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THE IMPACT OF THE ENTERPRISE FINANCIAL RISK MANAGEMENT FUNCTION ON FINANCIAL PERFORMANCE IN BOSNIA AND HERZEGOVINA

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Abstract

Adequate enterprise financial risk management (EFRM) represents a leading competitive advantage of enterprises that determines market survival and business success in an uncertain global environment. Over time, EFRM has become a constituent part of integral business dealings of enterprises and one of the strategic functions of enterprise management. The main purpose of the paper is to explore the effects of the EFRM function/system on the financial performance of enterprises in Bosnia and Herzegovina (BiH). The basic source of data in the research was collected by means of a structured questionnaire. The target population in the research consists of large enterprises that have continuously operated in the territory of BiH (2013-2017). The selection of enterprises was made applying a random sampling method and contains 72 enterprises. Appropriate descriptive and inferential statistical methods were used in the data analysis and panel data analysis was used to assess effects of EFRM function on financial performance. The scientific contribution of the paper is reflected in the fact that the research is pioneering for Bosnia and Herzegovina with the analysis of effects of the EFRM function on enterprise financial performance (EFP). The results show that there are no systematic, statistically significant differences between large enterprises that engage in risk management ('hedgers') and enterprises that do not engage in risk management ('non-hedgers') in BiH.

JEL classification: G3, G32, C4, C5, C83

Keywords: Enterprise Financial Risk Management; (Non)hedgers; Financial Performance; Panel Data Analysis; Bosnia and Herzegovina

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Introduction

Over the past fifty years, there has been a significant rise in global concerns regarding financial risks faced by both financial institutions and non-financial companies. In this environment, enterprises of various types and sizes are seeking robust EFRM frameworks that not only meet compliance requirements but also contribute to better decision making and ultimately enhance overall enterprise performance. Risk management is a fundamental concern in today's dynamic global environment (Gordon et al., 2009). Thus, risk management in the environment of global-oriented economies and internationalization of enterprises is a difficult and complicated task due to the multitude of risk sources, their intensity and their mutual permeation and strengthening (Jonek-Kowalska, 2019).

The role, position and importance of the EFRM significantly changed according to (Beder & Marshall, 2011; Moles, 2013; Abdić, 2019) after the collapse of the Bretton-Woods Agreement (1971); the oil shocks (1973, 1979, and 1990); a major stock market crash (1987); and the dramatic currency moves (1990s) which increased the volatility of market risk factors such as exchange rates, interest rates, energy prices and/or prices of key inputs/outputs. Increased volatility in the business world has exposed the inadequacy of traditional but fragmented approaches to risk management and this has led to an integrated approach to measuring and managing risks known as enterprise risk management (ERM) (Quon et al., 2012).

The theoretical concept of EFRM emerged in the late 1970s, based on both economic and financial literature derived on Fisher's separation theorem and the Modigliani-Miller theorem of capital structure irrelevance. Economists who have advocated for the justification of EFRM (Smith & Stulz, 1985; Rawals & Smithson, 1990; Froot et al., 1993; Nance et al., 1993) based their views on the existence of imperfections in the financial markets. However, it is necessary to emphasize that in the real world, apart from the imperfections in the financial markets, there are also different and sometimes even conflicting interests between owners, managers, creditors, employees and other stakeholders.

An active approach to EFRM has led to better understanding of the positive effects of risk management on sustainable business operations, while, on the other hand, it has evolved financial instruments and reduced the cost of risk hedging instruments. Over time, EFRM has become a constituent part of integral business dealings of enterprises and one of the strategic functions of enterprise management. According to Quon et al. (2012) a series of enterprise failures, enterprise scandals, and frauds are among the reasons for an enterprise to effectively implement risk management programs, and thus these enterprises' failures are caused by poor risk management and corporate governance. Also, it is important to stress that different types of professional bodies such as institutional investors, rating agencies, public authorities, regulators, and stock exchanges have recognized the need for risk management and have imposed several requirements in order to enhance risk management practices within public enterprises (Sax & Andersen, 2019).

The enterprises are subject to risks in many forms and the ultimate goal of ERM is to model, measure, analyze, and respond to these risks in a holistic manner, treating each risk exposure not in isolation, but rather in a portfolio context (Gordon et al., 2009). It can be concluded that, in recent days, a paradigm shift has occurred regarding the way enterprises view risk management.

The primary objective of this paper is to explore and analyse effects of EFRM function/system on the EFPs in the context of BiH markets. The secondary objective is to examine the practice of EFRM in large enterprises in BiH. The scientific contribution of the paper is reflected in the fact that the research is pioneering for BiH in covering the analysis of effects of the EFRM function/system on profitability, liquidity and indebtedness of enterprises in BiH. Due to the lack of EFRM information disclosure officially required in financial reports of enterprises this paper is designed to fill this gap in the context of the BiH market.

The literature review section provides an overview of the empirical and academic literature, followed by the research design and methodology section that describes the methodology and data used. The third section presents the results and discussion, and the last part lists some conclusion, limitations, and provides directions for future research.

Literature review

By exploring and analyzing both the theoretical arguments justifying the establishment of the EFRM function and the empirical research proving their impact on the enterprise cash flows and value, the rationales for establishing the ERM function can be divided into two basic groups (Judge, 2006; Aretz, Bartram & Dufey, 2007; Miloš et al., 2008):

1) a shareholder value maximization;
2) a managers' utility maximization.

Most empirical studies, to date, have focused on determinants of establishing FRM and on the use of risk management strategies through financial derivatives i.e. financial strategies (Bodnar et al., 2011; Délèze & Korkeamäki, 2018) or explored effects of enterprise

management and found that hedging stabilizes expected earnings and cash flows (Smith & Stulz, 1985; Géczy et al., 1997), increases the growth potential of the enterprise (Smith & Stulz, 1985; Nance et al., 1993) and consequently increases the enterprise's value.

Similarly, the analysis of EFP is a research area which has attracted various attention and interest from not only financial analysts, researchers, the general public and enterprise managers. There is a great variety of EFP measures in the extant literature (Naseem et al., 2019). In the narrower sense, business performance is focused on the use of simple financial indicators which are supposed to indicate the performance of the enterprise's economic goals (Saeidi et al., 2014). The narrower concept is known as "financial performance" which are the most frequently used measures of enterprise performance in empirical research (Carton & Hofer 2010). For Pham, Tran and Nguyen (2018) the financial performance of a business entity is measured and evaluated in terms of profitability, liquidity, solvency, dividend growth, sales turnover, asset base, capital employed, etc. However, Quon et al. (2012) have focused on enterprise value by examining operational, accounting and financial market performance. More specifically, they looked at changes in sales, changes in EBIT margins, and changes in Tobin's Q, respectively. Among others (Gordon et al., 2009; Baxter et al., 2013; Farrell & Gallagher, 2014; Sekreci, 2015; Lechner & Gatzert, 2017; Anton, 2018; Bohnert et al., 2019; Malik et al., 2020; Jia & Bradbury, 2020) analysed effect of ERM implementation on the financial and non-financial enterprise's market value measured by Tobin's Q. Among others (Karunaratne, 2017; Callahan & Soileau, 2017; Florio & Leoni, 2017; Yang et al., 2018; Naseem et al., 2019; Sax & Andersen, 2019; Otero González et al., 2020) analysed the effect of ERM implementation on the EFP measured by ROA and/or ROE or similar indicators. Therefore, we can conclude, there are no unique methods or models in order to assess EFP.

