

Large firm effect in enterprise risk management Empirical evidence of Hungarian corporations

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Received: April 21, 2021 • Revised manuscript received: February 9, 2022 • Accepted: February 14, 2023



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ABSTRACT

Micro-level risk awareness affects macro-level financial stability as well. Thus, the corporate risk management practice impacts the exposures and the potential fragility of an economy. While corporate risk management is accepted to create value in an imperfect market, the effect of the firm size is not straightforward. Smaller, financially constrained firms can benefit more by engaging in risk management programs, but larger corporations face more complex risks and have more resources for this activity. Empirical studies on risk management focusing mainly on the US market, highlight a positive relation between the firm size and the quality of risk management that includes not just the hedging of financial risks, but the concept of integrated risk management as well. The aim of this paper is two-fold: first, to summarize the existing literature on corporate risk management with a special focus on the effect of corporate size; second, to contribute to the existing literature by investigating a Central European market, Hungary. The findings are similar to those of the existing global literature, as derivatives usage, and applications of an integrated risk management concept increase with firm size. Although all firms in the sample manage their foreign exchange risk, interest rate hedging and more sophisticated derivatives, like options, are much less widespread in Hungary, compared to the US and Asian peers. The size effect is proven for the objective criteria of risk management quality by comparative analysis and a structured modelling framework, however, the subjective self-evaluation was uncorrelated to the size.

KEYWORDS

enterprise risk management, financial risk hedging, principal component analysis, structured modelling

JEL CLASSIFICATION INDICES

G32, G39

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1. INTRODUCTION

Corporate risk management theory has a very broad literature investigating the relevance and the optimal models of corporate hedging. While the perfect market assumption of [Miller and Modigliani \(1958\)](#) states that a firm's value is unaffected by the management of financial risks and market imperfections, in reality, taxes, transaction costs, information asymmetry, and costs of financial distresses justify the importance of risk management as a significant part of corporate management ([Smith – Stulz 1985](#); [Lessard 1991](#); [Froot et al. 1993](#); [Tirole 2006](#); [Voszka, 2021](#)).

Corporate risk management gained importance in practice over the last decades ([Stulz 1996](#); [Nocco – Stulz 2006](#)). In the 20th century, risk management consisted of buying insurance against some types of risks. Then, with the development of financial markets, corporations obtained access to a wide range of financial derivatives that allowed them to reduce their exposure and, consequently, the risk of their cashflow. The earlier concept of risk management and measurement was focused on certain types of risks separately and controlled their consequences independently. The holistic approach of risk management that considers the overall effect of the risk factors on the operation is captured by the Enterprise Risk Management (ERM) concept ([Hull 2015](#)). This is described by the [Committee of Sponsoring Organizations of the Treadway Commission in 2004](#):

“Enterprise risk management is a process, effected by an entity's board of directors, management, and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives.”

The new phenomenon that risk management should be considered for is the growing importance of the non-financial factors, such as environmental, social and governance (ESG) issues on corporate value ([Aybars et al. 2019](#)). The social capital built by ethical operations, such as the Corporate Social Responsibility (CSR) activities, can provide a downside protection in the times of stress ([Lins et al. 2019](#)). The firm's ESG/CSR profile and activities are influenced by many factors like ownership, market and leadership but the direction of the causal relation is not obvious ([Gillan 2021](#)).

In practice, corporate hedging is influenced by many factors, such as overall risk appetite ([Berlinger – Váradi 2015](#)) and the availability of financial markets, their liquidity and market risk premiums ([Mian 1996](#); [Joseph – Hewins 1997](#); [Haushalter 2000](#); [Csóka – Hevér 2018](#); [Dömötör – Kovács 2018](#)), management incentives ([Tufano 1996](#); [Bihary – Dömötör 2018](#)), and/or behavioural effects ([Brown et al. 2003](#); [Faulkender 2005](#)).

This paper aims to review the empirical studies of the literature investigating corporate risk management and to analyse the practice of the Hungarian firms, focusing on the question of whether better developed risk management practice comoves with the corporate size. The theoretical works of [Froot et al. \(1993\)](#) and [Holmström – Tirole \(2000\)](#) suggest that risk management can serve as a substitute for outside financing. Therefore, smaller firms, prior to their growing phase, are better motivated to engage in the risk management programs and, thus, avoid credit rationing. On the other hand, larger corporations face more complex risks and also have more scope (financial and human resources) to set up an internal risk management function ([Nocco – Stulz 2006](#)).



