Forecasting the financial performance of small and medium-sized enterprises: evidence from the Hungarian food retail sector

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Abstract

Introduction. This research aims to develop a financial model capable of performance measurement for food retail SMEs operating in a specific region of a typical Central and Eastern European emerging economy, Hungary, based on accounting statements and macroeconomic indicators, the utilisation of which enables managers to measure and improve financial performance.

Materials and methods. Multivariate stepwise linear regression was applied to select the indicators for the model, and multivariate linear panel regression was applied to develop the specific model. The database contained 972 company statements covering the period 2015-2019.

Results and discussion. Using panel data of financial indexes and macroeconomic indicators as independent variables, a multivariate linear regression function can be defined, allowing enterprises' operating profit to be estimated and predicted as a dependent variable with high accuracy and significance. The result of the modelling is a random-effects regression model that can predict 81.6% of the operating profit/loss of food retailers in Hungary's North Great Plain region. The practical results of the secondary research can be applied to the entire population of the study region based on statistical procedures. Among the financial ratios produced from the statements used in the course of the procedures, the application of ROA margin I, Net working capital, Net working capital ratio, Current assets ratio as key indicators, as well as Inventory turnover rate, Total assets turnover rate, Capital strength are suggested. Of the macroeconomic indicators, household income per capita and its change can provide guidance for planning, as food retail risk appears to be the most important macroeconomic indicator.

Conclusion. Businesses can use the model in their management accounting and control activities, either by substituting the relevant financial indicators into the final model to forecast the operating profit/loss or by making decisions with the support of the developed indicator system. Such scientifically established models can help improve SMEs' management accounting, thus maintaining or enhancing their decision-making processes and competitiveness.

Introduction

The role of small and medium-sized enterprises (SMEs) is fundamental in promoting economic growth in the national economies of the 21st century. The growth of economies heavily relies on the businesses within the SME sector, as emerging, renewed, and terminated companies keep the economy in constant motion. One of the most important areas of activity within the SME sector is trade. Regarding retail trade turnover, the largest proportion is represented by retail sales in non-specialised stores with food. The basis for the growth of iretail trade, including the growth of food retail, is the continuous increase in real wages, which is accompanied by an increase in consumer spending. There can be several ways of adaptation, including restructuring cost structures, cost reduction, diversification of activities, or shifting production costs onto consumers. Concerning the above cases, the development and preparation of decision alternatives play a crucial role, highlighting the importance of management control and performance measurement activities. There is a legitimate need for complex corporate financial performance evaluation and the development of management accounting and control methods that support corporate competitiveness within the context of businesses in the food retail sector.

Decision-makers measure the success of a business primarily through its financial performance, which is most easily captured by the information available from financial statements. In addition to being the basis for managerial decisions, financial statements can be used to analyse a company's performance and identify the reasons for deviations from previously projected values, and statistical organisations can use broader samples of financial statements to analyse and forecast the direction and level of economic development (Erdey, 2006; Osadchy et al., 2018).

Accounting information, completed with market data, is the basic input for financial analysis and planning, and the most important tools to use these inputs for decision-support planning and forecasting are various statistical methods, regression analysis, and operations research programming techniques. However, to extract useful inputs from financial statements, some form of measurement is required: most often, these are ratios, which put two pieces of data on an equivalent basis, thereby increasing their usefulness (Lee et al., 2023; Rákos et al., 2022). Financial ratio indicators are the oldest and simplest practical tools for evaluating and planning the performance of companies (Arkan, 2016). Financial ratio indicators play an important role in revealing the financial stability of an enterprise, preserving its competitive position, and eliminating potential financial risks (Belas et al., 2024; Kliestik et al., 2020; Tamimi and Orbán, 2022). Lukason and Camacho-Minano (2019) argue that financial ratio indicators measuring profitability, liquidity and leverage are the most relevant in bankruptcy forecasting.