Simultaneously, empirical studies that explore how managing risks (primarily financial) really affects EFP and creates value are scarce and mixed, especially, in emerging countries. According to (Miloš Sprčić et al., 2016; Callahan & Soileau, 2017; Marc et al. 2018; Anton, 2018) most studies explore ERM's influence on the performance and market value of financial companies (mostly insurance companies and banks) and there are just a few studies addressing ERM's effects on non-financial companies. However, due to high industry concentration and their inherent risks, each of these financial companies have been traditionally heavily regulated thereby being associated with more mature risk management processes compared to most other non-financial companies. Thus, the results of the aforementioned studies have limited generalizability. Similarly, Bromily et al. (2015) notice that, while many ERM articles have appeared in the business press, academic research on ERM is still in its infancy and they believe the results of ERM studies are inconclusive because the scholars did not use the same, or at least similar, measure of ERM.

By exploring and analyzing the available literature it has been revealed that, nevertheless, there have been several empirical studies that have considered the effects of FRM on various enterprise features such as financial performances, market value and/or cost of capital. According to authors Gates et al. (2012) in USA; Bertinetti et al. (2013) in Europe; Farrell & Gallagher (2014) simultaneously in Australia, Canada, UK and USA; Miloš Sprčić et al. (2016) in USA; Callahan & Soileau (2017) in USA; Lechner & Gatzert (2017) in Germany; Marc et al. (2018) in USA; Florio & Leoni (2017) in Italy; Sax & Andersen (2019) in Denmark; Malik et al. (2020) in UK; and Jia & Bradbury (2020) in Australia]. In developed countries ERM has a positive impact on EFP. Similarly, according to authors [Silva De Souza et al. (2012) in Brazil; Zou & Hassan (2017) in China; Khan & Ali (2017) in Pakistan; Anton (2018) in Romania; Zou et al. (2019) in China; Hanggraeni et al. (2019) in Indonesia; Yang et al. (2018) in Pakistan; Suttipun et al. (2018) in Southern Thailand; Naseem et al. (2019) in Asia Pacific; Bin Shahrin & Ibrahim (2021) in Malaysia]. In emerging countries ERM has a positive impact on EFP.

According to authors [Beasley et al. (2010) in USA; Quon, et al. (2012) in Canada] in developed countries EFRM has a mixed impact on EFP. Similarly, according to authors [Soltanizadeh et al. (2016) in Malaysia; Tudose & Rusu (2018) in Romania; Khalil-Oliwa (2019) in Poland; Jonek-Kowalska (2019) in Poland] in emerging countries FRM has a mixed impact on EFP. But, in some empirical studies the effects of ERM on enterprise performance were not determined/significant [Tahir & Razali (2011) in Malaysia; Sekerci (2015) in Nordian countries; Karunaratne (2017) in Sri Lanka; Şenol & Karaca (2017) in Turkey; Anton (2018) in Romania; Danisman & Demirel (2019) in Turkey; Sofia & Augustine (2019) in Indonesia; Otero González et al. (2020) in Spain; Khan et al. (2016) in France; Huang et al. (2020) in China]. However, it is important to notice that to the best knowledge of the authors of this paper there are no available papers in developed and/or developing countries in which engagement of EFRM solely diminishes (has a negative impact on) EFP. As it is evident, various researchers have been interested in examining the impact of EFRM on financial performance, but their findings have been varied and mixed. This research paper aims to explore the impact of EFRM on several dependent variables that represent indicators of profitability, liquidity and indebtedness. Therefore, based on the arguments outlined above the following hypotheses were tested:

H_{01}: EFRM has no significant impact on enterprise financial performance in BiH.

H_{02}: There are no significant differences between financial performance of enterprises marked as hedgers and enterprises marked as non-hedgers in BiH.

While previous studies have focused on enterprise value, we have taken a more balanced and comprehensive look at EFPs by examining liquidity, profitability and indebtedness, respectively. Thus, this paper investigates effects of EFRM function on liquidity, profitability and indebtedness of large enterprises in BiH.

Methodological approach

Data

Primary data for all target enterprises in the survey was collected through a structured survey questionnaire[4] completed by authorized personnel in the risk management, finance or internal audit departments of enterprises. Secondary data was collected from the financial statements of the enterprises submitted by the entities to the entity agencies for the collection of financial data of legal entities. The target population in the survey is represented by large enterprises that have continuously operated in BiH in the period 2013-2017.[5] The selection of a sample of companies from BiH for the research is based on the country's specific constitutional structure, post-war and transitional period in the Bosnian economy, and the non-uniform economic space and structure of companies. The population framework of the large enterprise was drawn up on the basis of the Statistical Business Register Data of BiH as of June 30, 2017. According to this register, there are a total of 335 large enterprises measured by the number of employees "'KD BiH 2010 - Class 7 (250 and more employees)". 129 enterprises were excluded from the population framework whose main activity according to the classification of economic activities of the Agency for Statistics of BiH - KD BiH 2010 was: K, M, N, O, P, Q and R.[6] Furthermore, large enterprises from the Brčko District are not included in the population framework because these enterprises are not obliged to submit financial reports to entity agencies for collecting financial data of business entities. Following the exclusion of enterprises from these activities and enterprises from the Brčko District, 206 large enterprises remained within the population framework. With a confidence level of 95% and a margin of error of 5%, 135 enterprises were selected in a random sample from different groups of activity, different forms of organization and ownership structure, and market orientation. The survey was conducted electronically using a structural questionnaire. Of the enterprises surveyed, 85 returned a completed survey, yielding a response rate of 62.96%.[7] In six survey questionnaires, more than 2/3 of the responses were left unanswered and were thus excluded from the analysis.

According to Hoyt and Liebenberg (2011) as well as Miloš Sprčić et al. (2016), during the preliminary data analysis, two enterprises were excluded from the sample because they had a zero value in the capital position during the analyzed period. Additionally, three more enterprises were excluded from further analysis: the first one due to a takeover (purchase from the bankruptcy process), the second because it was a majority state-owned enterprise and held a monopoly status in the market, and the third one because it was majority state-owned, organized as a holding company and had extremely large values in almost all the analyzed numerical variables of interest, exceeding 10 standard deviations in absolute value. Similarly, two more enterprises from the sample were founded at the beginning of the analyzed period and were subsequently recapitalized with multimillion amounts. These two enterprises were also excluded from the sample. After the aforementioned exclusions, 72 companies remained in the sample. In order to detect individual outliers in the data, a box plot and standardized values of numerical variables were used. The data that deviated more than 1.5xIQR are considered as mild outliers, while the data that deviated more than 3xIQR are considered as severe outliers. The data collected contained 0.3% of data that deviated more than 3xIQR, while there was approximately 1% of data that had deviations greater than 1.5xIQR. For variables of interest in which were identified univariate outliers according to Lievenbrück and Schmid (2014) and Florio and Leoni (2017) winsorizing was performed with 1% (or 5%).[8]

Methods and models

In line with the methodology applied in previous research (Bohnert et al., 2019; Bertinetti et al., 2013; Callahan & Soileau, 2017; Anton, 2018; Naseem et al., 2019; Danisman & Demirel, 2019; Sofia & Augustine, 2019; Abdić, 2019; Otero González et al., 2020; Jia & Bradbury, 2020) a panel data regression was con-

[4] The structured questionnaire used in this paper is a component of the structured questionnaire from the doctoral dissertation authored by one of the co-authors of this paper.

[5] Financial institutions were not included in target population because it is belived that financial and non-financial companies should not be taken together in one sample as most of financial companies are also market makers for risk management instruments and their motivation and strategies in managing risks may be different in comparison to non-financial companies.

[6] K - Financial, insurance activities; M - Professional, scientific, technical activities; N - Administrative and support service activities; O - Public administration and defence; P - Education; Q - Human health and social work activities and R - Arts, entertainment, recreation.

