Actual Questions of Risk Management in Models Affecting Enterprise Performance[1]

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Abstract

The aim of the article was to design an enterprise performance assessment model that accepts the results of selected financial indicators, ex ante models and risks. For the identification of risks, two approaches to calculating the Cost of Equity were applied. The first approach was based on CAPM's calculation of Cost of Equity, with the assumption of external and systematic risks. The second approach was based on Build-up model with the acceptance of internal and non-systematic risks. The data of the food industry enterprises in Slovakia for the period 2004 – 2013 were used to implement this research. Based on the application of these approaches, it was possible to identify the impact of internal, external risks, systematic and non-systematic risks on a company performance. Finally, we constructed new 3-dimensional Enterprise Risk Model (ERM) is a suitable risk management tool for assessing and predicting the risk impact on the enterprise performance.

Keywords: *Enterprise Performance, Risks, Cost of Equity, Enterprise Risk Model*

JEL Classification: C51, C52, C53, G32, D81

Introduction

Each activity on global markets is risky therefore enterprise or economic subject cannot predict the results of financial, investment or other decisions in entrepreneurship. In the classification of enterprise risks on global market conditions, it is necessary to pay attention to the risks that come into Capital Asset Pricing

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Models (CAPM) and calculating Costs of Equity. In this paper, we focus on empirical risk analysis in enterprise activities and especially risks that come into the calculation of the Cost of Equity in several models and consequently into the calculation of models of the enterprise's performance with focus on Slovak Republic.

In recent years, the requirement of investors of risk reducing and forecasting and the Cost of Equity investment estimation has increased. Several theoretical and empirical models exist to calculate risks and the Cost of Equity. Which of these models is the most suitable for the enterprise performance in the conditions of the Slovak Republic? Is it the well-known CAPM or Build-up model? Which risks are important to be analysed, predicted and optimized from the point of view of the Enterprise Performance Management? Is it more suitable for calculation of the Cost of Equity to predict input parameters with the use of models of the evaluation of historical data or expected market data of business and financial risks? We looked for the answers to the previous questions in creating own Enterprise Risk Model, which evaluated the financial performance, business success and impact of the risks on assessment of enterprise performance.

These enterprise models oftentimes are not used in managerial practices in Slovak Republic within the euro area. To obtain that rational incentive, we investigate, compare and apply these models for specific Slovak conditions using our approach by evaluating financial indicators, evaluating risks and creating of risk models. Therefore, these risk models are dynamically developed and used more and more worldwide (Lopez-Espinoza et al., 2013; Vicente et al., 2015).

1. Background of Models in Empirical Studies and Problems

Recently, there have been many significant changes not only in performance measurement approaches but also in changes in the methods used and the performance evaluation tools. There are many different definitions for enterprise performance. According to Wagner (2009), the performance of an enterprise is a characteristic that describes the way in which an enterprise carries out a certain activity similar to the way in which this activity is performed, in which interpretation of performance is realized by expressing the organized relationship of the researched and reference method of performing the activity according to the chosen criterion scale. Representatives who understand performance as the company's ability to best value investment in business activities include Frost (2005); Neumaierová and Neumaier (2002). Specifically, in defining the concept of performance, a different performance assessment is performed by different business entities such as owners, managers and customers (Šulák and Vacík, 2004). Another of the definitions of performance discusses enterprise performance as the company's ability to transform the factors of production to final products and services (Johnson and Kevan, 2000). Some authors point to the need to compare performance with the target value (Nenadál, 2004). The European Foundation for Quality Management (EFQM), which defines the term "performance" as a degree of results achieved by individuals, groups, organizations and processes (EFQM, 1999).

In practice, the most common indicators for measuring performance of companies (Performance Measurement System) are financial indicators – according to the opinion of a number of Slovak and foreign authors (Ittner, Larcker and Randall, 2003; Dixon, Nanni and Vollmann, 1990; Pavelková and Knápková, 2009; Synek a kol., 2011). In terms of claiming that the objective is not only to measure but above all to improve performance (Hammer, 2007), it should be noted that these classical financial ratios have a low reporting value in analysing and assessing the financial performance of an enterprise, from the point of view of managerial tactical and strategic management decisions. The development of modern performance assessment indicators was therefore focused on the working out and design of indicators that would have the closest possible link to the value of shares, allowing for as much information as possible, and accounting data, including indicators based on accounting data, would include risk assessment and take into consideration the extent of the tied capital and, as the last one, would allow performance evaluation as well as evaluation of enterprises (Mařík and Maříková, 2015).

According Kislingerová a kol. (2010) basic financial areas of enterprise performance evaluation and measurement can be complemented by some more recent and more modern indicators and methods, namely: evaluation using modern methods with application of market characteristics such as, for example, Indicator EVA (Economic Value Added), INEVA (IN Economic Value Added), MVA (Market Value Added), RONA (Return On Net Assets), WACC (Weighted Average Cost of Capital), or indicators based on FCF (Free Cash Flow), CVA (Cash Value Added) and others. At present, attention to performance evaluation and measurement is devoted to the development of performance measurement methods that include not only financial indicators but also non-financial ones that support business strategy and also allow performance measurement for individual levels of management. Such methods include, for example, the Balanced Scorecard, the EFQM Excellence Model, the measurement techniques for organizational management – CMM (Capability Maturity Matrices), Performance Pyramid, EP^2M (Effective Progress and Performance Measurement), Process Performance Management by Sink and Tuttle (1989).