The most commonly used statistical method for selecting the relevant financial indicators is a type of stepwise regression using the least squares method. The stepwise selection procedure helps in the selection of dependent variables (Voda et al., 2021). The most common area related to risks, based on financial indicators and using this method, is bankruptcy forecasting (Dankiewicz et al., 2022). There are numerous areas where a forecasting model based on financial indicators could be particularly useful (Földvári and Erdey, 2009) for the importance of exchange rate determination.

Taani (2011) investigated the impact of accounting information on earnings per share using five categories of financial ratios applying multiple regression methods and stepwise regression models. Asiri (2015) uses this method to investigate the correlation between the market capitalisation of 65 UK firms and their financial ratios – the aim is to examine the extent to which market value is determined by internal financial performance, such as

profitability, liquidity, or efficiency (Nugroho et al., 2024). Arkan (2016) examined the importance of financial ratios from financial statements in predicting stock prices in emerging markets. Using a stepwise multiple regression model, he tested the statistical power of 12 financial indicators in predicting the Kuwaiti financial market. Wang (2020) uses stepwise multiple regression to filter out the strong correlation factors as effective predictors among the many factors affecting the stock market return rate, examining the Chinese stock market. The South Asian case is investigated in detail by Gazi et al. (2024).

Of course, examples are not only available for modelling the market value of companies, stock market returns and risks. In many cases, the focus is on the operating profit of a company as the object of forecasting. Operating profit is the profit a company realises from its business before deducting taxes and interest, also known as earnings before interest and taxes (Nworie and Nwoye, 2023). According to the research of Owusu-Akomeah (2015), working capital management plays a very important role in achieving business success as it significantly impacts operating profit. Examining manufacturing firms listed on the Ghanaian stock exchange, they found that indicators such as inventory turnover, suppliers' and customers' turnover, and cash conversion cycle affect operating profit. Qianyu et al. (2021) used neural network models and financial statement information to forecast the profit of listed Chinese companies and compared it with the results predicted by analysts. The average accuracy of their model in profit forecasting is 88.6%, which is 13.52% higher than the average accuracy of analyst forecasts.

There are numerous examples of creating prediction models apart from bankruptcy prediction, and it is frequent to focus on profit, even operating profit. The above examples, however, mainly focus on larger firms – smaller companies need such models just as much as larger ones, if not more. The current research aims to build a model for small and medium-sized enterprises. According to the latest official European data from 2023, 99.8% of all enterprises are SMEs, comprising 51.8% of value-added and 64.4% of employment – they can be considered substantial contributors to employment and to the GDP growth in many countries (European Commission, 2023). In Hungary, the proportion of SMEs among registered businesses in 2013 was 99% in the corporate sector. SMEs accounted for 44.3% of gross value added and employed 68.4% of the workforce.

SMEs' role is essential in the economic development of many countries (Bilan et al., 2017; Straková et al., 2022; Woźniak et al., 2019). They form the most dynamic corporate sector of the world economy, which is the most productive one in terms of job creation, and they play a vital role in the development of human well-being (Naradda Gamage et al., 2020). The proper management of this sector is essential for the development of the business environment and transparent economic relations (Vasylieva et al., 2023). Still, it is also important to note that the weak capital base of these enterprises is associated with a high risk of financial loss and bankruptcy (Ślusarczyk and Grondys 2019). Start-ups often face funding gaps, as they are unable to obtain bank financing and at the same time venture capital and private equity is only available for companies with high growth potential (Fazekas and Becsky-Nagy, 2015; 2019; Nagy, 2004). As Bak et al. (2020) state, resilience is also a key factor for SMEs, although the related scholarly work is limited despite the sector's importance to the economy. SMEs are highly vulnerable due to such factors as the consumers' rapidly changing preferences, the SMEs' dependence on several actors or their lack of resources and credit (Bivona and Cruz 2021; Bucher et al., 2016; Roy and Shaw 2020).