[7] It is important to note that, in general, the response rate to survey questionnaires sent electronically is lower. See more in: Graham & Harvey, 2001; Sučić et al., 2011; Nance et al., 1993; Judge, 2006.

[8] According to Adams et al. (2019) the most commonly used techniques and methods of treating outliers in finance are: winsorizing, trimming and dropping.

ducted. The relationship between EFPs and the EFRM function/system and other controlling variables/ determinants can be expressed, in general, as follows:

$$EFP = f(EFRM, DIV, GA, MO, AC, ASI, OS, lnTA, FL, GO) + \mu_i + \lambda_t + \nu_{it} \quad (1)$$

where is:
EFP - an enterprise financial performance measured by the indicators liquidity, profitability and indebtedness as dependent variables;
EFRM - enterprise financial risk management;
DIV - dividends;
GA - group of activities;
MO - market orientation;
AC - agency costs;
ASI - asymmetric information;
OS - ownership structure;
lnTA - size of the enterprise;
FL - costs of financial difficulties or costs of bankruptcy of an enterprise;
GO - growth options / opportunities;
μ_i - specific effects of enterprise i that do not change over time;
λ_t - time effects that are the same for all enterprises (do not vary across enterprises);
v_{it} - error term.

In accordance with the analyzed empirical studies (Bartram et al., 2009; Baxter et al., 2013; Miloš Sprčić et al., 2016; Callahan & Soileau, 2017; Florio & Leoni, 2017; Pham et al., 2018; Naseem et al., 2019; Jia & Bradbury, 2020; Otero González et al., 2020) individual financial performance indicators were used as dependent variables in models, such as profitability performance, liquidity performance and leverage performance As independent variables were considered dividends, enterprise size, financial leverage, growth options, accounts receivable turnover ratio, agency costs, ownership structure, risk exposure, total revenues, operating cash flow, cash and cash equivalents, and EFRM as a dummy variable. Additionally, besides the dummy variables that capture the difference between enterprises that engage in risk management and enterprises that do not engage in risk management, it is necessary to control for other potentially relevant variables. However, there is no substantial theoretical and/ or empirical research on the unequivocal selection of determinants of financial, organizational, and/or ownership characteristics that affect EFPs. Therefore, based on the previously analyzed empirical studies, were included, among others, market orientation, group of activities, asymmetric information, and time (year) dummy variables for the years 2014, 2015, 2016, and 2017 as additional control variables. Further, the most commonly used dependent variables in panel models that were also used in this paper as proxy variables for EFPs are given in Table 1.

Table 1: The most commonly used dependent variables in panel models as proxy variables for EFPs

Performance	Variable	Abbreviation	Short description
Profitability performances	Return on Equity	ROE	= EAT / book value of total equity
	Return on Assets	ROA	= EAT / book value of total assets
	Return on Capital Employed	ROCE	= EAT / (book value of total equity + long term liabilities)
Liquidity performance	Current Liquidity	CL	= current assets / current liabilities
	The average accounts receivable collection period	AARCP	= (average value of accounts receivable and sales revenue / business performance) * number of days in a year
Indebtedness performance	Debt ratio	DR	= total debt / total assets (book value)

Source: Author's own work.

Furthermore, it is important to emphasize that there is no clear boundary in the literature between enterprises that engage in risk management ('hedgers') and enterprises that do not engage in risk management ('non-hedgers'). Different methods, analyses, and proxy variables can be used to determine and measure the degree of utilization of ERM systems/functions. The enterprises that explicitly stated in the questionnaire that they manage financial risks and/or have an established EFRM system/function in this study were classified as 'hedgers', while the others were classified as 'non-hedgers'.

The most commonly used variables of interest and their assumed relationship are given in Table 2.

Table 2: An overview of independent variables used in the empirical research

Variable	Abbreviation	Category	Expected results
Enterprise financial risk management	EFRM	0 = the enterprise does not manage financial risks 1 = the enterprise manages financial risks	positive
Dividends (substitute for ERM)	DIV	0 = the enterprise did not pay a dividend in the current year 1 = the enterprise paid a dividend in the current year	positive
Group of activities	GA	0 = The enterprise is not classified as a service industry 1 = The enterprise is classified as a service industry	positive
Market orientation	MO	0 = The enterprise is not equally oriented towards domestic and foreign markets 1 = The enterprise is equally oriented towards domestic and foreign markets	positive
Agency costs	AC	0 = The enterprise does not have institutional investors with ownership stakes in the share capital exceeding 20% 1 = The enterprise has institutional investors with ownership stakes in the share capital exceeding 20%	positive
Asymmetric information	ASI	0 = The enterprise is organized as a limited liability company 1 = The enterprise is organized as a joint-stock company	positive
Ownership structure	OS	0 = The enterprise is not majority privately owned 1 = The enterprise is majority privately owned	positive
Enterprise size	lnTA	= log (Total assets)	positive
Financial leverage	FL1	= total debt / total equity (book value)	negative
Financial leverage	FL2	= EBIT / Interest Expenses	negative
Growth opportunities 1	GO1	= Purchase fixed assets / Total sales	positive
Growth opportunities 2	GO2	= Purchase fixed assets / Total assets	positive
Growth opportunities 3	GO3	= Costs of production services / Total sales	positive

Source: Author's own work.

Results

2/3 of the sampled companies (66.67%) belong to the manufacturing sector[9], while 1/3 belongs to the service sector (33.33%). In terms of ownership structure, 80.56% of the analyzed sample of enterprises are in majority private ownership, while 19.44% of the enterprises are in majority public ownership. Regarding market orientation, 55.56% of the enterprises are predominantly focused on the domestic market, followed by 29.17% with a dominant orientation towards foreign markets, and 15.28% of the companies are equally oriented towards both markets (Abdić et al., 2019).

Furthermore, the research results indicate that almost 2/3 of the analyzed enterprises, which stated that they manage some of the financial risks have written policies and procedures for managing those risks, and the FRM strategy is an integral part of the overall enterprise strategy in as many as 86.36% of the enterprises, while it is positioned at the operational level in 37.78% of the enterprises (Abdić et al., 2019).

Table 3 (Appendix) (Panel A and Panel B) provides the summary statistics for the 'hedgers' and 'non-hedgers' enterprises for the year 2017. The last column of the table presents the results of statistical tests used to compare the financial positions and indicators of enterprises in Subsample A and Subsample B. The test results indicate that, at a significance level of 10%, there are statistically significant differences between 'hedgers' and 'non-hedgers' enterprises in terms of the following financial positions and indicators: [ROCE, FL2, GO2, SFERE, SLRE, SDRE, group of activities, and market orientation]. The test results did not show statistically significant differences in the remaining financial positions and indicators from Table 3.

The effects of EFRM on the EFPs in BiH were assessed using multiple estimators, such as the pooled OLS estimator, fixed effects estimators (LSDV estima-

[9] Classification of enterprises by main activity of the Agency for Statistics of BiH - KD BiH 2010 (EU NACE Rev. 2) is quite detailed (21 main activities) and therefore all the enterprises were grouped into two groups of activities: manufacturing group and service activities group.

tor), and random effects estimator.[10] A comparative analysis of the estimated models is provided in Table 4.

Compared to the pooled OLS model, the LSDV model[11] provided a better fit to the data, significantly improved all measures of model representativeness such as SSR, root MSE, and (adjusted) R^2, but it lost 70 degrees of freedom. However, based on the previous considerations, it is not possible to unequivocally determine whether the LSDV model is superior to the pooled OLS model. The existence of statistically significant fixed effects were tested using an F-test. Based on the conducted test, the null hypothesis is rejected, and it is concluded that there is at least one significant fixed individual effect [F(67; 282) = 5.63; p-value < 0.001]. Therefore, the LSDV model with fixed effects is superior to the pooled OLS model.