Based on the above, in our article, we have focused on measuring enterprise performance with the application of selected financial indicators, prediction models and risks. To capture internal and external risks, systematic and unsystematic risks, as well as their impact on enterprise performance, we chose two models for the calculation of equity costs that are the determinant of performance: CAPM, which accepts external and systematic risks and Build-up model, which accepts internal and external risks, but does not accept systematic risk.

Empirical studies indicate that the Capital Asset Pricing Model and Build-up models are, in current practice, among the most frequently applied models to calculate the Cost of Equity. The basis of both models and approaches is the comparable that is an attempt to detect the impact of market, business and financial risks and external and internal risks on enterprise's performance in the most exact way. Modern academic corporate finance is built on the proposition that markets are fundamentally rational. The fundamental model of market rationality is the CAPM. In capturing the idea that markets are inherently rational, the CAPM has made finance an appropriate subject for econometric studies. Industry has come to rely on the CAPM form determining the discount rate for evaluation of investments, for evaluation of the firm itself, and for setting sales prices in the regulation of utilities, as well as for such purposes as benchmarking fund managers and setting executive bonuses linked to adding economic value (Dempsey, 2013). Mehrling (2007) recounts the first major step in the development of modern finance theory as the "efficient market hypothesis", followed by the second step, which as the CAPM. Capital Asset Pricing Model is nowadays, despite all the problems, which it incorporates, the basic model for estimating the Cost of Equity (Mařík a kol., 2011a) and we can assume the still attraction of the CAPM as the most appropriate model for evaluation and quantification of Cost of Equity (Hečková, Chapčáková and Badida, 2014). The Cost of Equity is an appropriate input for market evaluation of business.

The CAPM is still widely discussed, improved and applied in such cases as estimating the Cost of Capital for firms and the performance of managed portfolios. Many experts dealt with them and developed several different versions of CAPM to explain market pricing for explaining risks and return of portfolio. The basic version of the CAPM developed by Sharpe (1964) and Lintner (1965) has never been an empirical success. Empirical works tell us that relation between beta and average return is flatter than predicted by the Sharpe-Lintner version of CAPM (Fama and French, 2004). Early test of the CAPM showed that higher stock returns were generally associated with higher betas. Miller and Scholes (1972), Black and Scholes (1972) and Fama and McBeth (1973) also demonstrate a clear relationship between betas and return outcomes. The returns on stocks with higher the betas are systematically less than predicted by the CAPM, while those of stocks with lower betas are systematically higher. Black and

Scholes (1972) proposed a two factor model (with loadings on the market and zero beta portfolios). Fama and French (1992) show that beta cannot be saved. Controlling for firm size, the positive relationship between asset prices and beta disappears. Additional characteristics such as firm size (Banz, 1981), earnings yield (Basu, 1983), leverage (Bhandari, 1988), the firm`s ratio of book value to its market value (Chan et al., 1991), stock liquidity (Amihud and Mendelson, 1986) and stock price momentum (Jegadeesh and Titman, 1993) now appear to be important in describing the distribution of asset returns at any particular time. Fama and French Three Factor Model (1993) stated that the expected excess return on a portfolio is explained by sensitivity of its return to three market factors: market premium, size premium and value premium (add two additional factors) and was developed in their further studies (2004; 2006, and 2012). These authors identify exposures to differential returns across high and low book-to-market stock and across large and small firms to the CAPM as proxies for additional risk factors. The trend of adding factors to better explain observed price behaviours has continued to dominate Asset pricing theory. Subrahmanyam (2010) documents more than 50 variables used to predict stock returns. The three factor model of Fama and French and the Carthart model (1997), which adds momentum exposure as a fourth factor, are now academically most accepted. Further studies tested the explanatory power and applicability of Fama and French Three factor model for various national equity markets (Lam, 2005; Moerman, 2005; Chung et al., 2006; Mirza and Shahid, 2008; Fuenzalida and Mongrut, 2010; Eraslan, 2013; Abbas et al., 2015). Damodaran (2009) improved the CAPM model at several levels and the first approach was based on the introduction of Country Risk Premium (CRP). Further alternatives were developed in his works (2011; 2014) for better ways of measuring risk and estimating expected returns. Petřík (2009) states that CAPM, which is modified for the national markets, is nowadays the only effective market model accepted in practice.

In cases when it is not possible to apply CAPM, it is suitable to apply Build-up method. Those are the cases, when we have problems with the calculation of the coefficient β. Build-up method is an empirical method of estimation of the expected rates of return on equity. It is a typical approach to the Cost of Equity calculation. Main differences of these two approaches are the following: Build-up method does not involve coefficient β, it is based on subjective not market risk assessment, it covers higher number of risks, therefore it is more comprehensive (Vochozka and Mulač et al., 2012). Calculated interest rate provided by the Build-up method, similarly to the CAPM (Capital Asset Pricing Model) method, involves risk-free interest rate (mostly the rate of return of the government bonds) and specific risk premiums.

In the practice, several variations of the Build-up method exist. Neumaierová and Neumaier (2002) proposed Build-up model and Mařík a kol. (2011a) Build--up model as the modifications of the calculation of the Cost of Equity, which can better correspond with market conditions in the Czech Republic (Mařík and Maříková, 2015) and the Slovak Republic.

2. Methodology

The objective of this paper is to find out enterprise performance with the use of selected financial indicators, prediction models and risks, which were calculated in different ways. From the above indicators, the objective was to set up its own 3-dimensional Enterprise Risk Model (ERM). This model anticipates a risk management tool that aims to identify and predict the risk impact on enterprise performance.