Despite SMEs' importance and high vulnerability, they are often characterised by the lack of efficient management control or financial performance measurement tools and methods. Smaller companies use performance measurement tools less frequently and efficiently (Pešalj et al., 2018; Taylor and Taylor 2014). Garengo et al. (2005) studied the

constraints of using performance measurement systems in SMEs, which are the lack of financial and human resources, the short-term nature of planning, or the increased instability of the business environment. Cuzdriorean (2017) examined the use of management accounting and control practices in SMEs – performance measurement tools are among these practices –and found that the number of used practices is small compared to large companies. According to Lavia López and Hiebl (2015), SMEs use management control and performance measurement methods "not only to a lesser extent but also differently than large enterprises".

The aim of the present research is to develop a model suitable for performance measurement of businesses engaged in "non-specialised retail sale of food" activities operating in the Northern Great Plain region of Hungary, a European emerging market, based on accounting reports and macroeconomic indicators. The model should incorporate indicators that enable managers to measure and improve financial performance. The authors chose the timeframe of 2015-2019: in the years after 2020, a structural fracture happened in almost every economic sector due to the effects of the pandemic – our examined timeframe means an economically more stable, normal period to which companies can compare their present and future operations. Models formulated on historical data often provide great help even in the future.

The research hypothesis is that based on panel data and on the basis of financial indexes and macroeconomic indicators as independent variables calculated from the statements of the examined food retail enterprises, a multivariate linear regression function can be defined, which allows the operating profit or loss of the analysed enterprises to be estimated and predicted as a dependent variable with high accuracy and significance. An additional part of the hypothesis is that the random effects regression model is suitable for accurately and significantly predicting the operational profit/loss of food retail businesses, as opposed to the fixed effects regression model.

Materials and methods

Database of the study

The database for the secondary research was purchased from Opten Informatikai Ltd. The database contains the balance sheet and profit and loss account data of food retail enterprises in the sub-sector "Non-specialised retail sale of food", which are located in the Northern Great Plain region of Hungary, were established before 1 January 2015 and had at least one annual statement and a closed financial year in the period 2015-2019. A total of 972 statements were included in the survey over the indicated time period (2015 – 165, 2016 – 175, 2017 – 194, 2018 – 243, 2019 – 195). As it was articulated before, the reason behind the chosen timeframe of 2015-2019 is that in the years after 2020, a structural fracture happened in almost every economic sector due to the effects of the pandemic and, later, the Russo-Ukrainian war.

Limitation of data availability

A limitation of this study is the reliance on data collected between 2015 and 2019. While this dataset provides a robust foundation for analysis, it may not fully capture more recent trends in the field. Changes in technology or in the international economic and political situation since 2019 could influence the relevance of the findings to current contexts. However, as mentioned earlier, there are established and sound reasons behind the chosen

timeframe. Efforts were made to ensure the dataset's quality and relevance during the selected period; however, readers should exercise caution when generalizing the results to different timeframes. Future research could address this limitation by incorporating more recent data or extending the analysis to include longitudinal datasets covering a broader temporal range. This would enhance the study's robustness and applicability over time.

Applied methods

During the preparation and verification of the database and the calculation of the financial ratios, the following problems were encountered: in each year, there were enterprises that closed the current financial year without revenue, the balance sheet and profit and loss account data were not consistent, enterprises reported with the total cost method in one year and cost of sales method in another, and there were also outlier data. To solve the problems and thus to create a set of enterprises that could be included in the modelling, the following approach was adopted: enterprises with no revenue in the given financial year, enterprises with inconsistent data, enterprises with the cost of sales type profit and loss accounts, and enterprises with outliers and extreme outliers were filtered out and deleted.

To test the hypothesis, *multivariate linear panel regression* was performed on the database data. In a general sense, any database is a panel database in which observations can be distributed into a multidimensional structure. In the panel database, traditionally most commonly analysed, a given set of individuals is observed at fixed times over a given period. The observations thus consist of a certain set of properties of a given individual, the changes in these properties, and the time effect (Ahn et al., 2013; Freund et al., 2006).

