulting from the company's development strategy. Diversification of activities favors increasing the share of debt in the capital structure by increasing the company's debt capacity. Moreover, among all diversified companies, family companies were more indebted than non-family companies.

Socha (2017) analysed the capital structure factors of family firms based on a research sample including Polish small and medium-sized family firms that provided data on ownership structure and composition of management board between 2010 and 2013. The author indicates that as family involvement in ownership increased, the degree debt in the capital structure increased. Family firms with moderate levels of family involvement in management made less use of debt. The same author (Socha, 2015) in an earlier study highlighted that family firms finance investment activities using internal sources of capital and use debt to cover operating expenses.

4. Methods and dataset

The exact definition of the notion of family firm is debatable and no single precise definition has been developed to date. The research uses the definition recommended by the European Commission (EC) (2009)[1], based on which the definition of a family firm for the WIG Rodzinny index was developed. In Poland listed companies meet the definition of the family firm if the person who established or acquired the entity (share capital) or their families or descendants possess 25% of the decision-making rights mandated by their share of wealth. According to EC recommendations we add to our definition that at least one representative of the family or relatives is formally involved in the management of the company.

The subjects of the analysis entailed family-owned companies listed in 2023 (as of June 10, 2023) on the main stock exchange market in Poland. The Warsaw Stock Exchange sample encompassed 166 family firms (39,9% of all listed companies). Three entities were excluded from the analysis. Two of them did not publish full financial statements during the period under examination. One of the companies was a bank. Due to the different financial statements, it was not possible to obtain data to verify capital structure internal determinants. Ultimately, 163 companies, i.e., 98% of the entities selected initially, were qualified for the study.

[1] Polish family firms researchers affiliated to the FABERNET scientific network recommend similar criteria for family firms research.

The proposed model takes the form:

$$y_i = \beta_0 + \sum_{j=1}^{17} \beta_j x_{ji} + \varepsilon_i \quad (1)$$

where:
y_i is the explained variables, represented by the debt ratio in three forms: as a total debt ratio (TDR), short-term debt ratio (SDR), and the long-term ratio (LDR),
x_{ji} is the set of explanatory variables, such as OWN, INDUSTRY, GR, SIZE, TANG, ROA, ROE, LIQ, NDTS, RISK, FIO, CEO, MB, SB, CSB, FIM and FIS,
$\beta_0, \beta_1, \ldots, \beta_{17}$ are the structural parameters,
ε_i is the error term.

In the first step, the model was estimated by the ordinary least squares estimation method (OLS). Then quantile regression was in use quantile regression taking quantiles at 0.25; 0.5 and 0.75 with all variables and then with statistically significant variables, respectively. This method makes it possible to refer to the values of the assumed quantiles of the modelled variable. The main advantage of this approach over OLS is the resistance to the influence of outliers, as well as the lack of the need for assumptions as to the shape of the dependent variable. The application of quantile estimation to assess the impact of selected factors on the debt level of family businesses is a relatively new approach to this issue. This is because this approach will allow us to identify whether these factors change with a change in the modelled debt level quantile.

5. Results

In this section, we will present the results of descriptive statistics characterizing the level of debt (long- and short-term) among family firms in different quartiles and the impact of internal factors on capital structure. Table 2 presents the average values, standard deviation, median, first and third quartile and interquartile range of the indicators of total, short-term and long-term debt, i.e. the endogenic variables and all explanatory variables in family companies listed on the Warsaw Stock Exchange in 2023.

