Performance of Family Businesses in the Specific Conditions of CEE Countries: The Case of the Czech Republic[1]

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Abstract

Many authors point out that family businesses in the CEE region due to a different historical development might exhibit specific features and because of that deserve specific attention. The presented paper aims to contribute to this effort by exploring factors driving the performance of family businesses in the Czech Republic, in course of the research a panel of 7,995 businesses was analyzed by using the linear mixed effects model. The common problem of missing data, especially on micro-enterprises, was addressed by using CHAID methodology. We found that the factors driving family business performance differs between micro and SMEs segments of businesses, while the effect of families is most significant in terms of the model's slope rather than constant.

Keywords: *family business, performance indicators, small and medium enterprises, supplying missing data, linear mixed effect model, Czech Republic*

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Introduction

Although there has been significant research done in analysing the role of family ownership and involvement on business performance, there are still some research gaps that deserve scientific attention. The family business has a long tradition in western countries, while in post-communist countries (mainly CEE region) the family business has a long break caused by the socialism era. In 1990's the family businesses were reborn and many of them are still run by their founders, who currently plan to pass the business on their children. We argue that due to this specific historical development, the family business situation in the CEE region deserves special attention. In Poland and Hungary, family business existed in a limited form, especially in agriculture and handicraft production, but in the former Czechoslovakia the tradition of family business existed only in the form of family-specific occupations in an employment relationship. In this way, family skills and traditions were passed on between generations. Currently there are a limited number of papers dealing with specific situation of family business in the CEE region (see e.g. Duh et al., 2009; Marszalek, 2018 or Machek and Hnilica, 2014).

From this perspective it is interesting to verify whether the result of family business research worldwide is valid under the specific condition of the CEE region. Some specifics of family business from the CEE region could be found in Marszalek (2018). Marszalek (2018), for example, concluded that family businesses in the CEE region have a conservative financing policy, i.e. they are less indebted and have greater liquidity. This effect is evident, first and foremost, in services and construction. Bacci et al. (2018) found that the level of indebtedness is lower in the first and second generations of owners provided that ownership is concentrated in the hands of just a few members of the family which should be true in CEE countries where ownership is in the hands of the first generation. The level of indebtedness then increases with the diversification (dissipation) of ownership among other members of the family. By many researchers the family businesses are perceived as outperforming the non-family businesses (e.g. by Allouche et al., 2008; Anderson and Reeb, 2003; Botero et al., 2015; Erbetta et al., 2013; Halili et al., 2015, and others). The potential explanation gravitates about agency theory (Duh et al., 2009), whereas the involvement of family in business has a potential to decrease the agency cost and by that to enhance the performance (see Dyer, 2006; Ghalke et al., 2022). Schulze et al. (2003) add that the differences in family businesses performance spring from the growing influence of the family on the business and possible conflicts between members of the family. Similar conclusions were reached by other authors as well (e.g. Minichilli et al., 2010; De Massis et al., 2013; Civelek et al., 2021). Cruz et al. (2012) found that employing

family members in small and micro firms contributes to increased sales but decreases profitability. Second, also the age of the business plays a significant role in explaining the above-mentioned phenomenon (see Eddleston et al., 2019; Cruz et al., 2019 or Dyer, 2018). The mentioned authors concluded that younger and smaller family businesses are characterised by a lower level of performance, as smaller businesses place greater emphasis on non-financial business goals. The given conclusion has also been confirmed by De Massis et al. (2013), Gonzáles-Cruz and Cruz-Ros (2016) or Wagner et al. (2015) confirming that business size has a statistically significant positive effect on performance. Above that, the performance of family businesses is positively influenced by the family if members of the family hold senior positions (Chu, 2011). On the other hand, the professionalization of the family business does not affect the performance of the firm (Polat and Benligiray, 2022). From this it can be assumed that family businesses in the Czech Republic should have lower performance with respect to the length of their operation. On the other hand, other authors hold the opinion that family business relations can have a negative impact on performance (see Basco, 2013).

The aim of the paper is to identify the possible differences in performance of family and non-family businesses and identify the factors that significantly affect the performance of family businesses in the Czech Republic. The potential contribution of this study could be summarized in two points. First, the study deals with analysis of the situation of family businesses in a country of CEE region, for which a specific situation could be expected due to different historic development. Second, a larger set of ratios (namely 46 ratios) was analysed to cover various aspects of family business performance, with control for the industry specifics, business segment and interaction between variables and family business dummy variable, in the model.