In recent decades, panel econometrics has made steady progress, as has the analysis of panel data. Cross-sectional studies are usually carried out by analysing the data of the examined group(s) at a given point in time and looking for answers to the questions that arise at that point in time. Tarnóczi et al. (2015) argue that when analysing cross-sectional data over a longer period, it is difficult to detect individual and time effects, and therefore, panel analysis - a cross-sectional time series analysis - is a useful approach to address this problem. Depending on whether the elements of each panel are the same or different at the analysed time, a distinction is made between balanced and unbalanced panels. The panel database allows for a separate analysis of the time effect and the effects of each data group.

The analysis of panel data can also be understood as collecting several observations of cross-sectional data, which belong to different points in time. Panel regression is essentially a "cross-sectional time series analysis". Panel regression is not about increasing the size of the database to be analysed to obtain better statistical test results due to a higher degree of freedom. Panel data analysis allows the examination of economic questions that cannot be asked in cross-sectional or time-series analyses. Panel regression can also be interpreted as a multilevel model. Another advantage of panel data analysis is that models with more complex behaviour can be created and tested (Tarnóczi and Fenyves, 2017).

The mehod of panel regression analysis allows the examination of the regressive relationship between the data (panel matrix) of n variables with a time series of T periods. The basic equation of the model:

$$Yit = a + Xit\beta + Vi + \varepsilon it,\ i=1, ..., n \text{ and } t = 1, ..., T$$

where "a" stands for the constant term,

"β" are the coefficients of the model estimated by calculation,

"Vi + εit" represents the residual members (residues), i.e. "V" are the residues that refer to variables, which differ from unit to unit but are constant as variables (Madaras 2009).

Two main types of multivariate panel regression are distinguished by whether the error term (unobserved independent variable) "ε" is correlated with the independent variables in the model: fixed effects model and random effects model. In the fixed effects model, it is necessary to assume that the unobserved variable covering the variance of the error term is correlated with the explanatory variables in the model. In the random effects model, it is a condition that the so-called latent variable does not correlate with any of the independent variables in the model. The Hausman test is necessary to choose between fixed effects and random effects models. The null hypothesis of the Hausman test states that the random effects model provides consistent estimates. In this case, the random effects specification should be chosen over the fixed effects. Otherwise, the fixed effects model specification should be applied. Consistency should be examined based on the significance level, "p" value, associated with the Hausman test (Frondel and Vance 2010).

If the Hausman test indicates a $p>0.05$, the random effect panel regression model should be used; for a $p<0.05$, the fixed effect panel regression model should be used. If the assumption of the random effect estimation is true (i.e. there is no endogeneity in the model), the estimation is both consistent and efficient, i.e. it is more favourable than the fixed effect estimation (which is also consistent but not efficient). However, if the condition is not met, the random effect estimation is inconsistent (Berezvai 2015).

IBM SPSS Statistics version 26 and Stata version 13 were used for analysis and data management.

Results and discussion

Results of the multivariate stepwise linear regression

Before performing the multivariate linear panel regression, it was necessary to perform a multivariate stepwise linear regression for each analysed year to identify the financial indicators that most influence the profitability of the enterprises (Tömöri et al., 2022) in the database.

In the multivariate stepwise linear regression calculation, the dependent variable used is the "Operating profit/loss" of the examined companies. In the cross-sectional analysis, 21 financial indicators were selected as independent variables. The results of the regression show that, using the financial indicators calculated from the reports of the investigated food retail enterprises as independent variables for the given year, a multivariate linear regression function can be obtained using cross-sectional data for the time interval 2015-2019 as the independent variables, which allows the result of the operating profit/loss of the examined enterprises to be estimated as a dependent variable with high accuracy and significance.