Table 2.
Characteristics of the variables for family firms listed on WSE in 2023

variable	mean	stand. dev.	median	Q1	Q3	interq. range
TDR (Total debt ratio)	0,573	0,802	0,469	0,272	0,624	0,352
SDR (Short debt ratio)	0,439	0,799	0,307	0,163	0,436	0,273
LDR (Long term ratio)	0,140	0,129	0,108	0,045	0,190	0,145
GR (Firm growth)	-0,034	0,968	0,139	-0,016	0,243	0,259
SIZE (Firm size)	17,084	1,649	17,212	15,987	18,031	2,044
TANG (Asset tangibility)	0,196	0,199	0,113	0,032	0,328	0,296
ROA (Profitability)	0,063	0,931	0,047	0,010	0,094	0,084
ROE (Profitability)	0,474	3,916	0,095	0,016	0,197	0,182
LIQ (Financial liquidity)	3,332	7,361	1,629	1,057	2,740	1,683
NDTS (Deprecation)	0,045	0,083	0,030	0,011	0,051	0,040
RISK (Risk)	4378070	12847148	1363924	510995	3138298	2627302
FIO (Family Involvement in Ownership)	50,49%	20,14%	49,9%	32,07%	64,65%	32,58%
FIM (Family Involvement in Management Board)	40,69%	36,83%	33,33%	0,00%	57,50%	57,50%
FIS (Family Involvement in Supervisory Board)	16,59%	16,18%	16,66%	0,00%	25,00%	25,00%
CEO (Chief Executive Officer)	-	-	1	0	1	1
MB (Management Board Member)	-	-	0	0	1	1
SB (Supervisory Board Member)	-	-	0	0	1	1
CSB (Chairman in Supervisory Board)	-	-	0	0	1	1
OWN (Direct* or Indirect Ownership**)	-	-	1	1	1	0
INDUSTRY (Traditional or Innovative)	-	-	1	1	1	0

* Family members are the shareholders.
** The shares of the family firm are held by another entity, which in turn is owned by family members.
CEO, MB, SB, SCB are the dummy variables with 1 for family members, and 0 otherwise.
OWN direct 1, 0 otherwise.
INDUSTRY Traditional 1, 0 Innovative.

Source: own elaboration.

As can be seen in Table 2, the values of the total debt ratio calculated for family companies listed on the WSE in 2023 were at varying levels. The median of this indicator was 0.469. This means that the total debt of 50% of the family firms surveyed was at this level or lower. In contrast, the remaining 50% of companies had a total debt ratio of 0.469 or more. The high variability of the total debt ratio in family companies is also evidenced by its values determined for the first and third quartiles, amounting to 0.272 and 0.624 respectively. This is also confirmed by the high value of the interquartile range (0.352) of the total debt ratio in relation to the interquartile range determined for the short- and especially long-term debt ratios (0.273 and 0.145 respectively). It can therefore be concluded that family firms listed on the WSE exhibit differing debt capital requirements. These differences relate to particular to the size of total debt and short-term debt. On the other hand, the small value of the interquartile range determined for the long-term debt ratio indicates similar values of this variable in all entities.

Among the internal factors shaping the capital structure, the largest variation concerns company size (SIZE). As can be seen in Table 2, the variation in the middle 50% of units after discarding extreme values is as high as 2.044 for this variable. On the other hand, the smallest

value of the interquartile range was recorded in the case of the investment tax shield (0.040), which indicates similar values of this variable in all companies.

Of the variables reflecting family participation in ownership, management and supervision, the highest variation in the middle 50% of units is found in the participation of family members in the company's management board (57.5%). In contrast, after discarding extreme values, the least differentiated variable is the share of family members on the supervisory board (25%). Due to the dichotomous nature of the variables, the mean and standard deviation were not calculated for the last six factors depicting the family nature of the company (Table 2).

In Tab. 3, 4 and 5 the proposed model for TDR, LDR and SDR was estimated first using the OLS method with all proposed variables (column 1) and omitting statistically insignificant variables (column 2). In the next step, quantile regression was used taking quantiles at 0.25; 0.5 and 0.75 with all variables and then with statistically significant variables, respectively.

The first quartile, i.e. the quantile of 0.25 of total debt (TDR), is significantly influenced by all the variables considered. When analysing the influence of factors on the second quartile of the TDR, i.e. the median, it is the variables in column 5 that have an influence, while for quartile III, i.e. the quartile of 0.75, it is the factors in column 7 (Tab. 3).

Table 3.
Estimates of the total debt ratio for family firms listed on WSE in 2023