In the subsequent analysis, the random effects model (FGLS estimator) was used to investigate whether the random errors vary across enterprises and/or years. The presence of statistically significant random effects were tested using the Breusch-Pagan Lagrange multiplier (LM) test. Based on this test, the null hypothesis is rejected, and it is concluded that there is at least one significant individual-specific (or time-specific) component of variance of the random errors that is different from zero [$\chi2(1) = 123.27$; p-value < 0.001]. Therefore, the random effects model is superior to the pooled OLS model. The ratio of the variance of individual-specific errors to the variance of composite errors, or the rho coefficient, is 0.4614. A large value of the rho coefficient indicates that individual-specific errors contribute significantly to the variance of the composite error.

Based on the conducted Hausman test, [$\chi2(4) = 178.22$; p-value < 0.001] the null hypothesis was rejected, and it was concluded that the FE model (LSDV estimator) is favoured over the RE model (GLS estimator). In the fixed effects model, individual effects are parts of the intercept, and the correlation between the intercept and the regressor variables does not violate any Gauss-Markov assumption, making the fixed effects model the best linear unbiased estimator (BLUE). Therefore, Panel Model (LSDV estimator) was chosen to estimate the impact of the analyzed variables of interest on profitability performance (ROA).

Table 4: Comparative analysis of estimated models (ROA)[12]

Coefficient	Model		
	'Pooled' OLS	FE (LSDV)	RE
EFRM	0.00727150 (0.00536860)	0.00280800 (0.02021640)	0.00818460 (0.00904750)
lnTA	-0.00705060** (0.00215600)	0.00213630 (0.00899730)	-0.00593360* (0.00340690)
FL2	0.00000005*** (0.00000003)	0.00000002 (0.00000002)	0.00000003 (0.00000002)
GO1	-0.13486050*** (0.04729180)	-0.09845640* (0.05299480)	-0.11486400** (0.04802950)
GO3	0.32062820*** (0.08492410)	0.05980960 (0.09151440)	0.14933730* (0.08395720)
ARTR	0.00000209*** (0.00000002)	-0.00000001 (0.00000184)	0.00000061 (0.00000165)
DIV	0.04273280*** (0.00538510)	0.02353190*** (0.00825530)	0.03367900*** (0.00651280)
MO	0.01538020 (0.00720640)	0.02486240 (0.01740560)	0.01803100 (0.01217950)

[10] Due to spatial constraints in the paper is only presented the estimates of all the mentioned regression panel models using the example of assessing the effects of EFRM on the profitability performance (ROA) of enterprises in BiH. An overview of the estimated regression panel models, where the effects of EFRM on other profitability performance measures (ROE and ROCE), liquidity performance measures (CL and AARCP), and debt performance measure (debt ratio) of enterprises in BiH were assessed, is available upon request to the authors.

[11] There is a fundamental drawback of the "within" fixed effects model, which is that time-invariant variables, such as EFRM, are dropped from the model (due to transformation). As a result, it is not possible to estimate how the time-invariant variable affects ROA. Therefore, if one wants to control for fixed effects of enterprises and retain the time-invariant variable of interest (EFRM), the "within" estimator cannot be used, and a priori preference is given to the LSDV estimator of fixed effects.

[12] By integrating specific control variables into the mentioned models such as financial leverage (FP1), growth options (GO2), agent costs (AC dummy), exposure to risks (ER), total revenue (TR), operating cash flow (OCF), cash and cash equivalents (CCE), the obtained results remain unchanged both in terms of statistical significance and the magnitude of estimated coefficients of the variables of interest. For easier comparison and due to spatial constraints, the table summary does not include the parameters of the 71 dummy variables in the LSDV model. A complete overview of the LSDV model is available upon request to the authors.

Coefficient	Model		
	'Pooled' OLS	FE (LSDV)	RE
GA	-0.0035850 (0.0057374)	0.0590099** (0.0299603)	-0.0084275 (0.0095216)
ASI	-0.0009319 (0.0055331)	0.0191070 (0.0178614)	-0.0016683 (0.0092917)
Const.	0.1419804** (0.0397311)	-0.0863005** (0.0457982)	0.1336632** (0.0628553)
SSR	0.7960000	0.3410000	-
Standard errors	0.0480000	0.0350000	0.0350000
R2	0.2690000	0.6870000	0.2480000
F test	F = 25.0400000 p-value < 0.0010000	F = 8.0500000 p-value = 0.0010000	-
Ramsey Reset test	F(3; 346) = 3.9300000 p-value = 0.0090000	F(3; 279) = 0.3000000 p-value = 0.8270000	-
Breusch-Pagan and Cook-Weisberg tests	-	$\chi2(1)$ = 3.5100000 p-value = 0.0610000	-

***, **, * significant at 1%, 5% and 10% levels, respectively, standard errors are in parentheses

Source: Author's own work.

At the 1% significance level, the variable dividend (DIV) is statistically significant, and at the 10% significance level, the variable growth opportunities (GO1) is also statistically significant. Specifically, dividend payout (DIV) has a positive impact on ROA, while growth opportunities 1 (GO1) has a negative impact on ROA. Other variables are not statistically significant. Additional control variables, such as market orientation (MO), group of activities (GA), and asymmetric information (ASI) are not statistically significant at standard levels of significance. Furthermore, the time (year) dummy variables are not statistically significant at standard levels of significance, except for the time dummy variable for the year 2016 at a significance level of 10% which indicates that the mentioned effect is a result of the introduction of the new Law on Financial Operations in FBiH in 2016, rather than being a result of effect of ERM. Following the same methodology in the analysis of the effects of variables of interest on profitability performance (ROA), were estimated panel models to analyze the effects of variables of interest on other financial performance measures of enterprises.

Table 5 (appendix) presents the results of the estimated models examining the influence of variables of interest on the financial performance of profitability, liquidity, and indebtedness of enterprises, with a particular focus on the effect of the variable EFRM. The results of the estimated panel models: Panel Model 1 (ROA), Panel Model 2 (ROCE), and Panel Model 3 (ROE) indicate that EFRM does not have a statistically significant effect on profitability performance at any standard level of significance (ROA: t = 0.47; p-value = 0.637; ROCE: t = 0.29; p-value = 0.772; ROE: z = -0.46; p-value = 0.644). Similarly, the results of the estimated panel models: Panel Model 4 (CL) and Panel Model 5 (ARTR) suggest that EFRM does not have a statistically significant effect on liquidity performance at any standard level of significance (CL: z = 1.55; p-value = 0.121; ARTR: z = 0.94; p-value = 0.348). Lastly, the results of the estimated panel model: Panel Model 6 (DR) indicate that EFRM does not have a statistically significant effect on indebtedness performance at any standard level of significance (DR: z = -1.36; p-value = 0.174).

The results of the conducted panel analysis on the effects of EFRM from 2013 to 2017 on the EFPs did not show systematic differences between enterprises classified as 'hedgers' and enterprises classified as 'non-hedgers'. Given the highly heterogeneous profile of the enterprises in the analyzed sample (using the control variable of dividing enterprises into manufacturing and service industry groups) and the potential issue of endogeneity arising from the diverse nature/types of financial risks specific to each enterprise/industry (i.e. omitted variables), the lack of significance in the estimated effects of specific financial risk management methods / techniques for enterprises in BiH can be attributed to these factors.

Furthermore, taking into consideration the results of the conducted univariate statistical tests in 2017 (Table 3), it can be concluded that there are no statistically significant differences in terms of profitability, liquidity, and indebtedness between enterprises classified as 'hedgers' and enterprises classified as 'non-hedgers' in BiH. Additionally, considering the results of the estimated panel models (Table 5), it can be inferred that there are no statistically significant effects of EFRM on the performance of profitability, liquidity, and indebtedness of enterprises in BiH.