1. Problem Statement: Measuring the Performance of Family Businesses

When analysing performance of family businesses, the researcher is often limited to financial statements as the main information source of the utilizable data, as the family business often are represented by micro or small and medium enterprises. Above that, the analysis is further complicated by the fact that, especially the micro companies, do not provide their financial statements. Some researchers address the issue by analysing qualitative indicators. For example, Schmid and Sender (2021) asked respondents to rate the performance of their organisation compared to competing organisations in the same industry. A similar approach has also been taken by other authors, such as, for example, Ingram et al. (2020), Palalić and Smajić (2021), Santoro et al. (2021) or Sánchez-Marín et al. (2019), who consider

the position of the company against its competitors one of the key indicators of the success or failure of a business. The most recent studies of business performance are based on the principles of value-based management (e.g. Martínez-Romero et al., 2020; Pavelková et al., 2021) used mainly in big companies. In our research, we decided to use the accounting-based data of small and medium-sized enterprises and to investigate them on the basis of the chosen indicators. The company performance was approximated by return on assets (ROA) indicator, which is the most commonly used accounting-based performance measure, see Hoffmann et al. (2019), Diéguez-Soto et al. (2019) or Calabrò et al. (2021). The ROA measures the ability of the business to generate operating profit repeatedly (i.e. profit from the sale of property was excluded from the operating profit). We did not use the indicator ROE, though this is preferred by many authors because its value is affected by the indebtedness of the business and a number of previous research studies have stated that family businesses are less indebted than non-family businesses (see, for example, Bacci et al., 2018; Marszalek, 2018; Machek and Hnilica, 2014), though there are also differences in this regard. To identify the reasons for company performance, it is, however, necessary to examine all areas of company activity in order for it to be possible to determine where the principal differences between family and non-family businesses lie. In the case of accounting-based data, it is appropriate to use assets turnover, indebtedness, liquidity ratios, working capital ratios, cost-effectiveness ratios, etc. that measure effectiveness in various areas of the activity of a business. In addition to accounting-based ratios (or rather financial ratios), we also examined the effect of the size of the business, its industry and the category of business (family vs. non-family business). Two hypotheses were proposed on the basis of the theoretical background of the presented studies:

H1: There are accounting-based ratios that can be used to explain the differences in performance between family and non-family businesses.

In line with the literary research conducted, the overall performance of businesses was measured using profitability indicators (ROA) and in addition to profitability indicators, another 45 indicators were also used for measurement of the effectiveness of the activity of businesses and the dynamics of their development (see Table 2 below) in order to gain a complex picture of factors influencing the performance.

We formulated the following hypothesis on the basis of the given assumptions:

H2: Indicators that have significantly different values in the groups of family and non-family businesses cause the differing levels of their performance.

We used the ROA as the basic performance indicator; indicators of part performance (see Table 2 below) were used as explanatory variables (regressors).

2. Methodology and Data

The following definition of a family business (FB) was adopted: *a business in which one family has an absolute majority of the number of partners or exercises a majority of the voting rights is considered a family business. At least one member of the given family is a member of the statutory body of the company. At least two members of the given family must be engaged in the company.* This definition corresponds to the official definition of family businesses, which was adopted in 2020 in the Czech Republic but has not yet been reflected in business statistics. Therefore, the identification of family business was done via short questionnaire survey, asking managers whether their business meets the recent definition. The number of contacted companies was 76 980, the return rate was less than 14%. However, for many of them the data was missing. The analysed dataset includes data on 7,995 micro, small and medium sized enterprises (56.5% of which are family businesses) for the years 2016 to 2018.

To solve the problem of partially missing data we use the Chi-square Automatic Interaction Detector (CHAID) methodology of replacing missing values, which enhances the possibilities of analysing especially the situation of micro-enterprises more deeply. We obtain an imputed value of the target (missing value) by conditional branching at each intermediate node of the tree (see Higashijima et al., 2010). The algorithm makes it possible to select the ideal combination of predictors for each supplemented value, on the basis of which the missing value will be supplemented.

The research aim was verified in two steps. In the first step, Welch's test was applied to identify financial ratios whose values reach statistically different values between the samples of family and non-family businesses (H1 verification). In the second step, these ratios were used as explanatory variables in a regression model to analyse the role of these ratios in explaining company performance as measured by the ROA (H2 verification). In order to verify hypothesis H2 and fulfil the objective of the paper, the possible significance of interaction terms between the analysed financial ratios would imply that the analysed factor affects the performance of family businesses to a different extent than that of non-family businesses. We employed a linear mixed-effect model (LMER) to analyse the relationship between selected factors and ROA. LMER is an extension of the simple linear regression model which makes it possible to model both the fixed and random effect. This allows us to apply the model to the analysis of panel data, without violating model assumptions (Pusponegoro et al., 2017; West, 2009).