The model is composed of three dimensions:

- ***1st dimension*** – It consists of these financial indicators: *Current Ratio, Turnover of short-term Receivable, Turn of short-term Liabilities, Cas-to-cash, Debt Equity Ratio, Return of Assets, Return of Equity, Stability.* The selection of these indicators is the result of our own research. Key performance indicators have been selected to cover all areas of financial health and enterprise performance assessment. The model is open and it is possible to apply other financial performance indicators.
- ***2nd dimension*** – *focused on the assessment of future business success was created by these prediction models*: *Altman Model, Index IN05, Index creditworthiness, Taffler Model, Springate Model, Fulmer Model, Balance Sheet Analysis by Doucha I, Quick Test.* Just as in the case of the 1st dimension, the selection of these models was the result of our own research and it is possible to modify their choice in relation to the requirements of the analyst.
- ***3rd dimension*** – assessed the impact of the risk on enterprise performance to compare the impact of external, systematic risks based on CAPM (according Damodaran, 2003) and unsystematic, internal risks based on the Build-up model (according to Mařík a kol., 2011a). Likewise, the risks that have been applied in the model are modifiable at discretion.

2.1. Methodology Based on CAPM for Application of Systematic Risks for the Calculation of Cost of Equity

For the analysis of systematic risks and calculation of the Cost of Equity with these risks we used modified CAPM in Damodaran (2004):

$$r_e = r_{fUS} + \beta \, . \, ERP_{US} + CRP \quad (1)$$

where

r_e – rate of equity,
r_{fUS} – US risk free rate of return,
ERP_{US} – US Equity risk premium,
CRP – country risk premium.

CAPM Inputs

- ***Risk-Free Rate (r_f)***

We can generally say that absolutely risk-free assets do not exist. In the US, treasury bills – US T-Bills are considered the least risky. It is important to note that evaluation based on their rate of return is used when evaluating individual shares. For calculation of the Cost of Equity of the enterprise, it is recommended to use the rate of return of 10 year SK T-Bonds (NBS, 2015). Nevertheless, according to the recommendation of several authors (Petřík, 2009; Mařík a kol., 2011a; 2011b), it is more suitable to use the rate of return of the US T-Bonds for the calculation of the Cost of Equity of Slovak enterprises. This way, the requirement of not adding the market risk twice into calculation of the Cost of Equity is fulfilled. In Table 1, there is a comparison of risk-free rates of return of the Slovak Republic and the US.

T a b l e 1

Comparison of Risk-free Rate of Return 10-year T-Bonds of the Slovak Republic and the US

Risk-free Rate of Return	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
SK T-Bonds	5.42	4.58	3.62	4.15	4.61	4.72	4.12	4.06	5.21	3.92	2.69	1.22
US T-Bonds	4.25	4.22	4.39	4.70	4.02	2.21	3.84	3.29	1.88	1.76	3.94	2.17

Source: Author' processing based on NBS (2015); Damodaran (2014a).

- ***Equity Risk Premium (ERP)***

The Equity Risk Premium (ERP) is the additional return the investor requires for an investment in the market portfolio compared to the risk-free return (Damodaran, 2002). The calculation principle is based on the difference in the average return on the market portfolio, i.e. shares on the capital market and the average return on government bonds ($[E\,(r_m) - (r_f)]$).

However, the risk premium for the market should, according to several experts, be based on the expected values. Since its estimation would be rather inaccurate in this case, it is necessary to build on historical data to achieve greater accuracy, and the result must subsequently be corrected by the market assessor.

It should be noted that the past period for ERP calculation must be long enough, using the arithmetic or geometric mean in the calculation. Which calculation is more appropriate is constantly a controversy among scholars, but without a clear conclusion. It is for the experts to consider which method of calculation they would choose.

More prevalently supported, according to Mařík a kol. (2011a) is the geometric calculation. On the basis of the calculations of the autocorrelation of historical data of the market risk premium can be said that the value calculated using historical data is statistically insignificant and therefore, according to the mentioned source, it is recommended to apply the arithmetic mean for the calculation of the market risk premium mean.

There are studies of Damodaran (2004) that prefer the use of geometric mean. According to his studies, the year-on-year correlation is low, but the autocorrelation of five-year periods is significantly negative. Accordingly, a period of low return will replace a high return period. Since CAPM looks for profit over a longer period of time than one year, negative autocorrelation of five-year yields is a significant argument for the use of geometric mean. A specific situation is also the situation where the average can be obtained from both calculations.

The other question is whether to use values from a local or other capital market. Some experts argue that if we use national data, we may encounter problems related to the functionality and, in particular, the scope of the national stock markets. More and more professionals are turning to use data from the world's best, America's capital market. This premium will then be adapted to the conditions of the national markets.

The capital market risk premium can be replaced by an implied risk premium at the time of the equity cost calculations. The implied risk premium represents an alternative to the historical value of the capital market risk premium. This risk premium is based on a two-phase model. The implied capital market risk premium is currently a more appropriate alternative to the market risk premium as the impact of the economic crisis has raised the stock market's risk. Historical risk premium, due to its mathematical calculation, is not able to adequately capture this fact (Mařík a kol., 2011a).

The arithmetic or geometric mean can be used for the calculation. The data are shown in Table 2.

The highest ERP was reached by the arithmetic average for the period from 1928 to 2014, and that is 6.25%. Lower rates of ERP are reached by the shortening of time period. The risk premium by the application of geometric average is lower in comparison with the application of the arithmetic average. At present, a geometric average is preferred in the Slovak Republic, while in the US, on the contrary, it is recommended to use arithmetic average. The appropriate value is somewhere in-between these average (Mařík a kol., 2011a). The risk premium of the Slovak capital market, which is at present at around 5%, is higher than the risk premium of the US capital market in both cases, whether using geometric or arithmetic average.