The control variables of market orientation (MO) and asymmetric information (ASI) are not statistically significant at standard levels of significance in any ana-

lyzed model (except the ASI dummy variable in Panel model 4 - CL at a significance level of 10%). The control variable of group of activities (GA) is statistically significant in three analyzed models, specifically: Panel model 2 - ROCE, Panel model 4 - CL, and Panel model 5 - ARTR at significance levels of 5%, 10%, and 1%, respectively. Additionally, the time (year) dummy variables are not statistically significant at standard levels of significance (except the time dummy variable in the model: Panel model 1 - ROA for the year 2016 at a significance level of 10%; Panel model 3 - ROE for the year 2016 at a significance level of 10%; Panel model 5 - ARTR for the years 2015, 2016, and 2017 at significance levels of 10%, 1%, and 1%, respectively; Panel model 6 - DR for the year 2017 at a significance level of 10%), indicating that the mentioned time effect in the year 2016 is a result of the introduction of the new Law on Financial Operations in FBiH in 2016.

Discussion

The research results showed that enterprises that explicitly stated that they manage financial risks and/or have an established EFRM system/function do not have better financial performance measured by profitability, liquidity and indebtedness of the enterprise. Based on the above, it can be concluded that EFRM has no influence on EFPs in BiH. These findings are broadly in line with those reported by other studies on samples of enterprises from developed as well as emerging countries like [Tahir & Razali (2011) in Malaysia; Sekerci (2015) in Nordian countries; Karunaratne (2017) in Sri Lanka; Şenol & Karaca (2017) in Turkey; Anton (2018) in Romania; Danisman & Demirel (2019) in Turkey; Sofia & Augustine (2019) in Indonesia; Khan et al. (2016) in France; Huang et al. (2020) in China; Otero González et al. (2020) in Spain]. By integrating specific control variables into the mentioned models such as financial leverage, growth options, agent costs, exposure to risks total revenue, operating cash flow, cash and cash equivalents, the obtained results remain unchanged both in terms of statistical significance and the magnitude of estimated coefficients of the variables of interest.

The first explanation for the obtained results is that the quality of the established EFRM system in the analyzed enterprises is low because EFRM is more prevalent at the strategic level (62.22%) compared to the operational level (37.78%) of the enterprises in the sample. The 'silo approach' dominates EFRM in BiH, indicating that risk management in practice is not an integral part of strategic management and planning within the enterprises, and it lacks essential support from top management.

The second explanation for the obtained results is that the surveyed key individuals responsible for risk management in the analyzed enterprises did not provide accurate and reliable information regarding the level of development of the EFRM function / system and/or did not realistically assess the enterprise's exposure to the risks they face.

The third explanation for the obtained results is that due to the war in the 1990s, BiH still does not have a unified economic space, the financial markets in BiH are thin and underdeveloped which is resulting in a limited number of hedging instruments. Additionally, there is likely a low professional education level and skills of chief risk officers or similar functions, and enterprises predominantly rely on internal hedging instruments such as natural hedging.

Therefore, it can be concluded that establishing EFRM systems/functions in BiH does not contribute to increasing the value of enterprises or improving their financial performance, nor does it create additional value for the enterprise owners. Instead, it appears that these risk management efforts mainly serve to fulfil formal requirements or meet the expectations of certain stakeholder groups such as regulatory bodies and/or creditors.

The regulators and policymakers will identify the shortcomings of ERM practices in BiH and can impose guidelines for managing risks as best practices, similar to those in developed countries. Hence, in order to ascertain whether ERM represents a value-added activity and for whom it brings value, it becomes essential to take into account the diverse goals and risk appetites established by the enterprises that adopt ERM.

Conclusions, limitations and recommendations

In recent years, EFRM has gained meaningful relevance, primarily driven by the rising complexity of financial risks and the continuous advancement of regulatory frameworks like laws, standards and code of practices. Similarly, the relationship between EFRM and EFPs has drawn the attention of academics and practitioners for a long time, especially due to how the relationship between risk and financial performance is not verified in imperfect financial markets. Due to a lack of consensus in the literature, the specific motivation for writing the paper was the lack of empirical research on the interrelation between EFRM and the EFPs in emerging countries like BiH. The research results have revealed low levels of EFRM development in large enterprises in BiH. From the perspective of the organizational approach to EFRM, the most popular approach is 'Risk management activities are primarily centralized' followed by the approach 'Risk management decisions are primarily decentralized with centralized coordination', while the approaches 'Risk management activities are primarily decentralized' and 'Risks are not managed using financial derivatives' are rarely used.

Although the majority of empirical studies of the role and importance of ERM analyzed the impact of ERM on enterprise value where enterprise value is

proxied by Tobin's Q, in this study we decided to use accounting measures of financial performance due to thin financial markets and the existence of a large amount of non-tradable shares of BiH enterprises. Thus, the market value cannot be directly evaluated by the equity market of BiH, which could impair the function of Tobin's Q for analysis in the context of BiH. But there are also some limitations of accounting financial performance such as of their inability to make future predictions, or meet all stakeholders' needs, and also they do not take sustainable development into consideration.

The results of this paper reveal the difficulties of analyzing the effects of the quality of the ERM system based on the information disclosed by the enterprises. For this reason, this study emphasizes the need for enterprises to provide more detailed information on the process, structure, management, and risk governance. As noted in the paper, other studies have used in most cases a dummy variable created from the questionnaire survey as an indicator of adoption and the level of development of the ERM function / system, but in some studies authors have also used an ERM index, an appointment of a CRO or similar function in enterprise; an ERM level of sophistication. Furthermore, the questionnaire survey represents some kind of limitation of this study because it did not establish details of why and when large enterprises in BiH approached adoption of EFRM. The generalization of empirical results from previous studies is limited due to geographic and industrial restrictions, different stages of development of financial markets and hedging instruments, government and law legislation, knowledge and skills of financial managers as well as the stage of development of ERM function/systems.

As theoretical and empirical research focusing on ERM in emerging markets like BiH is scarce, this study expanded the knowledge about ERM by providing further insight regarding the impact of different kinds of determinants on ERM adoption and the mediating effect of ERM on financial performance. Although there is a shift towards ERM adoption, evidence showed there is none widely practiced among enterprises in BiH. EFPs used in this paper are historical accounting performance measures. Thus, taking into account that the benefits of EFRM adoption are not expected to be immediately realized, in some future papers after the accession of BiH to the European Union and the establishment of a single economic space, it will be valuable to analyse the effect of EFRM on the EFPs using a prospective market-based value measure like Tobin's Q because its reflects future expectations of investors.

Finally, for further research it will be useful to consider and analyze the impact of ERM on enterprise value proxied by the Balance Scored Card because it covers not only aspects of traditional financial performance, but also includes aspects of non-financial performance like internal processes, customers and learning.

References

Abdić, A. (2019). Financial Risk Management: Conceptual Framework and Empirical Analysis on the Case of Bosnia and Herzegovina Enterprises. (Doctoral dissertation).

Abdić, A., Rovčanin, A. & Abdić, A. (2019). Enterprise financial risk management in BiH. International scientific conference Economy of integration: conference proceedings, 6, 47-58.

Adams, J., Hayunga, D., Mansi, S., Reeb, D. & Verardi, V. (2019). Identifying and treating outliers in finance. Financial Management Association International, 48(2), 345-384.

Anton, S.G. (2018). The Impact of Enterprise Risk Management on Firm Value: Empirical Evidence from Romanian Non-Financial Firms. Inžinerine Ekonomika - Engineering Economics, 29(2), 151-157.