Based on the cross-sectional modelling, the indicators used in the final models for the given years are ROA margin I, Net working capital, Net working capital ratio, Inventory turnover rate, Total assets turnover rate, Capital strength, Current assets ratio, PAT WC margin. Of these, the following financial ratios occurred as independent variables in each year in each model:

- ROA margin I. (Operating profit or loss / Total assets)
- Net working capital (Current assets - Current liabilities)
- Net working capital ratio (Net working capital / Total assets)

Based on the global interpretation of the t-tests, these three variables have the highest added value and impact in the models each year so that the above financial indicators can be defined as key indicators based on the analysis. It is expected that the above indicators will be included in the models following the panel regression procedure.

Multivariate linear panel regression

Because it is possible to handle both time and observed elements in panel databases based on grouping rules, the panel regression procedure also used macroeconomic data for modelling, either in balanced or unbalanced form, which are presented in Table 1.

Table 1

Applied macroeconomic variables

	EUR/HUF MNB annual average exchange rate in HUF (HUF)	5-year BIRS (average of the current year) (coefficient)	Annual net income per capita of households (thousand HUF)	Employment rate (current year) (coefficient)
2015	309.9	0.0215	1 150.303	0.57510343
2016	311.46	0.013	1 199.094	0.59702898
2017	309.21	0.0114	1 300.079	0.6096726
2018	318.87	0.0165	1 431.983	0.61978921
2019	325.35	0.0112	1 610.692	0.62603421

Source: own editing based on KSH (Central Statistical Office) data

SPSS and Stata statistical software were used for panel regression modelling. Based on the outputs of a backward regression procedure on panel data in SPSS, fixed effects and random effects panel regression models were constructed using Stata.

The "backward" procedure consists of including all independent variables in the model in the first round and excluding, in the course of iterations, those independent variables, the omission of which does not substantially reduce the amount of variance explained by the model (R^2). The aim of the "backward" regression on panel data is to find independent variables among financial and macroeconomic indicators that can be used in "fixed effects" and "random effects" regressions. Of the 21 financial indicators mentioned in subsection 4.1, those that were used in the final model for the year in question in the cross-sectional modelling were selected for backward regression: ROA margin I, Net working capital, Net working capital ratio, Inventory turnover rate, Total asset turnover rate, Capital strength, Current asset ratio, PAT WC margin.

Among the output data of the backward regression on the independent variables, the data in the "Coefficients" table are needed to make the decision. The "backward" procedure produced a satisfactory result after 9 iterations. After the 9^{th} iteration, the following variables were selected as independent input variables for the panel regressions based on the significance levels and multicollinearity measured by the VIF test.

The ROA margin I, Net working capital, and Net working capital ratio in Table 2 are included in the panel regression as independent variables using the backward procedure, which supports the result of the cross-sectional modelling that the financial ratios discussed can be defined as key indicators. The panel regression also includes the ratio of current assets to financial ratios as input explanatory variables. Among the macroeconomic indicators, the annual net income per capita of households is included in the panel models.

Table 2

Panel regression input independent variables

Coefficients							
Independent variable	Unstandardised coefficients		Standardised coefficients	t	Level of significance	Multicollinearity statistics	
	B	Standard error	Beta			Tolerance	VIF
Current assets ratio (Current assets / Total assets)	-588.099	97.424	-0.103	-6.036	0.000	0.656	1.526
Net working capital (Current assets - Current liabilities)	0.119	0.003	0.547	35.165	0.000	0.788	1.269
Net working capital ratio (Net working capital / Total assets)	-1313.946	87.341	-0.287	-15.044	0.000	0.524	1.907
ROA margin I. (Operating profit / Total assets)	10371.430	191.906	0.778	54.044	0.000	0.920	1.087
Annual net income per capita of households (thousand HUF)	0.297	0.117	0.036	2.550	0.011	0.932	1.073

Source: own editing

For the independent variables mentioned above, it can be stated that $p<0.05$, the VIF test values are between 1 and 2, i.e. they are significant, and there is no multicollinearity.

"Random effects - RE" panel regression results (STATA)

For both the random effects and fixed effects panel regressions, it is necessary to specify the time variables and the clustering variables, which in this case are the period 2015-2019 and the Opten ID of the companies.