Table 2

Arithmetic and Geometric Average of ERP (in %)

Years	**Arithmetical average**			**Geometrical average**		
	$R_{m;}$ S&P 500	*10-year T-Bond*	*R_m – T-Bonds*	*$R_{m;}$ S&P 500*	*10-year T-Bond*	*R_m – T-Bonds*
1928 – 2014	11.53	5.28	6.25	9.60	5.00	4.60
1965 – 2014	11.23	7.11	4.12	9.84	6.70	3.14
2005 – 2014	9.37	5.31	4.06	7.60	4.88	2.73

Source: Authors' processing based on Damodaran (2014b).

• ***Country Risk Premium (CRP)***

When calculating risk premiums, it is necessary to start from the US capital market but at the same time, it is necessary to adjust these risk premiums to each country's conditions. There are several methods of adjusting the risk premium of the country in which the analysed enterprise operates. Calculating the country risk premium is based on the country's rating. Ratings of countries are provided by the agencies such as Moody's Corporation. According to Moody's Corporation (2015), the Slovak Republic is at present in the rating class A2. Consequently, it is necessary to reflect the rating of the analysed country into the country default risk. In the case when we set the country risk premium, from the point of view of the investor in the Slovak Republic, it would be suitable to increase the country risk premium by the difference between long-term predicted inflation of the Slovak Republic and the US (or the SK and DE) according to International Monetary Fund (2015) (www.imf.org). Predicted inflation of the SK till 2020 is around 2.2%, the same as for the US. Then, we can assume that the difference between the predicted inflations of the Slovak Republic and the US is equal to 0. The Country Risk Premium (CRP) of Slovakia for the processing this issue was taken from the Damodaran web site (Damodaran, 2014d).

• ***Coefficient β***

Coefficient β is an important input of CAPM model. Values of the coefficient β for the Slovak food industry were taken by the method of analogy to the values of the coefficient β for the US food industry. It is a method based on the idea of determining β coefficient according to β of similar businesses, shares of which are traded on the capital market, but their activities are not diversified.

We used the following formula to calculate the β coefficient:

$$\beta_L = \beta_U \left(1 + (1-t)\frac{D}{E}\right) - \beta_D (1-t)\frac{D}{E} \qquad (2)$$

where

$ß_L$ – levered β, t – tax,
$ß_U$ – unlevered β, D – debt,
β_D – β debt, E – equity.

In Table 3, the development of levered β, unlevered β and total β of the Slovak food industry is represented.

Table 3

The *β* Development of the Slovak Food Industry

Coefficient *β*	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total β	2.96	2.20	1.83	1.69	1.51	1.48	1.83	2.37	1.61	2.47	3.11	4.95
Levered β	0.64	0.58	0.61	0.72	0.77	0.80	0.86	0.87	0.58	0.87	0.77	0.93
Unlevered β	0.52	0.50	0.50	0.61	0.66	0.63	0.69	0.72	0.47	0.71	0.66	0.80

Source: Authors' processing based on Damodaran (2014c).

It is obvious from the Table 3 that the highest values of the levered β (0.93) as well as unlevered β (0.80) were reached in 2014. It follows that the level of systematic risk rises, but it still has not reached the value of 1. On the contrary, the value of total β, which issued in cases without the possibility of diversification, reaches higher values, i.e. 4.95 in 2014. Correlation with the market is 19.5%. If we evaluated the Cost of Equity at this value of systemic risk, the Cost of Equity would be unacceptably high. That is why we will prefer for capturing the unsystematic risks the application of levered β and its adjustment by the estimation of business and financial risks by the selected ex-ante methods.

2.2. Methodology Based on Build-up model for Calculation of Business and Financial Risks

The methodology based on Build-up model with calculation of business and financial risks, proposed in the Czech Republic (using ex-post and ex-ante data) by next formula:

$$r_e = r_f + r_b + r_{fi} \qquad (3)$$

where

r_e – cost of equity,
r_f – risk free rate of return,
r_b – business risk,
r_{fi} – financial risk

As a starting point for calculation and prediction of business and financial risks it was important to set risk factors (Mařík a kol., 2011b). These factors were sorted by the methodology, to factors of business risk and factors of financial risk. Among the business risk factors were factors of risk in the level of food industry branch, level of market factors, competition level, management level, production level, as well as other factors related to the production margin. Financial risk was evaluated by application of 7 risk factors – interest coverage, debt ratio, enterprise safety indicator, current liquidity, day sales receivables, day sales inventories, coverage repayments from cash flow.

Risk weight of factors after the calculation was 32.8. For calculation of weight of risk factor we used degrees (*x*): 1 – low, 2 – average, 3 – increased, 4 – high (Mařík a kol., 2011b).

Own calculation of risk premium based on Slovak conditions in relation to capital evaluation we express as multiplication of Risk Free Rate – r_f by National Bank of Slovakia (2015). As specific function for calculation we chose a^x. Result of this calculation is the Risk Premium for one risk factor and degrees of risk.

The technique of computation:

$$r_e = r_f + RP \tag{4}$$

$$r_e = r_f \,.\, a^x \tag{5}$$

$$RP = r_f \,.\, a^x - r_f \tag{6}$$

$$RP = r_f \,.\, (a^x - 1) \tag{7}$$

$$Z_x = (a^x - 1) \tag{8}$$

where

r_e – cost of equity,
Z_x – risk premium coefficient,
RP – risk premium,
r_f – risk free rate,
a – constant,
x – risk degree.