The empirical studies on the relation of corporate size and risk management activity conclude that firm size is a significant factor positively affecting risk management practice. This paper also confirms the positive relation, based on a comparative analysis of the sample and the correlation of latent variables of size and level of risk management quality.

Section 2 presents the empirical literature on the practice of corporate risk management, with particular focus on the effect of the firm size. Section 3 details the data and provides a descriptive analysis of the survey result. The fourth Section contains the analysis of the dataset through a latent variable model. Finally, the conclusions are derived.

2. LITERATURE REVIEW

Earlier studies (detailed in the next sub-section) of the practice of corporate risk management focused on financial risks, mainly on questions dealing with the kinds of risk firms were facing, whether they were aware of them, and how they managed them (if they did). These studies presented a descriptive analysis of the survey results, combined with other – mainly financial – firm characteristics.

With the increasing relevance of the integrated risk management approach and the appearance of the ERM concept, the most important research question changed from being the description of the risk management practice to being the evaluation of the ERM status of firms and the factors determining it.

The global environmental changes sped up in the last years. The consequences of the climate change and also the effect of a global pandemic like the COVID-19 pose a new challenge to corporate risk management. Financial markets became more volatile, increasingly procyclical and cross-integrated, making financial contagion more likely (Davidovic 2021).

Those global uncertainties are much less manageable by pure financial tools, operational and strategic answers are needed that are more and more in the focus of corporate risk management. The environmental and socioeconomic considerations of uncertainty forces organizations to analyse more carefully the risk factors affecting their business continuity and also their sustainability relevance (Settembre-Blundo et al. 2021). During the pandemic caused market shocks, corporations with better focused crisis management are proved to ensure fewer negative returns (Cheema-Fox et al. 2021).

2.1. Descriptive studies

Foreign exchange (FX) risk management and product usage of the Australian firms were analysed by Batten et al. (1993) based on survey results of 72 large corporations. FX turnover, that can be considered as an indicator of size, was found to have the most significant effect on the risk management characteristics, such as usage of more sophisticated products and computer technology.

Financial risk management and derivative usage in risk management were investigated in two surveys at The Wharton School in 1995 and 1998. The analysis of the responses was published by Bodnar et al. (1998) focusing on the risk management practice of the US non-financial firms. The results were compared with a companion survey on the German non-financial firms in 1997 by Bodnar et al. (1999). They found that the derivative usage in risk management has some common features in both the countries: hedging of FX-risk is the most common; larger firms



use derivatives significantly more often in both countries. They also detected some differences in the traded instruments and the goal of hedging.

The size effect in derivatives usage was also confirmed by [Heaney et al. \(1999\)](#), who analyzed the non-financial firms in Japan.

The Wharton School survey format was used by [Sheedy \(2006\)](#) to analyze corporate risk management in Hong Kong and Singapore. She found that derivative usage is more intense in Hong Kong and Singapore than in the US, but the size effect – that larger firms tend to use derivatives more – is the same in all the three countries. However, the difference between large and medium-sized corporations is not as significant in Asia.

A global extension of the survey was completed by [Bodnar et al. \(2011\)](#) as they analysed the responses of 1,100 firms all over the world. The results were very similar to the previous ones. Derivative usage is widespread, but more than one-third of the companies refuse using derivatives as a part of their risk management program. Mainly over-the counter (OTC) derivatives and basic instruments (e.g., forward contracts) are preferred. They found major differences in the practice of financial and non-financial firms, but location was not a distinguishing factor. The fact that larger companies manage their financial risks more was also confirmed.

In Hungary, the central bank (MNB) carried out two surveys in 2005 and 2007, the results were summarised by [Bodnár \(2006, 2009\)](#). The first survey investigated the exchange rate exposure of the small and medium-sized enterprises and the management of their exposure. According to them, the small enterprise sector is less risk-aware; it underestimates its risk exposure and does not manage it. The model found no relation between corporate size and FX risk management. The second survey included large corporations as well, with a focus on foreign exchange exposure. The overall results were similar to the previous ones: the Hungarian corporate sector is unaware of risk management tools, considering them expensive, complicated and ineffective. However, larger firms were found to be more aware of the usage and availability of derivatives for the risk management purposes.