Method	**OLS**		**Quantile regression**				
Quantile			**0.25**	**0.5**		**0.75**	
model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
const	3.133***	3.402***	-0.730***	-0.561**	0.512***	-0.367	-0.174**
OWN	0.057		-0.069***	0.014		0.044	
INDUSTRY	0.359**	0.365**	0.046***	0.023		0.109	0.155***
GR	-0.118		0.057***	-0.006		-0.028	0.014**
SIZE	-0.164***	0.176***	0.061***	0.055***	0.052***	0.045**	0.035***
TANG	0.342		-0.086***	-0.208*	-0.131**	-0.261*	-0.227***
ROA	0.104		-0.336***	-0.001		-0.152***	-0.113***
ROE	-0.001		0.017***	0.015***	0.015***	0.012*	0.011***
LIQ	-0.017*	0.021***	-0.008***	-0.011***	-0.011***	-0.009**	-0.011***
NDTS	1.712	1.635**	1.087***	2.393***	1.802***	2.921***	2.959***
RISK	<0.001**	<0.001***	-<0.001***	<-0.001		<-0.001	
FIO	-0.001		-0.002***	-0.004	-0.004*	-0.005	0.006***
CEO	0.045		0.061***	0.025		0.032	
MB	0.021		0.139***	0.172***	0.101***	0.130*	0.081***
SB	-0.054		0.023***	-0.051		-0.069	
CSB	0.054		0.013***	-0.035		-0.022	
FIM	-0.500	0.448***	-0.083***	-0.120		-0.110	
FIS	-0.487		0.021***	0.411	0.172**	0.466	
R-squared	0.231	0.197					
Log-likelihood			-30.075	-47.739	-50.234	-99.798	-102.557
Sum sq. res.	0.750	76.413	42.946	96.218	96.672	101.127	96.657
Akaike crit.	351.764	336.170	96.150	131.479	118.468	235.595	227.114

*) **) ***) statistically significant at the level of 0.1, 0.05, and 0.01 respectively.

Source: own elaboration.

As can be seen in Tab. 3, the level of total debt significantly depends on the form of shareholding in the company considering indirect or direct ownership (OWN). This means that in companies with direct family ownership, the level of the first quartile of debt is lower than in other family firms. Another variable with a statistically significant impact on capital structure is the sector of activity (INDUSTRY) taking into account either traditional or innovative activities. This means that for traditional activities, the level of the first and third quartiles of debt is higher than in companies with modern activities. In contrast, no such impact was observed for the entities included in the median.

Growth opportunities (GR) had a statistically significant positive impact for the first and third quartiles of total debt. The size of the company (SIZE) exerted a statistically significant positive effect for all debt quartiles of the family firms studied. This means that the larger the company, the higher its leverage level. Asset structure, on the other hand, had a negative effect on the amount of total debt of the surveyed entities. This regularity was noted for all debt quartiles. Interestingly, profitability, depending on the measure used, had an impact on total debt in a different direction. Thus, for ROA, the impact was negatively statistically significant. By contrast, for ROE, the opposite relationship was noted. However, for the first and third quartiles of debt, the impact is stronger for ROA. Liquidity (LIQ) had a negative impact for all quartiles of total debt. However, its strength was low. Also, in the case of risk (RISK), there was a very weak, statistically significant negative impact for the first quartile of debt of the surveyed family firms. In the case of the non-interest tax shield (NDTS), there was a statistically significant positive effect of this variable on all quartiles of debt of the family firms studied. It is noteworthy that the strength of this impact is the highest among all explanatory variables selected for the analysis.

Positive effects of variables characterizing family participation in ownership, management and supervision were observed for the percentage of family involvement in ownership (FIO) for the third quartile of debt, the affiliation of the company's CEO to the family (CEO) for the first quartile of debt, the presence of a family member on the management board (MB) for the first, second and third quartiles of debt, the presence of a family member on the supervisory board (SB) to the first quartile of debt, the supervisory board chairman's family affiliation (CSB) to the first quartile of debt and the participation of family involvement in supervisory board (FIS) to the third quartile of debt. However, given the strength of influence and the impact of the variable on all debt quartiles, the most important factor of the above is the presence of a family member on the management board (MB).

The first quartile (quantile of 0.25) of short-term debt of family firms is significantly influenced by the factors in column (4). The median of short-term debt is influenced by the variables in column (6). The third quartile, on the other hand, is influenced by the factors in column (8), as shown in Tab. 4.