For "a" constant calculation it is important to set lower and upper price limit of Cost of Equity. Lower price limit is set at the level of Risk Free Rate; upper price limit can be expected at the highest risk degree. For calculation of upper price limit of Cost of Equity it is necessary to add the Risk Free Rate of Return to the Risk Premium. Based on this method it is possible to calculate required "a" constant by the following relation (Mařík a kol., 2011b):

$$a^x = \frac{r_e}{r_f} \qquad a = \sqrt[x]{\frac{r_e max}{r_f}} \tag{9}$$

The result of this method is, as was stated previously, Risk Premium for one analysed factor, according to the set degree of risk. In the case of this calculation, it is possible to calculate Risk Premium not only for the year 2015, but also for the longer time period into the future. This method of calculation can be thought of as a prediction of risk that we expect in the future. By comparing the calculated constants, we found out that the highest values of Risk Premiums in all risk degrees were reached in year 2012. We assume that it was caused by the lowest yields of Slovak government bonds that closely mirrored the yield of bonds within the Eurozone, by the directives of European Central Bank. Value of a^x is the same as it was in 2011, which was caused by the same yields of Slovak government bonds. After the “a” constant calculation, it is possible to calculate “Z” coefficient which stands for Risk Premium coefficient that can be used on the following calculation of business and financial risk.

In common economic environment, number of risk factors is higher than one, so as we described in the beginning of methodology in this paper, we will assume the existence of 25 factors of business risk and 7 factors of financial risk; 32 factors altogether. After the multiplication with risk weights, the fill value of factors was 32.8. After the calculation of Risk Premium, we can calculate particular business and financial risks for analysed years.

We have calculated the business risk and financial risk by relationship:

$$Business\left(Financial\right)Risk \ = \sum_{x=1}^{4} number\, of \ \ factors_x \ .weight_x \ . \ Z_{1x} \tag{10}$$

3. Data

For the creation of 3-dimensional ERM, secondary data from the financial statements of selected enterprises in the food industry from the years 2004 – 2013 were used. For the calculation and analysis of the selected risks we picked the sample of enterprises (229) that are representatives of food industry in the Slovak Republic.

For the evaluation of financial performance, 8 financial indicators and 8 prediction models were selected. Both the financial performance as well as the financial health assessment of the food enterprises reached the worst results in 2008, which may be related to the financial crisis that occurred within the Euro zone. Gradually, food enterprise performance started improving, with a slight decline in 2010 and a significant positive change in 2011. The current liquidity ratio, which is the holder of the financial risk, reached the lowest values in 2008 and the average value for the whole analysed period was 1.23. Profitability indicators Return of Assets and Returns of Equity were low, with negative (negative) values between 2006 and 2010. Both returns were positive in 2013 and reached 3.5% and 3.2% respectively. Money turnover was the longest in 2010, due to a 123 days payback period. Debt Equity Ratio was the highest in 2008, then in 2011. The highest stability was achieved in 2004. We have applied eight mathematical and statistical models to assess the future success of food business enterprises in the years 2011 to 2013. We have seen positive developments since 2011. The worst results were achieved in 2008, as in the case of the evaluation of the financial performance. This deterioration was the reversal of the financial crisis of 2008.

Within this part of the paper we focused on the summarisation of major facts from the food industry that are important mainly for the assessment and forecasting of risks of this industry. The annual GDP share of the food industry in the Slovak Republic is 2%. This share can be considered low in comparison to other EU countries, as the major part of EU countries have the share of food industry in GDP in around 10 – 15%.

Despite this fact, the long term studies of the food industry in the Slovak Republic show slightly growing tendency. From the standpoint of market structure of industry, food industry belongs to the industries with imperfect competition, that is characterised with high volatility of profits and revenues, so their prognosis is inaccurate and their processing complicated. This industry also belongs to the branches of noncyclical industries. That means that the industry is independent from the economic cycle, which positively influences the height of systematic risk. According the report of the Ministry of agriculture of the Slovak Republic (2014), the main weaknesses and risks of food industry in the Slovak Republic were the following: partial absence of resources, increased wear of tangible fixed assets, lack of Research & Development investments, high expenses within the industry, insufficient use of capacities, low share of food industry in GDP, reserves in vertical integration, high dependence of food industry on food chains, lack of cooperation in capital markets, lack of financial resources for expansion, low competitiveness on domestic and foreign markets, absence of marketing strategies, departure of international corporations due to change of macroeconomic environment, liquidate of SMEs (Small and Medium-sized Enterprises) production due to insolvency, permanent pressure of imports on domestic production and others. All of these weak links should be taken into the consideration when weighting the risks in the food industry.

T a b l e 4

Summarized Results of the Food Industry and their Impact on the Risks

Brief summary of the analysis of selected industry	**Impact on risk**
It is a non-cyclical industry, independent from the economic cycles	„+“ positive
Selling a product of everyday needs	„+“ positive
The product is not subject to high price volatility	„+“ positive
Share of fixed costs on total costs is low	„+“ positive
Enterprise does not belong to small businesses	„+“ positive
The competition consists of smaller distribution enterprises entering the market, which are not a great threat yet	„+“ positive
Alternative energy sources, technological development – increased risk	„–„ negative
Production is less diversified – increased risk	„–„ negative

Note: „+“positive – It means that it is a positive impact on risk, thus reducing the risk;
„–„ negative – It means that it is a negative impact on risk, thus increasing the risk.

Source: Authors' processing based on Kiseľáková, Horváthová and Šofranková (2015).

4. Results and Discussion

We present the results of calculation and predicted the Cost of Equity using CAPM and Build-up models. Finally, we created ERM for food industry that consists of three dimensions – the dimension of the financial situation evaluated using selected financial indicators, the dimension of prediction enterprise's financial health and the dimension of the impact of the risk on the enterprise's performance in the form of two modifications – ERM1 using the CAPM and ERM2 using the Build-up model.