The papers mentioned so far, contained descriptive analysis and comparison of the different categories where firm size was measured by the sales revenue, except for [Bodnár \(2006\)](#) which was based on the number of employees.

2.2. Studies on the evaluation of risk management (ERM) programs

[Lechner and Gatzert \(2018\)](#) grouped empirical studies on ERM into three main lines of research. The first one investigates the implementation of ERM, the second examines the firm characteristics that are determinants of the ERM, while the third searches for evidence of the impact of ERM on corporate value. The studies apply mainly public data sources like Compustat or financial reports of the firms in the sample, some of which were based on surveys.

[Colquitt et al. \(1999\)](#) investigated the characteristics and extent of integrated risk management and one of their focus areas was the size effect. They found that both derivative usage as well as the frequency of finite risk insurance and financial reinsurance increase with firm size. Their analysis was based on comparing the ratios among the groups with different firm sizes, similar to the method of [Bodnar \(1998\)](#) and [Sheedy \(2006\)](#).

[Liebenberg – Hoyt \(2003\)](#) modelled the determinants of appointing a corporate risk officer, which was considered a signal of using the ERM concept among the US insurers. They compared the firm characteristics of the group of firms that announced a Chief Risk Officer



(CRO) appointment with a control group. Both of their models (comparative statistics and logit regression) failed to display a significant positive effect of the corporate size. Their insignificant results might have been due to the limited sample size (26 firms + 26 control firms) and the fact that CRO appointment is not necessarily a good measure of integrated risk management. On the other hand, later they found significant differences in the size between the ERM users and non-users on a wider panel dataset (Hoyt – Liebenberg 2011), where the ERM usage was identified by certain keywords in the financial reports and media appearances.

Positive correlation between corporate size and ERM implementation was exhibited by several further studies on the sample of the US firms (Beasley et al. 2005; Gordon et al. 2009; Pagach – Warr 2011; Baxter et al. 2013; Farrell – Gallagher 2015). These studies used multivariate models, linear regression and logistic regression to examine the effect of size – as an explanatory variable – on the ERM usage or the level of integrated risk management.

Besides the US, Golshan and Rasid (2012) analyzed the Malaysian corporate sector, Zhao and Singhaputtangkul (2016) interviewed the Chinese construction firms and in Europe Lechner and Gatzert (2018) investigated the German market. Of the studies listed, the size effect could not be proven only in the Malaysian sample. Golshan and Rasid (2012) found that only the financial leverage and the presence of a Big Four auditor have a significant effect on the ERM usage.

Table 1 summarizes the studies that modelled the size effect as a determinant of ERM.

In addition to examining the significance of the differences between ERM users and non-users, the above studies examined the relation between ERM adoption and its determinants using linear and logistic regression models that model the predictive power of firm variables such as size.

The research of Zhao and Singhaputtangkul (2016) used the structural equation modelling (SEM) technique that aims to capture the relation among the latent variables. The technique consists of a measurement model that identifies the latent factors of the observable variables and a structural model that tests the relation between them.

According to the existing empirical literature, the effect of corporate size on risk management implementation and the presence of an integrated risk management concept are confirmed on the US, Australian, European, and also, the Asian samples.

Gatzert and Martin (2015) further summarize the empirical studies on the determinants of ERM, introducing all the factors — not only the size — as presented above.

3. DATA AND DESCRIPTIVE ANALYSIS

I investigated the Hungarian market based on the client database of the Hungarian branch of an international commercial bank (Dömötör 2014). All of the bank's active clients (about 100 firms) were approached, so the sampling method was a form of cluster sampling. As the bank focuses on large firms, the surveyed clientele came from the top 500 companies in Hungary. The data collection was implemented through a password-protected questionnaire on an online interface. I received 15 responses through the online interface and 10 questionnaires were sent back via e-mail; together with data recording through personal interviews, I obtained a total of 29 responses. This meant a response rate of about 30%.