Table 4.
Estimates of the short-term debt ratio for family firms listed on WSE in 2023

Method			**Quantile regression**					
Quantile	**OLS**		**0.25**		**0.5**		**0.75**	
model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
const	3.510***	3.793***	-0.043	0.075***	0.161	0.277***	0.409	0.212***
OWN	0.097		0.042*	0.049***	0.036		0.114**	0.074***
INDUSTRY	0.356**	0.359**	0.048**	0.044***	0.038		0.164***	0.177***
GR	-0.107		0.048***	0.044***	0.026		-0.027	0.030***
SIZE	-0.195***	-0.205***	0.009	0.012***	0.004		-0.012	
TANG	0.339		0.103**	0.105***	-0.252***		-0.380***	-0.392***
ROA	0.086		-0.055***	0.054***	-0.001		-0.060***	-0.015***
ROE	-0.001		0.015***	0.015***	0.016***	0.014***	0.012***	0.013***
LIQ	-0.016	-0.020**	-0.006***	-0.006***	-0.013***	-0.014***	-0.009***	-0.009***
NDTS	1.610*	1.574**	-0.006		1.187***	1.615***	3.062***	3.166***
RISK	<0.001***	<0.001***	<-0.001	<0.001***	<-0.001		<-0.001	<-0.001***
FIO	-0.001		-0.003**	-0.003***	-0.003		-0.004	-0.004***
CEO	0.046		0.015		0.026		0.074	0.081***
MB	-0.021		0.071***	0.064***	0.126***		0.123**	0.094***
SB	-0.058		-0.030	-0.025***	0.045		-0.111	-0.156***
CSB	0.045		-0.056*	-0.053***	0.072		-0.083	0.081***
FIM	-0.523	-0.493***	-0.094**	-0.075***	-0.073		-0.223**	-0.177***
FIS	-0.413		0.272**	0.231***	-0.091		0.871***	0.944***
R-squared	0.246	0.218						
Log-likelihood			-14.621	-14.865	-42.335	-48.223	-99.572	-99.739
Sum sq. res.	71.241	73.927	104.163	103.997	94.878	91.387	93.142	92.774
Akaike crit.	347.796	331.275	65.242	61.215	120.670	104.447	235.144	233.479

*) **) ***) statistically significant at the level of 0.1, 0.05, and 0.01 respectively.

Source: own elaboration.

As can be seen from Tab. 4, the amount of short-term debt is significantly influenced by the form of ownership in the company considering indirect or direct ownership (OWN). In entities where the family had direct ownership in the case of the first as well as the third quartile of short-term debt, its level is higher than in other family firms. The capital structure was influenced in an identical way by the sector of activity (INDUSTRY). In the case of traditional activities, the level of the first and third quartiles of short-term debt is higher than in those with modern activities.

Growth opportunities (GR) had a significantly positive impact on the first and third quartile of short-term debt of the family firms under study. In contrast, company size (SIZE) had a statistically significant positive effect only on the first quartile of short-term debt of the analysed entities. Asset structure (TANG) had a positive effect on the first quartile of short-term debt of the entities under study and a negative effect on the third quartile. The same patterns were noted for the impact of return on assets. On the other hand, in the case of profitability expressed by ROE, the impact was positively statistically significant for all quartiles of short-term debt of the family firms surveyed. Liquidity (LIQ) had a negative impact

for all quartiles of short-term debt. Risk (RISK) had a very weak, statistically significant negative effect for the first and third quartiles of short-term debt of the family firms surveyed.

The non-interest tax shield (NDTS) has a statistically significant positive effect on the second and third quartiles of short-term debt of the family firms studied, and the strength of this effect is the largest of all the explanatory variables selected for the analysis.

The impact of factors characterizing family participation in ownership, management, and supervision on short-term debt in our group of entities shows both a positive and negative direction. A negative effect of variables characterizing family participation in ownership, management and supervision was recorded for the percentage of family involvement in ownership (FIO) on the first and third quartiles of short-term debt, the presence of a family member on the supervisory board (SB) on the first and third quartiles of short-term debt, the supervisory board chairman's family affiliation (CSB) on the first quartile of short-term debt and the participation of family involvement in management board (FIM) on the first and third quartiles of short-term debt. In contrast, a positive effect of the variables characterizing family participation in ownership, management and supervision was observed for the CEO's family affiliation (CEO) on the third quartile of short-term debt, the presence of a family member on the management board (MB) on the third quartile of short-term debt, the supervisory board chairman's family affiliation (CSB) on the third quartile of short-term debt and the participation of family involvement in supervisory board (FIS) on the first and third quartiles of short-term debt.

In Tab. 5. in columns (4); (6) and (8) the factors significantly affecting the first, second and third quartiles of long-term debt of the Polish public family firms, respectively.