Although extreme values were replaced with threshold values, it was still necessary to use data transformation to avoid regression problems caused by skewed data distribution. The variables were transformed using the modulus transformation

developed by John and Draper (1980), with λ = –1. The final model was derived in two steps. In the first step, the model was derived separately for each of the analysed financial ratios, while checking for industry and family business specifics (in the form of dummy variables). The aim was to identify only those ratios that have a significant relationship to the ROA and whose estimated effect size is not negligible. A multiple model was derived in the second step, adopting only the significant ratios with a sufficiently large estimated effect size. The regression model for the first step took the following form:

$$ROA_{it} = \gamma + \alpha FB_i + \beta X_{it} + \zeta IND_j + \varepsilon_{it} + \upsilon_i$$

where

γ – is the intercept,
α, β and ζ – are regression coefficients,
FB_i – is the family business dummy variable (FB_i = 1 if the business is a family business; FB_i = 0 otherwise),
X_{it} – analysed financial ratios,
IND_j – industry dummy, where j = C, F, G, M, where „other industry" was set as default value,
b_0 – random constant,
ε_{it} – residual term,
v_i – individual effects.

Industry dummy variables were added to the analysis to respect the industry effect. First, the NACE main section industry classification was adopted. Some of the codes were merged because of the low number of observations within a given category. The final number of analysed industries was limited to five – namely C-manufacturing (17.3% of observations), F – construction (11.6%), G – wholesale (20.4%) M – professional activities (13.1%), rest of the codes were merged into category "others" (37.6%).

Some authors (e.g. Cruz et al., 2012) point to the differences between micro and small and medium-sized enterprises, which also cause differences in their performance. Therefore, the models were derived separately for the set of micro-enterprises (66.2% of observations) and for the set of SMEs (the remaining 33.8% of observations) – see Table 1.

T a b l e 1

Number of Observations per Businesses Category and Segment

Category of enterprise	Size	N	%
Non-family	Micro-enterprises	6,740	28.4
	SME	3,514	14.8
Family	Micro-enterprises	8,969	37.8
	SME	4,492	18.9

Source: The authors' own processing.

In the second step, the ratios that proved to have a significant relationship to the ROA were entered into a multiple regression model. In this model, the family business specifics were also analysed as an interaction term between the FB variable and financial ratios, which allows us to verify Hypothesis 2. The final multiple regression model for the second step, whose purpose was verification of hypothesis H2, took the following form:

$$ROA_{it} = \gamma + \alpha FB_i + \beta X_{it} + \zeta IND_j + \delta FB_i x X_{it} + \varepsilon_{it} + \upsilon_i$$

where

$FB_i \; x \; X_{it}$ – an interaction term.

In contrast to previous studies, we investigated a large number of factors and analysed data covering a period of three years to identify differences in the performance of family and non-family businesses. The variables tested are calculated from companies' financial statements and represent partial performance indicators (return on invested capital, indebtedness, assets management, liquidity, cost efficiency) or may have an impact on the value creation of the company (e.g. year-on-year change in sales and profit, investment in fixed and total assets, reinvestment rate, etc.). We used the following indicators for the analysis of company performance – see Table 2.

T a b l e 2

Financial Performance Indicators Used

Abbrev.	Description	Abbrev.	Description
C/TA	Cash/Total Assets	TC/TA	Trade Creditors/Total Assets
CA/CL	Current Assets/Total Current Liabilities	TC/TL	Trade Creditors/Total Liabilities
CA/S	Current Assets/Sales	TCPP	Trade Creditors Payment Period
CCC	Cash Conversation Cycle	TD/TA	Trade Debtors/Total Assets
CG	Capital Growth	TL/TA	Total Liabilities/Total Assets
CashR	Cash Ratio	WC/S	Working Capital/Sales
DCP	Debtor Collection Period	WC/TA	Working Capital/Total Assets
ROCE	Operating Profit/Capital Employed	TC/TD	Trade Creditors/Trade Debtors
OPM	Operating Profit/Sales	TAG	Total Assets Growth
ROA	Operating Profit/Total Assets	FAG	Fixed Assets Growth
OCF/IE	Operating CF/Interest Expenses	In/S	Investment/Sales
OCF/TA	Operating CF/Total Assets	In/FA	Investment/Fixed Assets
EFA/OP	Profit Earned from Selling Assets/ Operating Profit/Loss	In/EAT	Investment/EAT
EG	Earnings Growth	MEC/S	Material and Energy Consumption/ Sales
IA/TA	Intangible Assets/Total Assets	LC/S	Labour Cost/Sales
ROE	EAT/Equity	LC/OP	Labour Cost/Operating Profit
QR	Quick Ratio	SE/S	Services/Sales
RE/TA	Retained Earnings/Total Assets	1-(EAT/EBT)	1-EAT/EBT
S/TA	Sales/Total Assets	1-(EBT/OP)	1-EBT/Operating Profit
ST/TA	Stock/Total Assets	D/OP	Dividends/Operating Profit
S/TTA	Sales/Tangible Assets	ROS	EAT/Sales
SG	Sales Growth	CE/TA	Capital Employed/Total Assets
SHP	Stock Holding Period	E/CE	Equity/Capital Employed