The database is unique, as almost all corporations, which are active in risk management, were approached and the sample can be considered representative. The majority of the multinational companies have no such activity in Hungary, as most of them have centralised risk management, so the survey respondents cover a significant part of the total population surveyed.



Table 1. Empirical studies of the size effect

Author(s)	Date	Sample	Sample size	Size effect	Method	Size measure	Data source
Batten et al.	1993	Australian firms	72	+	Descriptive analysis, Chi-test	FX-turnover	Survey
Colquitt et al.	1999	US firms	379	+	Descriptive analysis	revenue	Survey
Liebenberg - Hoyt	2003	US firms	26 + 26	no	Logistic regression	In total assets	Public database
Beasley et al.	2005	US and international firms	123	+	Logistic regression	In revenues	Survey
Gordon et al.	2009	US firms	112	+	Linear regression	In total assets	Public database
Pagach - Warr	2011	US firms	77	+	Logistic regression, Hazard model	In assets	Public database
Hoyt - Liebenberg	2011	US insurers	117	+	Panel regression	In total assets	Public database
Baxter et al.	2013	US firms	165	+	Lin. regression, Logistic regression	In market cap.	Public database
Golshan - Rasid	2012	Malaysian firms	48 + 42	no	Descriptive analysis Logistic regression	In total assets	Public database
Farrell - Gallagher	2015	US firms	225	+	Linear regression, Logistic regression	In total assets	Public database
Zhao - Singhaputtangkul	2016	Chinese construction firms	35	+	Structural equation analysis	Financial grades in the contractor registration system	Interview
Lechner - Gatzert	2018	German firms	115 + 45	+	Logistic regression, Hazard model	In total assets	Public data



The design of the questionnaire was based on the experiences of the research partner bank and the Wharton survey (1995) to investigate corporate risk management practices as extensively as possible. The questions were grouped into three types:

- financial data of the annual report and other firm characteristics,
- objective questions on risk management implementation, and
- the subjective evaluation of the respondents on the company's risk management quality.

Although the firms in the sample were considered to be large companies in local markets, they were quite diverse according to their size. To analyze the firm characteristics according to the size, I built three groups, as [Bodnar et al. \(1998\)](#), based on the annual sales figures. Firms with total sales higher than 300 million USD (HUF 90 bn) in the 2011 fiscal year belonged to the large companies. Medium-sized firms had sales revenue between 85 and 300 million USD (HUF 25 – 90 bn). Companies with sales less than 85 million USD were considered to be small. About one-third of the companies belong to each category.

[Table 2](#) presents the results together with those of previous studies. The majority (86%) of Hungarian firms in the sample use derivatives to reduce their foreign exchange risk and all the derivatives users trade forwards.¹ There are significant differences among the groups. Large and medium-sized firms all use trade derivatives, but only 60% of the small companies use derivatives.

Although the results are comparable with certain limitations as the date of data collection and the definition of the categories differ, the Hungarian sample's results seem to be more similar to the Asian survey results.

To investigate the quality of risk management several questions were asked about whether the company had each of the following sophisticated characteristics: the presence of an integrated risk management concept, a written risk management policy, and whether they use the contracts of International Swaps and Derivatives Association (ISDA) as a legal framework and apply hedge accounting. All those statements were considered to reflect an active risk management of the firm. The proportion of the companies with positive answers increased with the size, showing that larger firms are more risk-aware in all analyzed respects. Further aspects of risk management related to the derivatives usage showed that options are much less applied in Hungary – only 21% of the companies conclude options on average – in contrast to the 57% and 46% of option usage in the US and Asian samples, respectively.

Despite the fact that almost all companies reported that they have positions exposed to interest rate risk, they typically do not hedge against that kind of risk in Hungary: only 21% of the firms use derivative transactions to manage interest rate exposure. This ratio is much higher in the US (80%) and in Asia (70%). Both option usage and interest rate hedging frequency increase with the size. [Table 3](#) summarizes the results.

One part of my survey contained some statements on the quality of risk management (detailed in the next session) that had to be evaluated on a 9-grade Likert scale (1 is the worst, 9 is the best), aiming to measure the subjective evaluation of the respondents, the CFO or the CRO of the firm. [Table 4](#) contains the average and the standard deviation of the answers.