The results of the RE panel regression are presented in Table 3. The Corrected R^2 is 0.8156, which means that the constructed random-effects regression model can predict the operating profit/loss of the enterprises in the North Great Plain region with 81.6% accuracy.

The STATA procedure uses the Wald Khi-square test for RE panel regression to determine whether the model applies only to the sample under consideration or to the entire population. The Wald test result is 4015.06, $p=0.00$, which leads to the conclusion that the model is applicable to the entire population. All variables in the model are significant.

The random effects model for food retailers in the North Great Plain can be written in the following form:

$$\text{Operating profit}_{Pred} = 210.5 + (-614.9\text{xCurrent Asset Ratio}) + (0.115\text{xNet Working Capital}) + (-1230.1\text{xNet Working Capital Ratio}) + (10306.3\text{x ROA Margin I}) + (0.315\text{x Annual Net Income per Capita Household})$$

Table 3

RE panel regression model summary

Name of the independent variable	Beta	Standard error	z test	Level of significance	Confidence interval (95%)	
Current assets ratio	-614.9	109.8	-5.60	0.000	-830.2	-399.6
Net working capital	0.115	0. 003	30.90	0.000	0.108	0.122
Net working capital ratio	-1230.1	96.4	-12.7	0.000	-1419.1	-1041.09
ROA margin I.	10306.3	191.1	53.9	0.000	9931.7	10680.9
Annual net income per capita of households (thousand HUF)	0.315	0.118	2.67	0.008	0.084	0.5469
Constant	210.5	168.3	1.25	0.021	-119.3	540.5
Corrected R^2	0.8156	**Wald Khi-square test result**	4015.06	**RE model significance level**	0.000	
Dependent variable: Operating profit/loss						

Source: own editing

"Fixed effects - FE" panel regression result (STATA)

The results of the FE panel regression are presented in Table 4. The corrected R^2 is 0.7874, which means that the constructed fixed effects regression model can predict the operating profit/loss of the companies in the North Great Plain region with an accuracy of 78.74%.

The STATA procedure applies an F test for the FE panel regression to determine whether the model applies only to the examined sample or to the entire population. The result of the F test is 291.62, p=0.00, which suggests that the model could be applied to the whole population. However, it is important to point out that the indicator for the proportion of current assets is not significant in the fixed effect model (p=0.789).

The random effects model for food retailer companies in the North Great Plain can be written in the following form:

$$\text{Operating profit/loss}_{Pred} = -427.57 + (-78.4\text{xCurrent asset ratio}) + (0.088\text{xNet working capital}) + (-884.2\text{xNet working capital ratio}) + (10492.6\text{x ROA margin I}) + (0.483\text{x Annual net income per capita households})$$

Table 4

Summary of FE panel regression model

Name of the independent variable	Beta	Standard error	t-test	Level of significance	Confidence interval (95%)	
Current assets ratio	-78.4	293.02	-0.27	0.789	-654.6	497.8
Net working capital	0.088	0.013	6.62	0.000	0.062	0.114
Net working capital ratio	-884.2	248.13	-3.56	0.000	-1372.2	-396.2
ROA margin I.	10492.6	290.08	36.17	0.000	9922.21	11063.1
Annual net income per capita of households (thousand HUF)	0.483	0.195	2.47	0.014	0.099	0.868
Constant	-427.57	331.54	-1.29	0.198	-1079.5	224.4
Corrected R^2	0.7874	**F test result**	291.62	**FE model significance level**	0.000	
Dependent variable: Operating profit/loss						

Source: own editing

Hausman test results

Based on primal logic, considering the determinative coefficient (FE (0.7874) < RE (0.8156)) and the explanatory power of the independent variables, as well as the significance level (in the case of the fixed effects model, the indicator of the current assets ratio is not significant, p=0.789), it is clear that the random effects model performs better.