Source: The authors' own processing based on references.

3. Results

The results show that there are financial ratios that consistently show different values in family and non-family businesses in both analysed groups (micro-enterprises and SMEs). The results on Welch's test application are shown in Table 3 (only for indicators for which a statistically significant difference in mean values was confirmed).

T a b l e 3

The p-value of Welch's Test of Equality of Means

Variable/segment/statistics	Micro		SMEs	
	t-stat.	*p-val.*	*t-stat.*	*p-val.*
CA/S	28.679	0.0000	76.111	0.000
ROA	0.008	0.9298	14.212	0.000
OCF/TA	0.498	0.4805	21.143	0.000
S/TA	0.078	0.7802	32.136	0.000
WC/S	17.342	0.0000	9.367	0.002
1-(EAT/EBT)	4.199	0.0405	7.333	0.007
C/TA	91.575	0.0000	12.532	0.000
CCC	9.483	0.0021	15.845	0.000
CG	0.182	0.6693	12.418	0.000
CashR	30.568	0.0000	7.028	0.008
DCP	23.391	0.0000	105.986	0.000
IA/TA	0.091	0.7629	19.936	0.000
RE/TA	0.219	0.6396	159.482	0.000
ST/TA	18.182	0.0000	47.087	0.000
S/TTA	46.879	0.0000	19.923	0.000
TCPP	0.074	0.7851	28.250	0.000
LC/S	27.427	0.0000	105.843	0.000
LC/OP	0.768	0.3809	13.788	0.000
SE/S	88.474	0.0000	124.932	0.000

Source: The authors' own processing.

Hypothesis 1 can be accepted for most of the analysed ratios, since the mean value of the same ratios significantly differ between the sample of family and non-family businesses. The mean values of the ratios are not significantly different in the case of just a few indicators (e.g. ROCE, ROE, QR, SG, SHP, TAG, In/FA, D/OP, ROS, CE/TA, E/CE). These indicators will be excluded from further analysis in line with our research aim. The next step was to analyse the role of these ratios in explaining business performance (given by the ROA). This was done by estimation of the LMER model. The model was separately estimated for the sample of micro businesses and SMEs. The final model for each of the analysed samples was derived in two steps – a univariate model for each of the analysed financial ratios was derived in the first step, and a multiple regression model was estimated, employing only significant variables with a substantial effect size, in the second step.

3.1. LMER Model Results for Micro Enterprises Sample

At the first step, the LMER model was derived on univariate bases for each of the analysed ratios separately to analyse the individual relationship to the business performance. The results showed that at univariate level, each of the analysed ratios attains a significant estimate at the 1% level, though the estimated sizes of the effect vary significantly. The most significant effect estimates were attained in the following ratios: operating cash flow to total assets (OCF/TA), labour cost to sales (LC/S), cash to total assets (C/TA) and retained earnings to total assets (RE/TA). The descriptive statistics of the applied variables are subjected to Appendix 1. These ratios were further analysed in a multiple regression model. The following table presents the model's overall statistics.

T a b l e 4

LMER Model for Micro-Enterprises – Overall Statistics

Statistics	
Pseudo-R Square (conditional)	0.29881
–-2 Restricted Log Likelihood	2315.9
Akaike's Information Criterion (AIC)	2317.9
Schwarz's Bayesian Criterion (BIC)	2325.5

Source: The authors' own processing.