¹On the hedging instruments and possibilities on the Hungarian market, see [Walter \(2014\)](#).



Table 2. Derivative usage of firms with different size, %

	US	Hong Kong and Singapore	Hungary
Total	50	78	86
Large	83	89	100
Medium	45	82	100
Small	12	62	60

Table 3. Corporate risk management characteristics, %

	Ratio	RM policy	ISDA	Hedge accounting	Options	Interest rate hedge
Total	100	55	48	21	21	21
Large	34.5	100	70	40	30	50
Medium	31.0	45	56	22	22	11
Small	34.5	20	20	0	10	0

Table 4. Subjective evaluation of the risk management

	Mean	Standard dev.
Total	7.26	1.68
Large	7.89	0.84
Medium	7.84	1.17
Small	6.16	2.14

Based on the results, the smaller firms evaluate the risk management of their company less, but the differences among the three groups are insignificant. This is partly consistent with the findings of [Bodnár \(1998\)](#), [Sheedy \(2006\)](#), as shown in [Table 2](#). A similar survey was conducted by [Horváth in 2020](#) focusing on the FX exposure of the Hungarian corporations. This research also confirms that the larger companies are more active in managing their risks, however, their attitude and goals differ if they have long or short position in HUF.

4. STRUCTURED MODEL OF THE RELATION BETWEEN RISK MANAGEMENT AND CORPORATE SIZE

I analysed the size effect in a structured model that is similar to the above introduced SEM technique. At first, latent variables for the size and the risk management quality are searched from the observed variables using principal component analysis, and then, their correlation is investigated.



4.1. Modeling size

Firm size can be measured using different financial data, most frequently by total assets or net sales. The categorization of the previous section was based on net sales. However, choosing the total assets to build the groups would have caused some minor changes in the ordering.

As Figure 1 shows, financial data in our case contain outliers that cause a bias in the sample, the logarithm of the financial data is used for modelling purposes.

To get a complex variable that considers more than a single dimension of the size, principal component analysis was used based on the logarithm of the following variables:

- Total assets
- Equity
- Net sales
- Number of employees
- Operating profit
- Pre-tax profit.

By the principal component analysis (PCA) method, uncorrelated latent variables can be identified under the correlated variables (Kovács 2009); in this case, factors representing the size of the company.

The correlation of the studied variables ranges between 0.62 and 0.94, as shown in Table 5, and are all significant at 99% level, the KMO measure² is 0.776, making the data suitable for principal component analysis.

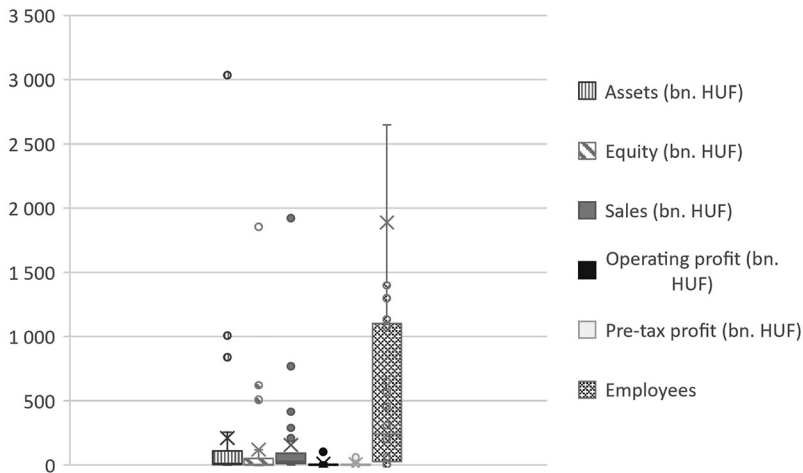


Fig. 1. Distribution of the firms' size measures

Note: The box shows the middle 2 quarters, the dots can be considered outliers.

²Kaiser-Meyer-Olkin (KMO) adequacy measure is the ratio of the sum of the square of the correlations and the sum of the square of the correlations plus the sum of the square of the partial correlations. If this value is below 0.5, the sample is not suitable for principal component analysis.