The Hausman test was used to decide between random effects and fixed effects regression models. The significance level of the test is p=0.352, which means that the random effects model is practically applicable. The random effects model is consistent and effective for food retailers in the North Great Plain. The fixed effects model is effective but not consistent.

The results show that based on the panel data between 2015 and 2019, using the financial ratios of food retailers in the examined Hungarian region and macroeconomic indicators as independent variables, a multivariate linear regression function can be defined, which allows to estimate and predict the operational profit/loss of the examined companies as a dependent variable with high accuracy and significance. The random effects regression model can predict the operating profit/loss of the examined companies with high accuracy and significance; the fixed effects regression model cannot be used instead.

Conclusions

The primary objective of the research was to develop a decision-supporting performance measurement tool based on quantitative data. The research resulted in the development of a multivariate regression model and a financial indicator framework. The practical results of the secondary research can be applied to the entire population of the study region based on statistical procedures. The result of the modelling is a random-effects regression model that can predict 81.6% of the operating profit/loss of food retailers in Hungary's North Great Plain region.

Among the financial ratios produced from the statements used in the course of the procedures, the application of ROA margin I, Net working capital, Net working capital ratio, Current assets ratio as key indicators, as well as Inventory turnover rate, Total assets turnover rate, Capital strength are suggested. The indicators form a set of indexes that can contribute to the financial analysis, financial planning and decision-making of food retailers in the North Great Plain region. Of the macroeconomic indicators, household income per capita and its change can provide guidance for planning, as food retail risk appears to be the most important macroeconomic indicator.

It is concluded that, based on the panel data for the period 2015-2019, the financial ratios and macroeconomic indicators calculated based on the statements of the examined food retailing enterprises can be used as independent variables to define a multivariate linear regression function that can be used to estimate and predict the operating profit/loss of the examined companies under study as a dependent variable with high accuracy and significance – our hypothesis can be accepted. The main result of the research is that a performance evaluation panel regression model specific to food retailing enterprises in the North Great Plain region has been developed, which can be used to predict the outcome of the operating profit/loss of the studied companies. Based on the Hausman test, there is no endogeneity in the model, and the error terms do not correlate, which makes the application of the random effects model practical. The random effects model is consistent and effective for the sample, and the fixed effects model is effective but not consistent. The adjusted R^2 of the RE panel regression is 0.8156, which means that the constructed random effect regression model can predict the operating profit/loss of the North Great Plain companies with 81.6% accuracy. Based on the Wald Chi-squared test, the RE panel regression is applicable to the entire population.

It can be concluded that the analysis and interpretation of key indicators can help food retailers to produce higher operating profit. Based on the identified key indicators, the effectiveness of working capital management can be analysed at a high level of abstraction, which can be used as a basis for determining the appropriate action in operations to mitigate the problem. It can also be concluded that multiple indicators have been identified in the cross-sectional stepwise regression procedure, not all directly related to working capital management. However, their application can provide additional information for food retailers in the examined region. Although excluded from the panel model, the applicable indicators had explanatory power in the cross-sectional regressions: Inventory Turnover, Total Asset Turnover, and Capital Strength. It is also found that the variance explained by the dependent variables excluded from the panel model is partially equal to that explained by the remaining variables. In practical terms, this means that the two financial indicators provide partially or entirely the same information. From a professional point of view, the analyst should pay attention to the similarity of the information content when assessing performance.

The model resulting from the research can be used by food retailers in the examined region of Hungary in their financial analysis, management control and performance measurement activities. The companies have two options: they can either substitute the relevant financial indicators and the current level of the macroeconomic indicator into the final generic model to obtain a forecast of the operational profit/loss, or they can make decisions with the support of the developed indicator system. Of course, it is also possible to use both methods in combination, and it is recommended from a professional point of view. Following the steps of creating the present model, further financial performance measurement tools can be created for other samples of different sectors or geographical areas, which can help management and investors of SMEs to grasp the profitability of the companies better.

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