T a b l e 5

Multiple Regression Model, Sample of Micro-Enterprises

					95% CI	
Parameter	**Estimate**	**SE**	**t-stat.**	**p-val.**	**Lower**	**Upper**
Intercept**	0.217	0.010	21.967	0.000	0.198	0.236
[FB = 0]	–0.001	0.014	–0.084	0.933	–0.029	0.027
[IND = C]**	–0.029	0.008	–3.717	0.000	–0.045	–0.014
[IND = F]**	–0.043	0.008	–5.329	0.000	–0.059	–0.027
[IND = G]**	–0.061	0.007	–8.907	0.000	–0.075	–0.048
[IND = M]	–0.010	0.007	–1.411	0.158	–0.024	0.004
LC/S**	–0.236	0.015	–16.130	0.000	–0.265	–0.208
C/TA**	0.161	0.014	11.764	0.000	0.134	0.188
RE/TA**	0.185	0.008	23.957	0.000	0.170	0.200
SE/S**	–0.242	0.014	–16.729	0.000	–0.271	–0.214
ST/TA**	–0.045	0.017	–2.720	0.007	–0.078	–0.013
TC/TA	–0.019	0.017	–1.139	0.255	–0.052	0.014
MEC/S**	–0.148	0.016	–9.111	0.000	–0.180	–0.116
[FB = 0] x LC/S	–0.019	0.021	–0.901	0.368	–0.060	0.022
[FB = 0] x C/TA	–0.034	0.020	–1.715	0.086	–0.074	0.005
[FB = 0] x RE/TA**	0.039	0.012	3.318	0.001	0.016	0.063
[FB = 0] x SE/S**	0.056	0.021	2.735	0.006	0.016	0.097
[FB = 0] x ST/TA	0.008	0.027	0.277	0.782	–0.046	0.061
[FB = 0] x TC/TA	–0.008	0.025	–0.305	0.761	–0.056	0.041
[FB = 0] x MEC/S	–0.026	0.025	–1.049	0.294	–0.074	0.023

Note: CI – confidence interval, SE – standard error; **significant at the 1% level, *significant at the 5% level.

Source: The authors' own processing.

The potential presence of multicollinearity was analysed using the Variance Inflation Factor. Results showed that none of the analysed ratios attained a VIF of 4 or higher, meaning that the presence of multicollinearity could be regarded as non-significant. The results on estimation of multiple regression model for analysing the situation of micro-enterprises are shown in Table 5, where results of fixed effect estimates are presented. The industry effect is significant for manufacturing (C), construction (F) and wholesale and retail (G), while the reference category is "other industry". However, the industry effect does not differ from professional, scientific and technical activities (M). The necessity of examining the performance of companies with regard to their sectoral affiliation is clearly confirmed.

The FB variable is non-significant in the model as a main effect, though this variable plays a significant role in interaction with other variables, which highlights the importance of the characteristics of family businesses. To be specific, the FB variable interacts significantly with the variables RE/TA and SE/S. As expected, the sign of the RE/TA estimate is positive for both family and non-family businesses. RE/TA can be considered as an indicator of past profitability and, implicitly, as an indicator of the age of the business, as it represents the profit generated in the past and reinvested back into the business. The unit increase of retained earnings over total assets in the case of non-family businesses (FB = 0) has a larger positive impact on the ROA than in the case of family businesses. An opposite conclusion applies to the level of services over sales (SE/S). The main effect sign is negative, which is in line with expectations as it represents a cost structure ratio. This ratio interacts significantly with the FB variable with a positive sign, meaning that a unit increase in the proportion of services has a less negative impact on the ROA in the case of non-family businesses than in family businesses. This is probably the reason why family businesses involve family members who are not employees in the business in order to reduce the cost of external services. The ratios of labour cost over sales (LC/S), cash to total assets (C/TA), and material and energy consumption over sales (MEC/S) play a significant role in the performance of micro-businesses, though their impact does not differ significantly in family and non-family businesses. Hypothesis 2 can be accepted in the case of micro-enterprises as the effect of interactions between RE/TA or SE/S and the family business (FB) dummy significantly influences the value of the ROA.

3.2. LMER Model Results for SMEs Sample

Similar procedure was applied to the sample of SMEs: The descriptive statistics of the applied variables are subjected to Appendix 2, Table 6 presents the model's overall statistics and the results of multiple regression model estimation on SMEs sample are presented in Table 7.

T a b l e 6

LMER Model for SMEs – Overall Statistics

Statistics	
Pseudo-R Square (conditional)	0.22106
–-2 Restricted Log Likelihood	–11614.1
Akaike's Information Criterion (AIC)	–11612.1
Schwarz's Bayesian Criterion (BIC)	–11605.1

Source: The authors' own processing.