Table 5.
Estimates of the long-term debt ratio for family firms listed on WSE in 2023

Method	**OLS**		**Quantile regression**					
Quantile			**0.25**		**0.5**		**0.75**	
model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
const	-0.438***	-0.457***	-0.220***	-0.198***	-0.327**	-0.466***	-0.288*	-0.534***
OWN	-0.027		-0.020	-0.017***	-0.020		-0.053*	
INDUSTRY	0.020		-0.021	-0.012***	0.026		0.060**	
GR	-0.007		0.003		-0.003		-0.011	-0.025**
SIZE	0.033***	0.004***	0.017***	0.015***	0.024***	0.034***	0.026***	0.041***
TANG	-0.034		0.076**	0.083***	0.033		-0.075	
ROA	0.017		0.010	0.010***	0.013		0.015	
ROE	<0.001		0.001	0.001***	<0.001		-0.001	
LIQ	<0.0001		<0.001	<0.001***	<0.001		-0.001	
NDTS	0.093		-0.004		0.017		0.119	
RISK	<0.001		<0.001**	<0.001***	<0.001		<0.001	
FIO	<0.001		0.001	0.001***	0.001		-0.001	
CEO	0.034		-0.009		0.027		0.092**	
MB	0.074**	0.068***	-0.025	-0.023***	0.021	0.046***	0.137***	0.093***
SB	0.007		0.015		0.040		-0.033	
CSB	0.011		-0.012	-0.015***	0.011		-0.010	
FIM	-0.035		0.038	0.020***	-0.0003		-0.097	
FIS	-0.065		-0.027		-0.161		0.037	

Cont. table 5.

R-squared	0.262	0.228						
Log-likelihood			144.492	143.499	124.279	119.220	102.031	89.632
Sum sq. res.	1.832	1.916	3.260	3.290	2.014	1.990	2.597	2.552
Akaike crit.	-193.998	-217.322	-252.984	-262.999	-212.558	-232.440	-168.063	-171.263

*) **) ***) statistically significant at the level of 0.1, 0.05, and 0.01 respectively.

Source: own elaboration.

As can be seen in Tab. 5, the amount of long-term debt significantly depends on the form of ownership in the company considering indirect or direct ownership (OWN). In entities that were directly owned by the family, the level of the first quartile of long-term debt is lower than in other family firms. Another variable affecting long-term debt is the sector of activity (INDUSTRY). For the firms engaged in traditional activities, the level of the first quartile of debt is lower than in those engaged in innovative activities.

Growth opportunities (GR) had a statistically significant negative effect only on the third quartile of long-term debt. The size of the company (SIZE) proved to be an important variable shaping long-term debt. This factor exerted a statistically significant positive effect for all quartiles of long-term debt of the family firms surveyed, as it did for total debt. Asset structure (TANG) interacted positively with the amount of total debt of the entities studied, but this relationship was only recorded for the first quartile of long-term debt. The same patterns occurred for profitability (ROA and ROE), liquidity (LIQ), and risk (RISK). However, for the last variable, its impact, although statistically significant, was very weak.

Statistically significant positive effects of variables characterizing family participation in ownership, management and supervision were observed for the percentage of family involvement ownership in ownership (FIO) on the first quartile of long-term debt, the presence of a family member on the management board (MB) the second and third quartiles of debt, and the family involvement in management board (FIM) on the first quartile of debt.

6. Discussion

Relationship between family firm status and debt ratios is theoretically unclear. The overall low total-debt ratio of family firms supports the view that family firms are risk averse. On the other hand, control considerations also have a significant impact on debt ratios, as family firms adjust their capital structure depending on the rights of shareholders and creditors in the country. The values of the total debt ratio calculated for family firms listed on the WSE in 2023 varied significantly. This means that these entities have different approaches to financing themselves with debt capital. However, it is worth noting that the values of the total debt ratio even in the third quartile did not exceed the value of 0.67; i.e. the upper limit determining the level of acceptable financial risk related to the necessity of repayment of liabilities with

financial costs (Gabrusewicz, 2014). The relatively low level of the index is indicative of the low indebtedness of the Polish public family firms and their significant financial independence, as pointed out also by Pernsteiner and Węcławski (2016) in earlier studies for small and medium sized family firms. What seems interesting, the level of total debt, short-term and long-term debt significantly depends on the form of shareholding in the company considering indirect or direct ownership of the family. It is worth noting that conservatism in terms of shaping the financing structure leads to an increase in the resilience of these entities to threats arising, inter alia, from changes in the economic situation (Majerowska, Gostkowska-Drzewicka, 2021).