Aretz, K., Bartram, S.M. & Dufey, G. (2007). Why hedge? Rationales for corporate hedging and value implications. The Journal of Risk Finance, 8(5), 434-449.

Bartram, S.M., Brown, G. W. & Fehle, F.R. (2009). International Evidence on Financial Derivatives Usage. Financial Management, 38(1), 185-206.

Baxter, R., Bedard, J.C., Hoitash, R. & Yezegel, A. (2013). Enterprise risk management program quality: Determinants, value relevance, and the financial crisis. Contemporary Accounting Research, 30(4), 1264-1295.

Beasley, M.S., Clune, R. & Hermanson, D.R. (2005). Enterprise risk management: An empirical analysis of factors associated with the extent of implementation. Journal of Accounting and Public Policy, 24(6), 521-531.

Beasley, M., Pagach, D. & Warr, R. (2008). Information Conveyed in Hiring Announcements of Senior Executives Overseeing Enterprise-Wide Risk Management Processes. Journal of Accounting, Auditing & Finance, 23(3), 311-332.

Beder, T. & Marshall, C.M. (2011). Financial engineering: The evolution of a Profession. John Wiley & Sons, Inc., Hoboken.

Bertinetti, G.S., Cavezzali, E. & Gardenal, G. (2013). The effect of the enterprise risk management implementation on the firm value of European companies. Working Paper 10, Department of Management, Università Ca' Foscari Venezia, Venezia.

Bin Shahrin, A.R. & Ibrahim, A.H. (2021). Enterprise Risk Management and Firm Performance: Evidence from Malaysian Nonfinancial Firms. Journal of Operational Risk, 16(4), 27-43.

Bodnar, G.M., Giambona, E., Graham, J.R., Harvey, C.R. & Marston, R.C. (2011). Managing Risk Management. Microeconomics: Production.

Bodnar, G.M., Hayt, G.S. & Marston, R.C. (1998). Wharton Survey of Financial Risk Management by US Non-Financial Firms. Financial Management, 27(4), 70-91.

Bohnert, A., Gatzert, N., Hoyt, R.E. & Lechner, P. (2019). The drivers and value of enterprise risk management: evidence from ERM ratings. The European Journal of Finance, 25(3), 234-255.

Callahan, C. & Soileau, J. (2017). Does Enterprise risk management enhance operating performance? Advances in Accounting, incorporating Advances in International Accounting, 1-14.

Carton, R.B. & Hofer, C.W. (2010). Organizational Financial Performance: Identifying and Testing Multiple Dimensions. The Academy of Entrepreneurship Journal, 16(1), 1-22.

Danisman, G.O. & Demirel, P. (2019). Corporate risk management practices and firm value in an emerging market: a mixed methods approach. Risk Management, 21, 19-47.

Délèze, F. & Korkeamäki, T. (2018). Interest rate risk management with debt issues: Evidence from Europe. Journal of Financial Stability, 36, 1-11.

Farrell, M. & Gallagher, R. (2014). The Valuation Implications of Enterprise Risk Management Maturity. Journal of Risk and Insurance, 82(3), 625-657.

Florio, C. & Leoni, G. (2017). Enterprise risk management and firm performance: The Italian case. The British Accounting Review, 49, 56-74.

Froot, K.A., Scharfstein, D.S. & Stein, J.C. (1993). Risk Management: Coordinating Corporate Investment and Financing Policies. The Journal of Finance, 48(5), 1629-1658.

Gates, S., Nicolas, J.L. & Walker, P.L. (2012). Enterprise risk management: A process for enhanced management and improved performance. Management Accounting Quarterly, 13(3), 28-38.

Géczy, C., Minton, B.A. & Schrand, C. (1997). Why Firms Use Currency Derivatives. The Journal of Finance, 52(4), 1323-1354.

Gordon, L.A., Loeb, M.P. & Tseng, C.Y. (2009). Enterprise risk management and firm performance: A contingency perspective. Journal of Accounting and Public Policy, 28(4), 301-327.

Graham, J.R. & Harvey, C.R. (2001). The theory and practice of corporate finance: evidence from the field. Journal of Financial Economics, 60(2-3), 187-243.

Hoyt, R.E. & Liebenberg, A.P. (2011). The value of enterprise risk management. Journal of Risk and Insurance, 78(4), 795-822.

Huang, C.M.H., Yang, W. & Zeng, R.Q. (2020). Analysis on the Efficiency of Risk Management in the Chinese Listed Companies, Mathematics, 8(10), 1-13.

Jia, J. & Bradbury, M.E. (2020). Complying with best practice risk management committee guidance and performance, Journal of Contemporary Accounting & Economics, 16(3), 1-12.

Jonek-Kowalska, I. (2019). Efficiency of Enterprise Risk Management (ERM) systems. Comparative analysis in the fuel sector and energy sector on the basis of Central-European companies listed on the Warsaw Stock Exchange. Resources Policy, 62, 405-415.

Judge, A. (2006). Why and How UK Firms Hedge. European Financial Management, 12(3), 407-441.

Karunaratne, A.H.G.K. (2017). The Impact of the Adoption of Enterprise Risk Management on the Industrial Financial Performance: Evidence from Sri Lanka. International Journal of Research in Business and Social Science, 6(6), 9-20.

Khalil-Oliwa, O. (2019). Effects of enterprise risk management (ERM) implementation. A comparative case study in the conditions of the Polish economy. Journal of Interdisciplinary Research, 9(2), 245-250.

Khan, M.J., Hussain, D. & Mehmood, W. (2016). Why do firms adopt enterprise risk management (ERM)? Empirical evidence from France. Management Decision, 54(8), 1886-1907.

Khan, S.N. & Ali, E.I.E. (2017). The moderating role of intellectual capital between enterprise risk management and firm performance: A conceptual review. American Journal of Social Sciences and Humanities, 2(1), 9-15.

Lechner, P. & Gatzert, N. (2017). Determinants and value of enterprise risk management: Empirical evidence from Germany. The European Journal of Finance, 1-27.

Lievenbrück, M. & Schmid, T. (2014). Why do firms (not) hedge? - Novel evidence on cultural influence. Journal of Corporate Finance, 26, 92-106.

Malik, M.F., Zaman, M. & Buckby, S. (2020). Enterprise risk management and firm performance: Role of the risk committee. Journal of Contemporary Accounting and Economics, 16, 1-22.

Marc, M., Miloš-Sprčić, D. & Mešin Žagar, M. (2018). Is enterprise risk management a value added activity? Ekonomika a Management, 21(1), 68-84.

Miloš-Sprčić, D., Kožul, A. & Pecina, E. (2015). State and perspectives of Enterprise risk management system development - the case of Croatian companies, Procedia Economics and Finance, 30, 768-779.

Miloš-Sprčić, D., Mešin-Žagar, M., Šević, Ž. & Marc, M. (2016). Does enterprise risk management influence market value - A long-term perspective? Risk Management - An International Journal, 18, 65-88.

Miloš-Sprčić, D., Tekavčič, M. & Šević, Ž. (2008). Corporate risk management practices in Croatian companies. Ekonomski Pregled, 59(7-8), 344-369.

Moles, P. (2013). Financial risk management - Sources of Financial Risk and Risk Assessment. Edinburgh Business School Heriot-Watt University, Edinburgh.

Nance, D.R., Smith, C.W. & Smithson, C.W. (1993). On the Determinants of Corporate Hedging. The Journal of Finance, 48(1), 267-284.

Naseem, T., Shahzad, F., Asim, G.A., Rehman, I.U. & Nawaz, F. (2019). Corporate social responsibility engagement and firm performance in Asia Pacific: The role of enterprise risk management, Corporate Social Responsibility and Environmental Management, 1-13.