Table 5. Correlation matrix of the logarithm of the size measures

	ln_asset	ln_equity	ln_sales	ln_employees	ln_op_profit	ln_pretax_profit
ln_asset	1	0.879**	0.879**	0.617**	0.909**	0.918**
ln_equity	0.879**	1	10.000**	0.818**	0.837**	0.843**
ln_sales	0.879**	10.000**	1	0.818**	0.837**	0.843**
ln_employees	0.617**	0.818**	0.818**	1	0.675**	0.704**
ln_op_profit	0.909**	0.837**	0.837**	0.675**	1	0.944**
ln_pretax_profit	0.918**	0.843**	0.843**	0.704**	0.944**	1

Note: **correlation is significant at 99% level (2-sided).

Because of the strong relation between the variables, the first major component explains 88% of the total variance, so the data can be summarized into a single “size” factor. Consequently, size can be quantified with a single variable by saving the factor score of each company deriving from the PCA.

4.2. Components of risk management

To quantify the risk management quality of the company, objective and subjective survey variables were used. The objective variables were based on the answers to questions related to the risk management practice of the firm: presence of risk management policy, derivatives usage and administration. All of them are binary variables. On the other hand, the subjective evaluation on a 9-grade Likert scale formed the second group of variables.

Table 6 presents the objective and subjective variables used in the analysis.

The objective criteria are binary variables; their value is one if the statement is true for the company and zero if it is not. The KMO measure of the PCA of the objective criteria was below 0.5; therefore, that sample was not suitable for PCA. According to the KMO measure, two variables – “IR_hedge” and “Nat_hedge” – proved to be inadequate and were therefore omitted; the analysis was rerun with the other four. The two omitted variables are indeed not necessarily related to the quality of risk management. The absence of interest rate hedging under a normal yield curve can be a cost reduction choice made by the company. Natural hedging, on the other hand, can be part of a proactive risk management policy but it is also possible that the company has not adequately assessed the potential risks and hedging options. The KMO measure of the four-variable analysis is 0.596; the 0.016 value of the Bartlett test also indicates that the hypothesis of the independence of the variables can be rejected. Two components were identified, which explain 73% of the total variance.

Table 7 shows the correlations between the two principal components and the original variables.

The first component is related to risk management administration and strongly correlates with the written strategy and the application of hedge accounting variables. The other component correlates with the hedging goal of derivatives and with the risk measurement of hedging transactions. The objective measure of the quality of risk management was determined as the



Table 6. Variables of corporate risk management quality

Variables	Short name
Objective variables	
The firm has a (written) risk management strategy.	RM_Strat
FX-risk is managed by matching the positions (natural hedge).	Nat_hedge
FX-risk is hedged with derivatives.	FX_Deriv
Interest rate risk is managed.	IR_hedge
Hedge accounting is used to the accounting of derivatives.	Hedge_acc
The risk of the hedge position is measured.	Risk_meas
Subjective variables	
The risk management strategy is adequate.	Strategy
The implementation of risk management is consistent.	Implementation
Banking partners help in managing risk.	Banks
Fully confident about the features of hedging transactions.	Knowledge
Hedging transactions support corporate operation.	Opinion

Table 7. Components of risk management quality based on objective variables

Objective variables	Components	
	1	2
RM_Strat	0.823	0.286
FX_Deriv	0.292	0.741
Hedge_acc	0.894	-0.011
Risk_meas	-0.023	0.864

Note: For the figures in bold the correlation is significant at 99% level (2-sided).

sum of the factor scores of two components. It is worth noting that this sum gives the same result as that of a single chosen component.

The value of the subjective variables is between 1 and 9, where 1 means that the respondent does not consider the statement true for the company at all and 9 indicates that the respondent thinks it to be entirely true. PCA was run again, in order to identify the indicators for measuring the quality of risk management based on the judgment of the respondent colleague of the firm. The resulting KMO measure is 0.704 and the hypothesis of the independence of the variables can also be rejected by the Bartlett test at all conventional significance levels.

One component was selected, which retained 73% of the total variance. The correlation between the component and the variables was strong and positive; it varied between 0.77 and 0.93.



Since evaluation on the scale is greatly affected by the respondent's personality, the centered variables were also examined. These indicate which statements the respondent evaluated as better or worse than his own average. To do this, the average value of the given company was subtracted from each value, and I performed the analysis with the resulting values, centered for the company. According to the centered values, two main components can be identified – the first explains 64.5% of the total variance while the second explains a further 22%.