4.1. Calculation and Estimation of the Cost of Equity with Application by CAPM

For the calculation of the Cost of Equity with systematic risks, we apply the CAPM model. Necessary inputs are shown in the Table 5. Similarly, as is the case with the calculation of business and financial risks, we did the prognosis for the year 2015.

T a b l e 5

Development of Systematic Risks and the Cost of Equity, Predicted for 2015

Indicators	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Unlevered β	0.52	0.50	0.50	0.61	0.66	0.63	0.69	0.72	0.47	0.71	0.66	0.82	0.80
D/E	33.29	22.03	27.28	22.39	19.46	35.37	29.31	27.62	26.81	27.42	28.74	21.46	20.13
Leveredβ	0.64	0.58	0.61	0.72	0.77	0.80	0.86	0.87	0.58	0.87	0.77	0.97	0.93
ERP	4.82	4.84	4.80	4.91	4.79	5.00	4.50	5.00	6.00	5.80	5.00	5.70	5.75
CRP	1.43	1.43	1.20	1.05	1.05	2.10	1.35	1.28	1.28	1.50	1.28	1.28	1.28
r_f	4.25	4.22	4.39	4.70	4.02	2.21	3.84	3.29	1.88	1.76	3.04	2.17	0.50
Cost of Equity	8.76	8.46	8.52	9.29	8.76	8.31	9.06	8.92	6.64	8.31	8.17	8.98	7.13

Source: Own calculation and processing.

From Table 5, it is evident that the predicted Cost of Equity for the year 2015 of the food industry calculated with the CAPM model and with the application of systematic risks is 7.13%. By comparing the used methods and with different application of risks, we came to the conclusion that there are differences in the values of the Cost of Equity. In the case when we calculated the Cost of Equity with the acceptance of business and financial risk (the systematic and unsystematic), the Cost of Equity was higher than the price calculated with the acceptance of systematic risks. For the predicted year of 2015, the price difference was 2.20%. This difference represents the influence of unsystematic risks that can influence the enterprise or the industry respectively.

4.2. Calculation and Estimation of the Cost of Equity with Application by Build-up Model

The presented methodology based on the Build-up model (Mařík a kol., 2011b) was used for the calculation of business and financial risk in the food industry. Firstly we focused on the calculation of prognosis of business risk for the year 2015. Next we applied the methodology for calculation of business risks for the entire analysed time period of 2003 – 2014. Systematic as well as unsystematic risks were the part of the evaluation of the business risk factors (Table 4). Based on this, we can confirm that the business risk is the sum of systematic and unsystematic risks. Business Risk Premium for the year 2015 was 5.31%. Systematic Risk Premium for 2015 was 3.53%. Significantly high risks also occurred within the financial risk, influenced mainly by current liquidity, enterprise safety indicator and partially by interest coverage. Values of current liquidity are below 1 in the long term. Net working capital was negative, which as a result threatens the safety of the food industry in the Slovak Republic. Overall development of business and financial risk as well as the Cost of Equity is shown in Table 6.

T a b l e 6

The Estimation of Business Risk of the Food Industry for 2015

Business Risk of the food industry	**Number of factors**	**Weight**	**Weighted number of factors**	**Partial risk premium in %**
Low	4	1	4	0.25
Average	17	1	17	3.23
Increased	4	1	4	1.83
High		1		
Sum	25	1	25	5.31

Source: Own calculation and processing.

The projected commercial risk premium for the food industry for 2015 is 5.31%. Business risk factors were predominant at the level of the average risk level, which accounted for 3.23% of the overall risk.

Table 7

The Estimation of the Financial Risk of the Food Industry for 2015

Business Risk of the food industry	**Number of factors**	**Weight**	**Weighted number of factors**	**Partial risk premium in %**
Low	2	1.3	2.6	0.16
Average	3	1.3	3.9	0.74
Increased				
High	2	1.3	2.6	2.63
Sum	7	3.9	9.1	3.53

Source: Own calculation and processing.

The financial risk premium for the year 2015 is 3.53% (Table 7). Financial risks have also been subject to high risks, in particular due to the indebtedness, financial security of the capital structure. Using the commercial and financial risk, then, the estimated cost of equity for the food industry in the years 2003 to 2014, estimated in 2015.

Table 8

Development and Prediction of Business and Financial Risks and Cost of Equity (in %)

Indicators	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
r_f	4.25	4.22	4.39	4.70	4.02	2.21	3.84	3.29	1.88	1.76	3.04	2.17	0.50
Business Risk	6.48	6.47	6.52	6.60	6.41	5.55	6.35	6.14	5.30	5.20	6.03	5.52	5.31
Financial Risk	3.62	3.62	3.62	3.61	3.62	3.56	3.62	3.61	3.53	3.51	3.60	3.55	3.53
Cost of Equity	14.4	14.3	14.5	14.9	14.1	11.3	13.8	13.0	10.7	10.5	12.7	11.3	9.33

Source: Own calculation and processing.

Expected Cost of Equity for the year 2015 was 9.33%. This cost was among the lowest in the analysed time period. Lower Cost of Equity was only in 2012. In that year there were also lower business and financial risks. For 2015, we can underline the historically lowest yields of the Slovak government bonds that copy the yields of government bonds within the EU. To show the influence of the chosen risks on the performance of food industry in the Slovak Republic, we firstly have to focus on the business risks that incorporate both the systematic and unsystematic risks. Systematic risks are influencing all branches of industry in the Slovak Republic and this is why it is important to focus mainly on unsystematic risks that are characteristic for the food industry, particularly on the absence of chosen resources, high wearing-out of machinery, high costs, absenting Research and Development and many other factors. In the food industry, high operational risk prevails what is demonstrated on the EBIT reduction in relation to revenue.