In the case of family firms listed on the Warsaw Stock Exchange, positive relationships between family shareholding in ownership, management and supervision and their total debt prevail, mainly in terms of the presence of a family member on the management board (MB) when the relationship is positive for all quartiles. This is consistent with agency theory and supports hypothesis 3. Polish publicly listed family firms prioritize the interests of the family over those of the other shareholders. This way they determine the strategic direction of the firm and seek to retain control of it. In such a situation, debt is the preferred instrument for financing investments. Higher debt ratios and an aversion to financing activities by issuing shares by family firms in world studies are indicated by Keasey et al., (2015), Ellul (2009), Santor (2008), among others. In turn, regarding Polish family firms, such a regularity was observed by Socha (2017). But negative relationships were also observed for the percentage of family involvement in ownership (FIO) and the family involvement in management board (FIM) for the first quartile of total debt. Similar findings were obtained by Haider et. al (2021), who highlight that the family firms are less leveraged when the owners are part of management, for example CEO or Chairman. However, in this case, they are related to reducing the bankruptcy risk and the associated fear regarding the loss of socioemotional wealth. This finding is consistent with the studies of Moh'd et al., (1998) and Mulyania et al. (2016).

The variables characterizing FIO and MB turned out to be statistically significant for all total debt quartiles. In contrast, the other factors were significant in all cases just for the first quartile of this indicator, and the family involvement in supervisory board (FIS) was also significant for its median. Thus, regardless of the direction of the influence of the variables depicting the family's share of ownership, management, and supervision on the total indebtedness of the Polish publicly listed family firms, our results provide a strong argument supporting hypotheses 1 and 2.

The impact of factors characterizing family participation in ownership, management, and supervision on short-term debt shows both a positive and negative direction. It should be noted, however, that the negative relationship is more frequent than in the case of general indebtedness. This means that the family firms are trying to reduce short-term debt. As in the case of total debt, these actions are probably aimed at reducing the risk of bankruptcy and protecting the socioemotional wealth held. The diagnosed relationships are in line with previous research (Kawko, 2019). Due to the strength of its influence, family involvement in supervisory

board (FIS) is the most important factor influencing short-term debt size formation decisions. Therefore, in terms of short-term debt our results partially confirm our hypotheses. This is because the relationships described turned out to be statistically significant only for the first and third quartiles of short-term debt. However, they were not diagnosed for the median of this indicator.

Our studies confirm that for long-term debt positive relationships between family participation in ownership, management and supervision prevail. The presence of a family member on the management board is the most important factor what confirms hypothesis 1 and 2. The impact of the other variables characterizing family participation in ownership, management and supervision was only found to be significant for the first quartile of long-term debt, which only partially supports hypothesis 2.

Considering the direction and strength of the internal factors influence on the different total debt quartiles of family firms, it can be concluded that these entities, when shaping their capital structure, make decisions in line with the assumptions of the pecking order theory. This conclusion is in line with previous studies of capital structure factors of Polish family firms (Martyniuk, 2015; Kawko, 2019). The positive relationship between the non-interest tax shield and leverage is consistent with the assumptions of agency theory. Increasing depreciation leads to an increase in the value of free cash at managers' disposal. The way to reduce their irrational use by managers is to increase debt. Consequently, this leads to an increase in leverage. Hypothesis 3 is therefore confirmed. A positive effect of the non-interest tax shield on the capital structure of Polish companies, consistent with agency theory, was diagnosed by Czerwonka and Jaworski (2019). However, the research of these authors concerned not only family firms, but all companies listed on the Warsaw Stock Exchange. It might suggest that this approach to financing is a result of the institutional environment in which public companies operate in Poland, regardless of whether they are family-owned or not. Future comparative studies may identify for which companies this relationship is stronger.