The estimates on the model's fixed effect are shown in Table 7.

T a b l e 7

Multiple Regression Model, Sample of SMEs

Parameter	**Estimate**	**SE**	**t-stat.**	**p-val.**	**95% CI**	
					Lower	**Upper**
Intercept**	0.047	0.005	9.888	0.000	0.037	0.056
[RP = 0]	–0.006	0.006	–1.106	0.269	–0.018	0.005
[IND = C]	0.005	0.004	1.137	0.256	–0.004	0.014
[IND = F]	–0.002	0.005	–0.444	0.657	–0.013	0.008
[IND = G]*	–0.011	0.005	–2.213	0.027	–0.020	–0.001
[IND = M]**	0.021	0.007	3.140	0.002	0.008	0.034
LC/S**	–0.174	0.015	–11.560	0.000	–0.204	–0.145
C/TA**	0.142	0.013	10.623	0.000	0.116	0.168
RE/TA**	0.151	0.008	19.179	0.000	0.136	0.167
[FB = 0] x LC/S*	0.044	0.019	2.305	0.021	0.007	0.082
[FB = 0] x C/TA	–0.017	0.019	–0.897	0.370	–0.055	0.020
[FB = 0] x RE/TA*	0.023	0.012	1.968	0.049	0.000	0.046

Note: CI – confidence interval, SE – standard error; **significant at the 1% level, *significant at the 5% level.
Source: The authors' own processing.

The industry effect plays a less important role in SMEs as compared to micro-businesses, as significantly different values of the ROA were attained only in the wholesale and retail industry (G) and professional, scientific and technical activities (M). Only the labour cost over sales (LC/S), cash over total assets (C/TA) and retained earnings over total assets (RE/TA) play significant roles in the case of SMEs.

On the other hand, the interactions with the FB variable do not share the same profile. Labour cost over sales (LC/S) interacts with FB and, surprisingly, attains a positive sign implying that a unit increase in LC/S is associated with a smaller decrease in the ROA in non-family enterprises than in family enterprises. This confirms the results of family business research that indicate that family businesses have lower employee turnover than non-family businesses because they allow for a better work-life balance, support employee development and probably reward employees better. Furthermore, the FB variable interacts significantly with the proportion of retained earnings (RE/TA). This also applies to micro-businesses as well, though the positive effect is weaker. Hypothesis 2 can be accepted for

small and medium-sized enterprises, as the effect of interactions between LC/S and RE/TA and the family business (FB) dummy significantly influences the value of the ROA.

4. Discussion

The aim of our research was to examine the impact of individual factors (represented by financial ratios) on firm performance approximated by ROA. The ROA is the most commonly used performance indicator in strategic management research and measures the ability to generate profit, which is the principal source for financing the development of the business. The ROA values were analysed with respect to the business segment (family or non-family businesses), industry specifics and the role of other accounting-based indicators. We looked for factors that can explain differences in the ROA. The initial regression analysis showed that ROA values differ significantly in family and non-family SMEs, even when the industry effect is considered (in contrast to the situation for micro-businesses). However, the control variable of the family business becomes insignificant when other indicators are added to the regression. This suggested that the effect previously carried by the family business variable may also be carried by other factors. The interaction term between the analysed accounting-based indicators and the family business dummy variable was added to the analysis to verify this. The results showed that these interaction effects were significant, which corroborated our previous assumption. However, the family business effect appears to play a significant role in the interaction with indicators used as explanatory variables. Not one of the indicators of indebtedness acquires different values in the groups of family and non-family enterprises. This conclusion does not confirm the results of previous studies that indicate that family businesses are less indebted than non-family businesses (e.g. Bacci et al., 2018; Marszalek, 2018; Machek and Hnilica, 2014). The availability of bank credits in the period analysed may have contributed to higher indebtedness of all businesses. On the other hand, it is important to point out the importance of reinvesting profit to the performance of all the businesses analysed. This is probably due to the lower profitability of non-family micro-enterprises in most sectors and, thereby, the lack of resources for reinvestment. If the profit generated is reinvested in the enterprise, it has a greater impact on the ROA. It is typical for family businesses to pursue non-financial objectives in addition to financial ones. One of the most important goals is the long-term sustainability of the business with the aim of passing the business on to the next generation. While reinvesting profits is an important factor in their future performance, it is standard practice rather than any particularly unusual decision.