Otero-González, L., Durán-Santomil, P. & Tamayo-Herrera, A. (2020). The effect of Enterprise Risk Management on the risk and the performance of Spanish listed companies. European Research on Management and Business Economics, 26(3), 111-120.

Pagach, D.P & Warr, R.S. (2010). The Effects of Enterprise Risk Management on Firm Performance, Working Paper 27695. North Carolina State University, Raleigh.

Pham, C.D., Tran, Q.X. & Nguyen, L.T.N. (2018). Effects of Internal Factors on Financial Performance of Listed Construction-Material Companies: The Case of Vietnam. Research Journal of Finance and Accounting, 9(10), 1-7.

Quon, T.K., Zeghal, D. & Maingot, M. (2012). Enterprise risk management and firm performance. Procedia - Social and Behavioral Sciences, 62, 263-267.

Rawals, S.W. & Smithson, C.W. (1990). Strategic Risk Management. Journal of Applied Corporate Finance, 2(4), 6-18.

Saeidi, P., Sofian, S. & Binti Abdul Rasid, S.Z. (2014). A Proposed Model of the Relationship between Enterprise Risk Management and Firm Performance. International Journal of Information Processing and Management, 5(2), 70-80.

Sax, J. & Andersen, T.J. (2019). Making risk management strategic: Integrating enterprise risk management with strategic planning. European Management Review, 16(3), 719-740.

Sekerci, N. (2015). Does enterprise risk management create value for firms? - Evidence from Nordic countries. In: Torben, J.A. ed. (2016). The Routledge companion to strategic risk management, 389-420, Routledge, New York.

Şenol, Z. & Karaca, S.S. (2017). The effect of enterprise risk management on firm performance: A case study on Turkey. Studii Financiare, 21(2), 6-30.

Silva De Souza, R., Da Silva Gomes, S.M., Leal Bruni, A., Garcia De Oliveira, G., Santos Sampaio, M. & Almeida De Faria, J. (2012). Enterprise Risk Management and Performance Improvement: A Study with Brazilian Nonfinancial Firms. Performance Measurement and Management Control: Global Issues (Studies in Managerial and Financial Accounting), 25, 275-298.

Smith, C.W. & Stulz, R.M. (1985). The Determinants of Firms' Hedging Policies. The Journal of Financial and Quantitative Analysis, 20(4), 391-405.

Smithson, C. & Simkins, G.J. (2005). Does risk management add value? A survey of the evidence. Journal of Applied Corporate Finance, 17(3), 8-17.

Sofia, I.P. & Augustine, Y. (2019). Does Enterprise Risk Management and Hybrid Strategy Affect to Organizational Performance. South East Asia Journal of Contemporary Business, Economics and Law, 20(5), 120-126.

Soltanizadeh, S., Abdul Rasid, S.Z., Mottaghi Golshan, N. & Wan Ismail, W.K. (2016). Business strategy, enterprise risk management and organizational performance. Management Research Review, 39(9), 1016-1033.

Sučić, J.H., Miloš Sprčić, D. & Zoričić, D. (2011). Upravljanje financijskim rizicima u hrvatskim poduzećima. Zbornik Ekonomskog fakulteta u Zagrebu, 9(1), 67-84.

Suttipun, M., Siripong, W., Sattayarak, O., Wichianrak, J. & Limroscharoen, S. (2018). The Influence of Enterprise Risk Management on Firm Performance Measured by the Balanced Scorecard: Evidence from SMEs in Southern Thailand. ASR: CMU Journal of Social Sciences and Humanities, 5(1), 33-53.

Tahir, I.M. & Razali, A.R. (2011). The Relationship Between Enterprise Risk Management (ERM) and Firm Value: Evidence from Malaysian Public Listed Companies. International Journal of Economics and Management Sciences, 1(2), 32-41.

Tudose, M.B. & Rusu, V.D. (2018). Analysis of the effects of financing and risk management on the value of firms listed on the bucharest stock exchange, Annals - Economy Series, 2, 44-58.

Yang, S., Ishtiaq, M. & Anwar, M. (2018). Enterprise Risk Management Practices and Firm Performance, the Mediating Role of Competitive Advantage and the Moderating Role of Financial Literacy. Journal of Risk and Financial Management, 11(35), 1-17.

Zou, X. & Hassan, C.H. (2017). Enterprise risk management in China: the impacts on organizational performance. International Journal of Economic Policy in Emerging Economies, 10(3), 226-239.

Zou, X., Isa, C.R. & Rahman, M. (2019). Valuation of enterprise risk management in the manufacturing industry. Total Quality Management & Business Excellence, 30(11-12), 1389-1410.

Appendix

Table 3: Descriptive statistics in the year 2017 ('Hedgers')

	Panel A: Subsample 'Hedgers'				
Variable (Features of enterprise)	**N**	**Mean**	**St. Dev.**	**Min.**	**Max.**
Total revenue (TR)	23	1.05e+08	1.36e+08	6112,809.000	6.15e+08
Total assets (TA)	23	2.10e+08	3.75e+08	1.03e+07	1.79e+09
Cash and cash equivalents (CCE)	23	4253,988.000	7955,497.000	33,167.000	3.40e+07
Return on Capital Employed (ROCE)	23	0.043	0.089	-0.266	0.239
Return on Assets (ROA)	23	0.028	0.048	-0.117	0.107
Return on Equity (ROE)	23	0.069	0.108	-0.170	0.320
Current Liquidity (CL)	23	2.121	3.986	0.100	19.960
Average accounts receivable, collection period (AARCP)	23	59.595	61.099	1.911	280.587
Debt ratio (DR)	23	0.459	0.289	0.061	0.999
Enterprise size (lnTA)	23	18.287	1.323	16.152	21.307
Financial leverage (FL1)	23	1.713	1.773	0.083	6.339
Financial leverage (FL2)	23	960.748	3,109.526	0.000	10,813.940
Growth opportunities 1 (GO1)	23	0.051	0.081	0.000	0.274
Growth opportunities 2 (GO2)	23	0.096	0.119	0.008	0.548
Growth opportunities 3 (GO3)	23	0.032	0.044	0.000	0.121
Assessment of fx risk exposure size (SFERE)	23	2.783	1.126	1.000	5.000
Assessment of liquidity risk exposure size (SLRE)	23	3.696	1.428	1.000	5.000
Assessment of commodity risk exposure size (SCRE)	23	3.261	1.137	1.000	5.000
Assessment of debt risk exposure size (SDRE)	23	2.913	1.164	1.000	4.000
DIV dummy - Dividends (substitute for ERM)	23	0.348	-	0.000	1.000
GA dummy - Group of activities	23	0.696	-	0.000	1.000
MO dummy - Market orientation	23	0.261	-	0.000	1.000
AC dummy - Agency costs	23	0.043	-	0.000	1.000
ASI dummy - Asymmetric information	23	0.304	-	0.000	1.000
OS dummy - Ownership structure	23	0.739	-	0.000	1.000
TI dummy - Tax incentives	23	0.174	-	0.000	1.000

Source: Author's own work.