4.3. The Creation of Enterprise Risk Model for the Food Industry

We created the ERM in two versions. Model ERM1 evaluates the impact of systematic risks and model ERM2 evaluates the influence of business and financial risks. For the creation of the 3-dimensional models (ERM1 and ERM2) our approach by modelling and scoring method was used. The best values of financial indicators were ascribed maximum of 5 points, other financial indicators were given points based on their positive increasing or decreasing development. Maximum total score of the dimension of financial indicators was 40 points. The same method was also used for the conversion of acquired values of prediction models and the maximum total score of the prediction models´ dimension was 40 points. For the conversion of the risk score, we work on the assumption that the lowest value of risk will reach the highest score.

For the model ERM1, the total score of the dimension of systematic risks was reached by the summation of the score calculation of the coefficient β – levered (the lowest acquired value was 20 points and the rest was converted by the principles of the scoring method) and the score of the Total Risk Premium (the score was converted on the basis of the assumption that the lowest value of 0.05 was reached by Germany and Austria and we ascribed this score 20 points; acquired score of the given indicator for the Slovak Republic was converted with the use of the scoring method).

For the model ERM2, the dimension of systematic and unsystematic risks was the summation of business risks´ score (determined optimal value of 5 was ascribed maximum of 30 points and the reached values for ERM2 were converted on the basis of the scoring method principles) and financial risks´ score (optimal values were ascribed maximum of 10 points and the reached values for ERM2 were converted on the basis of the scoring method principles). Maximum total score of the three-dimensional models (ERM1 and ERM2) was 120 points while each dimension could reach maximum of 40 points.

From the ERM point score, it follows that the impact of systematic risks is lower and reaches the value of around 34.88 points on average, while the impact of business and financial risks is higher and reaches the value of 25.93 points on average. We can conclude that the influence of purely systematic risks is lower than the influence of business and financial risks, which represent the combination of systematic and unsystematic risks. The difference of given values in points represents the influence of unsystematic risks, which is 8.95 points, what represents the impact in the percentage of 0.8%. The total calculation of the performance by the model of ERM1 is given in the Table 9. It is obvious from this table that the performance and success development of the analysed enterprises grows, while the systematic risks stay at the approximately same level. If we compare for example years of 2004 and 2013, the level of systematic risks is lower by 0.16 points. This growth in 2013 was caused by the growth of systematic risk – β_L. The rise of this coefficient was caused by the growth of indebtedness of the analysed enterprises. The market risk (ERP) slightly increased, but the country risk premium (CRP) dropped. Consequently, it was expressed by overall slight decrease of systematic risks. The sector model ERM1 is depicted in Table 9.

Table 9

Development of the Sector Indicators in the Model ERM1

Year	Financial Performance	P-Models	Risks	Score
2004	30.87	28.85	35.95	**95.67**
2005	21.56	28.20	36.67	**86.43**
2006	20.55	20.26	36.78	**77.59**
2007	17.51	17.42	36.99	**71.92**
2008	15.69	11.69	33.21	**60.59**
2009	19.35	18.90	34.88	**73.13**
2010	17.33	17.10	33.51	**67.94**
2011	28.18	35.84	33.74	**97.76**
2012	29.33	36.14	31.28	**96.75**
2013	32.41	36.46	35.79	**104.66**

Source: Own calculation and processing.

We constructed the model ERM2 with the application of business and financial risks. During the analysed period, more significant improvement of financial risks from the value of 7.06% to the value of 3.66% appeared. The only financial risk to worsen the position of analysed enterprises is the risk which is derived from the indicator of Debt Service Coverage Ratio. Improvement appeared in the field of risks dependent on the indicators of Indebtedness, Interest Coverage, Current Ratio and Inventory Turnover. Improvement expressed in points was 2.3 points. The sector Model ERM2 is depicted in Table 10.

Table 10

Development of the sector indicators in the model ERM2

Year	Financial Performance	P-Models	Risks	Score
2004	30.87	28.85	24.07	**83.79**
2005	21.56	28.20	23.99	**73.75**
2006	20.55	20.26	23.90	**64.71**
2007	17.51	17.42	24.30	**59.23**
2008	15.69	11.69	27.64	**55.02**
2009	19.35	18.90	24.74	**62.99**
2010	17.33	17.10	25.31	**59.74**
2011	28.18	35.84	29.15	**93.17**
2012	29.33	36.14	29.84	**95.31**
2013	32.41	36.46	26.37	**95.24**

Source: Own calculation and processing.