The relatively low inflation in the economy of the Czech Republic during the analysed period on one hand and the growth in wages (the average wage in the economy grew by 15.4% in the given period) on the other hand may have contributed to the significance of labour costs (measured by labour costs to sales) to the performance of businesses. The importance of labour costs to the identification of differences in the performance of family and non-family businesses is also highlighted by the multiple regression model for SMEs. The labour cost (represented by indicator LC/S) explains the ROA in interaction with the variable FB: a unit change of LC/S has an impact on the ROA 0.044 lower in the case of non-family businesses than in family businesses – see Table 5. In the case of micro-enterprises, however, the effect of this factor on the ROA does not differ significantly between family and non-family businesses. It can be deduced from this that an increase in the number of employees or wages does not cause the same fall in the profitability in non-family businesses as it does in family businesses. It must again be noted in this regard that the data come from a period of low unemployment (4.5% in 2016, 2.4% in 2018) and that a labour shortage restricted the growth in revenue.

The results also showed the positive effect of retained earnings to total assets (RE/TA) on the ROA. The ratio RE/TA represents a factor of past profitability and, implicitly, the age of the business (Altman, 1968). It can be deduced that the ability of a company to use the profit generated (reinvest it) has a positive effect on its overall profitability (Kalali, 2022). This effect is significant for both micro-enterprises and SMEs, while it is significantly stronger in the case of non-family businesses than in family businesses. The mentioned effect is even more distinct in SMEs than it is in micro-enterprises. We also identified a negative effect of other cost indicators (material and energy consumption to sales, MEC/S and services to sales, SE/S), though this effect is significant only in micro-businesses (compare Table 4 and Table 5). Similarly, we found a negative effect of inventory to total assets, which testifies to the high inventory levels in micro-enterprises which causes a fall in their profitability (disposable resources are tied up in non-earning assets). Only the ratios of cash to total assets (C/TA) and retained earnings to total assets (RE/TA) are positively related to the ROA in all the businesses investigated.

Conclusion

Our research aimed to identify factors that may affect the performance of private enterprises and explain the difference in performance between family and non-family businesses. Our study focused on micro-enterprises and small and medium-sized businesses. This also influenced the selection of the indicators we used for the purposes of analysis. It was not possible to use approaches based on market

data, for which reason we used accounting-based measures of performance, thereby obtaining a relatively objective image of the performance of businesses that was unaffected by the subjective opinions of their owners (or managers) who may have a tendency to present a more favourable impression of the company they own (or manage). We used data on almost 8,000 businesses over a period of three years for the purposes of our analysis. As the nature of the data does not allow for the effective use of a simple linear regression model, a linear mixed-effect model had to be used as its assumptions are more robust.

During the preparation of the data, we first checked the completeness of the data and supplemented missing data. The missing data were supplemented using the CHAID methodology. In this way, the decision tree helped us fill in missing data based on the most appropriate indicators available.

For our initial analysis, we used a total of 46 indicators that appear in the expert literature or are used in valuation practice for evaluation of the competitive position of businesses. Those indicators that had different average values in the group family businesses and the group non-family businesses were selected in the first step. These indicators were then used to analyse the impact on return on assets, an aggregate indicator of corporate performance.

Based on univariate analysis, we selected variables that were used to derive two mixed-effect models (separately for microenterprises and SMEs). In the models, accounting based indicators were used both separately and in interaction with the FB dummy variable. In doing so, we wanted to see if there are indicators that differentially affect the performance of family and non-family businesses.

Our research was restricted exclusively to businesses in the Czech Republic. The reason for this is the fact that the accounting data of private companies are available to only a limited extent in the existing databases (e.g. Orbis) and is encumbered by differing accounting procedures. We believe, nevertheless, that the presented results are valid more broadly than merely in the Czech Republic, since we also used indicators mentioned in foreign studies.