In Table 8, the rotated component matrix shows the correlations of the components and the original subjective variables.

The first component shows a strong positive correlation with those statements which evaluate the risk management strategy of the company and its implementation. It shows a strong negative correlation with the opinion of the respondents concerning the services provided by the banks and the usefulness of hedging transactions. The better the opinion of their own risk management strategy, the less satisfied the firms are (relatively) with the banking services and the hedging transactions.

The risk management attitude of the company and how the respondent evaluates the knowledge of the company regarding hedging transactions appear in a separate component. The opinion on how familiar the company is with the characteristics of hedging transactions does not correlate with other statements evaluating corporate risk management.

After procuring the latent variables of size and risk management quality, their correlation is to be examined. The latent variables include a single factor for size but different factors for the quality of risk management; as included in Table 9 together with their short names.

Table 10 contains the Pearson's correlation coefficients between the factors and their significance (*P*-values). The factors of different measures of risk management quality are strongly correlated, some of them derived from each other. Being so trivially related, their correlation is not of interest.

Two of the indicators of risk management quality – the first objective factor and the sum of the objective factors, both in bold – proved to be semi-strongly correlated with the size factor at 99% significance level. The subjective factor, based on the uncentered values, also has a moderate correlation with the size but the significance level is just below 95%. Therefore, the firm size measured by the logarithm of the main balance sheet and profit data strongly correlates with the

Table 8. Components of risk management quality based on centered subjective variables

Subjective variables	Components	
	1	2
Strategy_cent	0.942	–0.117
Implementation_cent	0.929	–0.172
Banks_cent	– 0.858	–0.233
Knowledge_cent	–0.005	0.998
Opinion_cent	– 0.861	–0.066

Note: For the figures in bold the correlation is significant at 99% level (2-sided).



Table 9. Factors of corporate size and quality of risk management

Factor	Short name
Corporate size	size
Risk management first objective factor	obj_fact1
Risk management second objective factor	obj_fact2
Sum of risk management objective factors	obj_fact_sum
Risk management subjective factor	subj_fact
Risk management first subjective factor based on centered variables	subj_cent_1
Risk management second subjective factor based on centered variables	subj_cent_2
Sum of risk management subjective factors based on centered variables	subj_fact_cent_sum

Table 10. Correlation of corporate size and risk management quality

	obj_fact1	obj_fact2	obj_fact_sum	subj_cent_1	subj_cent_2	subj_fact	subj_fact_cent_sum
Size	0.637**	0.128	0.564**	0.404	0.264	0.442	0.371
(Significance)	0.003	0.591	0.010	0.077	0.260	0.051	0.108

Note: **correlation is significant at 99% level (2-sided).

first objective factor that represents the existence of a written risk management policy and hedge accounting rules. The subjective evaluation of the financial manager on the risk management of the firm also improves with the size (Csillag 2020).

The structured model confirms the results of the existing literature and the comparative analysis, proving that the firm size is positively correlated to the corporate risk management quality, also in Hungary.

5. CONCLUSION

The concept of enterprise risk management has gained importance among both professionals and academics in corporate finance in the last two decades. Empirical researches focus mainly on the US market, but some other studies reflect that corporations of the European, Australian and Asian markets act similarly to the US firms. This paper summarized the findings of the literature and compared them to the results of a survey that investigated the large Hungarian companies' risk management practice. The main focus of the research, the size effect in risk management, was examined by comparative analysis of the risk management characteristics of groups with different size, and a structured model was built to identify the correlation between the latent variables of size and risk management quality. Both analyses confirmed that in Hungary too larger companies have a more advanced risk management system that extends the usage of financial hedging with an integrated approach to a wider range of risks.



Although this study concentrated on the management of financial risks, they can not be separated from other types of risks that has been increasingly important in the last years. The quality of risk management determines the framework of the firms to be able to cope with the new global challenges, like climate risk.

ACKNOWLEDGEMENT

This work was supported by Higher Education Institutional Excellence Program of the Ministry of Human Capacities, 20764/3/2018/FEKUTSTRAT.

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