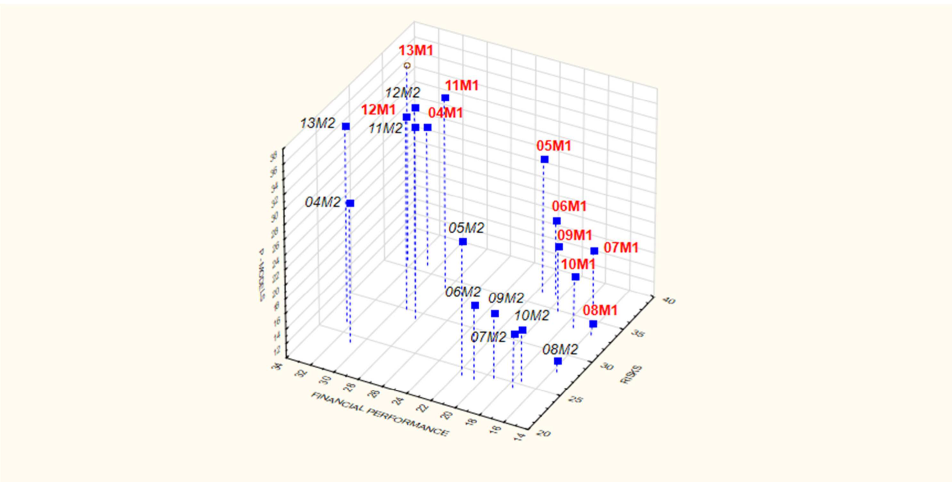
Based on the comparison of models ERM1 and ERM2 we can point that there is a difference in each of the analysed years while obviously the best position is taken by the enterprises in the model ERM1. In 2013, they reached the average values of 104.66 points, while this position is better by 9.43 points than the position in model ERM2. This proves that the impact of systematic risks on the performance of an enterprise is lower than the impact of unsystematic risks according to Mařík.

We can state that the values of systematic and unsystematic risks approximate to each other in 2012. In this case, the difference in their values was 1.44 points, which we can ascribe to the influence of unsystematic risks. In 2012, the highest value of these risks was reached, especially through to business risks, which were positively influenced by the low value of risk-free return at 1.76%. In 2013, the development of risks went towards the improvement of systematic risks through to ERP which reached the value of 5%, which was at the level of the value of emerging markets. CRP reached the value of 1.28% and coefficient β_L reached the value of 0.77.

In 2013, the deterioration of unsystematic risks came in spite of the significant improvement of financial risks. Deterioration of development was caused by the business risks, which was also caused by the value of risk-free return and by the deterioration of the position of analysed food enterprises in the market of the Slovak Republic. Final comparative matrix of the models ERM1 and ERM2 is depicted in Figure 1. The impact of most significant risks on the performance of Slovak food industry has been demonstrated.

Figure 1

The Matrix of 3-dimensional ERM1 and ERM2 for the Food Sector



Note: The numbers before M are the last two numbers of relevant years, marked M1 (ERM1) and M2 (ERM2).
Source: Own calculation and processing in STATISTICA.

Conclusion

We created two modifications of innovative models to assess the performance of enterprises (ERM). Each consists of three dimensions of corporate performance evaluation – dimension of financial indicators, dimension of prediction models and dimension of risks.

The design of these models are special because it combines three areas of assessment of the future company performance, namely current financial performance, future success and the risks that are necessary to achieve in order to eliminate them for this reason. Dimension of financial indicators and dimension of prediction models were the same in both models, the difference between the models was in the dimension of risks. In the ERM1 model, there were risks applied according to the CAPM model and for ERM2, there were risks applied on the base of the Build-up model.

Both models have their positives and negatives. The negative element of Build-up model is a subjective risk assessment and Cost of Equity. Business risks are assessed by 25 factors, and this assessment is rather subjective and financial risks are assessed by 7 factors. It works very subjectively to determine the maximum risk, which the methodology for calculating the various degrees of risk requires. Build-up model works without systematic risk – coefficient β is not a market evaluation of the company. The advantage of this model is that the calculation includes the unsystematic risks that are specific to the establishment, or sectors. For the calculation of the company's Cost of Equity, the CAPM model should be definitely recommended.

The reasons for CAPM model recommendation:

- CAPM model is the market model;
- CAPM model with the application of the country risk is also a good alternative for the companies whose shares are not traded on the capital markets;
- in the past the input data required for this model were not available, today through Damodaran databases, they are available and applicable;
- the model involves systematic risk expressed by coefficient β, thereby transforming into the equity evaluation impact such as economic cycles;
- Cost of Equity follows the development of the capital market and the profitability development of government bonds;
- Slovak companies' shares are not traded on the capital market and the problem is solved by the country risk.

A negative of CAPM model is that it does not take into account unsystematic risks. This proposal addresses the fact that the CAPM would be supplemented by specific risks, which in case of the food sector in Slovakia is financial risk due to low liquidity.

The contribution of this paper is the specification of the risks affecting the future developments and business performance as well as quantification of risks, their analysis and the possibility of their forecasts. Based on the risk prediction and risk additional charges, we can predict the development of the company's capital evaluation and development of its value. That of course is related to the amount of economic categories and their development in the future.

When creating innovative models to assess the performance of enterprises (ERM), we focused on the following:

- identification of risks affecting the performance of the company and its value;
- risk classification – systematic and unsystematic;
- risk quantification;
- analysis of risk impact on the performance and value creation of a company;
- combination with indicators of ex post and ex ante;
- construction of a 3-dimensional model assessment of enterprise performance, by which we eliminated the effects of individual variables and quantified the impact of three dimensions simultaneously;
- creating an innovative performance evaluation model of risk impact on performance, which were identified on the basis of Equity cost models.

In conclusion we can say that the ERM1 model is appropriate as it is in terms of risk analysis and its impact on company performance in Slovakia, market-based. It accepts the market risk but also the risks of Slovakia. This model is general and an applicable model for all businesses in Slovakia, regardless of industry and business field. It is a general model without significant specifics as opposed to the model of ERM2, which is specific and is based on the subjective and little information available.

If we wanted to specify the model ERM1 by sectors, we would recommend to identify the weakness of the local sector and to finalize the specific risk of the sector after careful analysis. The proposal declares the financial risk complement to CAPM model. The created performance evaluation model ERM with risks acceptance, is applicable in management practices to prevent, minimize, diversify and forecast the risks in global conditions in the real economy of the Slovak Republic as well as in the European region.

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