In view of the direction of the influence of the internal factors on the different quartiles of short-term debt, it can be concluded that family firms shape the amount of short-term debt according to the assumptions of the pecking order and trade-off theory. However, for the first quartile of short-term debt, decisions to shape its size are more often made according to the trade-off theory as evidenced by the direction of influence of variables such as asset structure, profitability expressed by ROA and ROE. These conclusions are partly in line with previous studies of capital structure factors of Polish family firms because, as already mentioned, previous analyses show that these entities make financial decisions in accordance with the pecking order theory (Martyniuk, 2015; Kawko, 2019). The positive relationship between the non-interest tax shield and short-term debt is consistent with the assumptions of agency theory and confirms, in part, hypothesis 3, as this regularity was not diagnosed for the first quartile of short-term debt.

Considering the direction and strength of the influence of the internal factors on the different quartiles of long-term debt of family firms, it can be concluded that these family firms make long-term debt decisions primarily in line with the assumptions of trade-off theory. However, this conclusion applies to firms whose long-term debt size falls into the first quartile.

7. Conclusions

Our study focuses on the capital structure of Polish listed family businesses. Due to the heterogeneous nature of family firms, we use the quantile estimation, which is new in this type of analysis. The method allowed us to identify the significance of individual capital structure factors by their quantile distribution.

In summary, the capital structure of family firms listed on the Warsaw Stock Exchange is shaped by several factors, both of an internal, sectoral nature and determining the family's share in the ownership, management, and supervision of the firm. However, these relationships show varying strength and direction depending on the maturity of the debt and the quartile into which the size of the indicator depicting the type of debt can be classified. Thus, firms with direct family ownership had lower levels of total debt and long-term debt than the others. For short-term debt, on the other hand, a relationship of the opposite direction was noted, also for the third quartile of debt. In the case of traditional activities, the levels of the first and third quartiles of total and short-term debt are higher than in companies with innovative activities. An inverse relationship was diagnosed for the first quartile of long-term debt.

Considering the direction and strength of the influence of internal factors on the different quartiles of total debt of family firms, it can be concluded that these entities shape their capital structure in line with the assumptions of the pecking order theory. For the short- and long-term debt of family firms, financing decisions are made according to the assumptions of both the pecking order and trade-off theories. However, for the first quartile of both types of debt, the trade-off theory mainly applies, as evidenced by the direction of influence of variables such as asset structure, and profitability expressed by ROA and ROE. The most important internal factors shaping the capital structure of Polish public family firms are size and non-interest tax shield. The first of these factors (SIZE) had a statistically significant effect on all quartiles of total and long-term debt and on the first quartile of short-term debt. The second variable (NDTS) had a positive, statistically significant impact on all quartiles of total debt and the second and third quartiles of short-term debt. Moreover, the strength of this impact is the largest of all the explanatory variables selected for the analysis. This implies that the family firms prevent the irrational use of free cash arising from increased depreciation by managers. To do so, they increase debt.

Factors determining family participation in ownership, management and supervision have a significant impact on the capital structure in our study. Given the strength of influence and the impact of the variable on all quartiles of total and long-term debt, the most important factor of the above is the presence of a family member on the management board. In the area of short-term debt, on the other hand, it is the share of family members on the supervisory board. The relationships between the variables characterizing a firm's family status and capital structure are both positive and negative, which in both cases can be justified on the grounds of agency theory. Family firms look after the interests of the family first and foremost, rather than those of the other shareholders. This means that family members determine the strategic direction of the company and seek to retain control of the company. In such a situation, debt is the preferred instrument for financing investments and the relationship between leverage and factors determining the family status of the company is positive. Negative relationships can be explained by concerns about the possible loss of socioemotional wealth. The influence of factors characterizing family involvement in ownership, management, and supervision proved statistically significant for most variables for the first, second and third quartiles of total debt. In contrast, for short- and long-term debt, the hypotheses were confirmed partially, primarily for the first quartile of both types of debt.

8. Future research proposals and limitations

Our research is not without limitations but that may offer opportunities for further research. We used only the listed family firms' data so we cannot generalize these results on the non-public family firms, especially on SMEs. In addition, the study concerns only one year, a rather specific one, especially from the point of view of the business risk caused by the war in Ukraine. Hence, risk aversion on the part of family businesses as well as lenders could be higher than in an average year. It would therefore be worthwhile to examine the impact of individual factors over a longer period. A fruitful research direction could be also to extend the research scope to the Central European countries. Similarities and differences between countries in the region could be highlighted through international comparative research.

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