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Appendices

Appendix 1

Descriptive Statistics of Variables – the Micro-Enterprises Model

IND	Var	Family businesses			Non-family businesses		
		Count	Mean	std. Dev.	Count	Mean	std. Dev.
C	ROA	1184	0.0521	0.2723	665	0.0659	0.2417
	RE/TA	1184	0.1162	0.6400	665	0.1786	0.5688
	C/TA	1184	0.2609	0.2211	665	0.2892	0.2443
	PC/S	1184	0.2999	0.2267	665	0.2977	0.2445
	SE/S	1184	0.2886	0.2087	665	0.3000	0.2272
	ST/TA	1184	0.2077	0.1709	665	0.2092	0.1657
	TC/TA	1184	0.1416	0.1854	665	0.1405	0.1952
	MEC/S	1184	0.3122	0.2371	665	0.2801	0.1898
F	ROA	1030	0.0363	0.2480	627	0.0344	0.2879
	RE/TA	1030	0.1048	0.5895	627	0.0332	0.6546
	C/TA	1030	0.2755	0.2247	627	0.3187	0.2515
	PC/S	1030	0.2243	0.2024	627	0.2391	0.2054
	SE/S	1030	0.3525	0.2070	627	0.3655	0.2146
	ST/TA	1030	0.2089	0.1678	627	0.1989	0.1545
	TC/TA	1030	0.1611	0.1851	627	0.1806	0.2094
	MEC/S	1030	0.2981	0.1933	627	0.2817	0.1849
G	ROA	1842	0.0326	0.2911	1159	0.0287	0.3227
	RE/TA	1842	–0.0100	0.7185	1159	–0.0443	0.7399
	C/TA	1842	0.2902	0.2311	1159	0.3035	0.2454
	PC/S	1842	0.2178	0.2337	1159	0.2363	0.2372
	SE/S	1842	0.3009	0.2265	1159	0.3369	0.2707
	ST/TA	1842	0.2952	0.2145	1159	0.2664	0.1815
	TC/TA	1842	0.1436	0.1773	1159	0.1693	0.2201
	MEC/S	1842	0.1973	0.1693	1159	0.2001	0.1809
M	ROA	1459	0.0664	0.3156	1588	0.0616	0.3279
	RE/TA	1459	0.1123	0.6647	1588	0.1230	0.6687
	C/TA	1459	0.3555	0.2617	1588	0.3837	0.2727
	PC/S	1459	0.3854	0.3140	1588	0.3658	0.2891
	SE/S	1459	0.3767	0.2556	1588	0.4010	0.2745
	ST/TA	1459	0.1899	0.1314	1588	0.1915	0.1234
	TC/TA	1459	0.1248	0.1709	1588	0.1284	0.1847
	MEC/S	1459	0.1993	0.1592	1588	0.1915	0.1710
Others	ROA	2813	0.0774	0.3251	2304	0.0701	0.3511
	RE/TA	2813	0.0097	0.7266	2304	0.0211	0.7234
	C/TA	2813	0.3247	0.2658	2304	0.3657	0.2780
	PC/S	2813	0.3609	0.3253	2304	0.4064	0.3806
	SE/S	2813	0.3532	0.2525	2304	0.4056	0.3082
	ST/TA	2813	0.1780	0.1374	2304	0.1750	0.1256
	TC/TA	2813	0.1380	0.1898	2304	0.1434	0.2018
	MEC/S	2813	0.2472	0.2057	2304	0.2328	0.2233

Source: The authors' own processing.

A p p e n d i x 2

Descriptive Statistics of Variables – SMEs Model

IND	Var	Family businesses			Non-family businesses		
		Count	Mean	std. Dev.	Count	Mean	std. Dev.
C	ROA	1324	0.0977	0.11724	805	0.0810	0.15140
	RE/TA	1324	0.4393	0.33954	805	0.2965	0.46535
	C/TA	1324	0.1614	0.16374	805	0.1491	0.16305
	PC/S	1324	0.2341	0.11839	805	0.2394	0.14663
F	ROA	587	0.1050	0.13534	417	0.0949	0.12382
	RE/TA	587	0.4159	0.29746	417	0.3459	0.36812
	C/TA	587	0.2087	0.19407	417	0.1980	0.17326
	PC/S	587	0.1657	0.12539	417	0.1613	0.13839
G	ROA	1021	0.1032	0.11978	653	0.0916	0.12806
	RE/TA	1021	0.4380	0.34768	653	0.3820	0.37822
	C/TA	1021	0.1862	0.19973	653	0.1618	0.16670
	PC/S	1021	0.0987	0.06902	653	0.1100	0.13154
M	ROA	239	0.0885	0.12277	359	0.1213	0.16317
	RE/TA	239	0.3847	0.31454	359	0.3529	0.30629
	C/TA	239	0.1745	0.16153	359	0.2481	0.21876
	PC/S	239	0.2862	0.28147	359	0.3388	0.33504
Others	ROA	1314	0.0777	0.13091	1278	0.0631	0.13192
	RE/TA	1314	0.3164	0.34126	1278	0.2053	0.37741
	C/TA	1314	0.1536	0.17342	1278	0.2009	0.20115
	PC/S	1314	0.2345	0.23493	1278	0.3316	0.31988

Source: The authors' own processing.