Table 3: Descriptive statistics in the year 2017 ('Non-hedgers')

	Panel B: Subsample 'Non-hedgers'					A vs. B
Variable (Features of enterprise)	N	Mean	St. Dev.	Min.	Max.	Test statistic (p-value)
Total revenue (TR)	49	1.49e+08	2.00e+08	8885,367.000	1.04e+09	Z = 1.359 (0.1742) 2)
Total assets (TA)	49	1.64e+08	2.52e+08	8276,829.000	1.37e+09	Z = -0.139 (0.8895) 2)
Cash and cash equivalents (CCE)	49	1.16e+07	3.26e+07	6,680.000	2.20e+08	Z = 1.395 (0.1630) 2)
Return on Capital Employed (ROCE)	49	0.081	0.076	-0.123	0.316	Z = 1.793* (0.0729) 2)
Return on Assets (ROA)	49	0.049	0.051	-0.033	0.188	Z = 1.105 (0.2691) 2)
Return on Equity (ROE)	49	0.106	0.103	-0.163	0.508	Z = 1.407 (0.1594) 2)
Current Liquidity (CL)	49	3.226	4.325	0.330	21.180	Z = 1.528 (0.1266) 2)
Average accounts receivable. Collection period (AARCP)	49	53.630	52.560	0.299	266.527	Z = -0.380 (0.7036) 2)
Debt ratio (DR)	49	0.398	0.276	0.014	0.999	Z = -0.936 (0.3493) 2)
Enterprise size (lnTA)	49	18.225	1.155	15.929	21.041	t = -0.2032 (0.8396) 1)
Financial leverage (FL1)	49	2.039	4.586	0.015	28.232	Z = -1.045 (0.2962) 2)
Financial leverage (FL2)	49	5,752.251	24,243.710	-1.495	169,275.300	Z = 2.871*** (0.0041) 2)
Growth opportunities 1 (GO1)	49	0.035	0.051	0.000	0.199	Z =0.031 (0.9751) 2)
Growth opportunities 2 (GO2)	49	0.104	0.135	0.005	0.573	Z = 0.079* (0.0937) 2)
Growth opportunities 3 (GO3)	49	0.028	0.036	0.000	0.151	Z = 0.269 (0.7883) 2)
Assessment of fx risk exposure size (SFERE)	49	2.061	1.180	1.000	5.000	z= -2.795*** (0.0052) 2)
Assessment of liquidity risk exposure size (SLRE)	49	3.102	1.327	1.000	5.000	z= -1.838** (0.0661) 2)
Assessment of commodity risk exposure size (SCRE)	49	3.184	1.318	1.000	5.000	t= -0.2417 (0.8097) 1)
Assessment of debt risk exposure size (SDRE)	49	2.531	1.157	1.000	5.000	t= -1.3055** (0.0196) 1)
DIV dummy - Dividends (substitute for ERM)	49	0.429	-	0.000	1.000	c2 = 0.4243 (0.5150) 3)
GA dummy - Group of activities	49	0.653	-	0.000	1.000	c2 = 0.1278* (0.0721) 3)
MO dummy - Market orientation	49	0.102	-	0.000	1.000	c2 = 3.0506* (0.0810) 3)
AC dummy - Agency costs	49	0.122	-	0.000	1.000	c2 = 1.1122 (0.2920) 3)
ASI dummy - Asymmetric information	49	0.367	-	0.000	1.000	c2 = 0.2741 (0.6010) 3)
OS dummy - Ownership structure	49	0.837	-	0.000	1.000	c2 = 0.9520 (0.3290) 3)
TI dummy - Tax incentives	49	0.061	-	0.000	1.000	c2 = 2.2647 (0.1320) 3)

The last column represents the results of statistical tests comparing the values of subsample A and subsample B
Notice: 1) t-test, 2) Mann Whitney U-test, 3) c2 – test
***,**,* significant at 1%, 5% and 10% levels, respectively. Standard errors are in parentheses

Source: Author's own work.

Table 5a: Enterprise financial risk management (EFRM) and enterprise financial performance (EFP)

Coefficient	Performance of profitability		
	Panel Model 1 - ROA (LSDV estimator)	Panel Model 2 - ROCE (LSDV estimator)	Panel Model 3 - ROE (GLS estimator)
EFRM	0.00972230 (0.02058300)	0.00850080 (0.02926440)	-0.00798310 (0.01726750)
lnTA	-0.00305450 (0.00953600)	-0.01176220 (0.01355800)	-0.02293840*** (0.00665230)
FL2	0.00000002 (0.00000002)	0.00000003 (0.00000003)	0.00000004 (0.00000005)
GO1	-0.09933200* (0.05339480)	-0.08363330 (0.07591550)	-0.26318260*** (0.10157580)
GO3	0.06709220 (0.09186320)	0.12708420 (0.13060890)	0.57045300*** (0.17754440)
ARTR	0.00000019 (0.00000184)	-0.00000050 (0.00000260)	-0.00000198 (0.00000348)
DIV	0.02370250*** (0.00828340)	0.03608180*** (0.01177720)	0.06577750*** (0.01337760)
MO	0.02056220 (0.01763800)	-0.03417720 (0.02507720)	0.02366540 (0.02323090)
GA	0.04409110 (0.03122250)	0.09155220** (0.04439150)	-0.00993570 (0.01820990)
ASI	0.02498790 (0.01818100)	-0.00589490 (0.02584930)	-0.01225160 (0.01773980)
Ig_2014	0.00541890 (0.00583100)	0.00715210 (0.00829040)	0.00327140 (0.01279750)
Ig_2015	0.00215450 (0.00590050)	0.00111820 (0.00838920)	-0.00149420 (0.01284120)
Ig_2016	0.01057750* (0.00598410)	0.01031200 (0.00850800)	0.02411960* (0.01283330)
Ig_2017	0.00867200 (0.00609640)	0.00732510 (0.00866780)	0.01459910 (0.01289470)
Intercept	0.07213990 (0.17670360)	0.28679290 (0.25123300)	0.47288240*** (0.12224830)

Source: Author's own work.

Table 5b: Enterprise financial risk management (EFRM) and enterprise financial performance (EFP)

Coefficient	Performance of liquidity		Performance of indebtedness
	Panel Model 4 - CL (GLS estimator)	Panel Model 5 - ARTR (GLS estimator)	Panel Model 6 - DR (GLS estimator)
EFRM	0.321910700 (0.207847300)	0.18829380 (0.20063690)	-0.08400100 (0.06176940)
lnTA	-0.085202200 (0.063307700)	0.06286020 (0.06218480)	-0.08883000 (0.01691990)
FL2	0.000000005 (0.000000216)	-0.00000016 (0.00000022)	0.00000006 (0.00000005)
GO1	-0.176481100 (0.522883400)	0.11220190 (0.52470150)	0.15741950 (0.12623720)
GO3	-0.294252400 (0.901476900)	-0.21011460 (0.90480340)	0.01078220 (0.21745360)
ARTR	0.000009060 (0.000018000)	-0.00000595 (0.00001810)	-0.00000359 (0.00000435)
DIV	0.004539900 (0.078297100)	-0.00484440 (0.07836000)	0.00435760 (0.01912120)
MO	0.079756300 (0.280690700)	0.05449950 (0.27093170)	-0.02929660 (0.08344450)
GA	-0.393014300* (0.216885600)	0.58950810*** (0.20943570)	0.02697810 (0.06433980)
ASI	0.560424000*** (0.213005300)	0.29215570 (0.20564870)	-0.09285610 (0.06324490)
Ig_2014	0.049446500 (0.058356500)	-0.05793080 (0.05866930)	0.00901950 (0.01398000)
Ig_2015	0.033019800 (0.058751800)	-0.12080030* (0.05905580)	0.01052710 (0.01408860)
Ig_2016	0.073101300 (0.059020300)	-0.20943260*** (0.05930560)	0.00054600 (0.01417890)
Ig_2017	0.036923100 (0.059645600)	-0.21325250*** (0.05991580)	0.02550080* (0.01435230)
Intercept	1.887395000* (1.167421000)	2.19768900 (1.14618700)	2.05301000 (0.31302590)

***,**,* significant at 1%, 5% and 10% levels, respectively. Standard errors are in parentheses

Source: Author's own work.