THE COMPARATIVE RISK AND PERFORMANCE ANALYSIS OF HUNGARIAN AND ROMANIAN EXCHANGE INDICES

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Abstract: *Nowadays, the most dominant characteristics of the financial environment are instability, variability, riskiness and uncertainty. It is difficult to find a field where the decision making process is risk-free. This statement is especially true in case of financial investments according to which risk taking is rewarded. But it is also true that the financial market participants cannot be completely avoided risks, but there are many options for managing and minimizing them. One of the most well-known theories of financial instruments' risk minimization is the modern portfolio theory, which is the collection of tools and techniques by which a risk-averse investor may construct an optimal portfolio. In portfolio theory it is also known the possibility of risky assets diversification to obtain the optimal return/risk ratio. Consequently, this paper aims to examine the efficient portfolio alternatives by determination of performance ratios based on CAPM model and modern portfolio theory, such as Sharpe ratio, Jensen's alpha and Treynor ratio and risk measuring methods, such as Value at Risk, or Expected Shortfall. In present research we concentrate to a comparative analysis of portfolios consist in main stock indices shares of two neighboring countries from Central and Eastern Europe: Hungary and Romania. The analysis was performed on the Romanian BET and Hungarian BUX stock market indices using the six-month daily closing prices. Data of the analysis were downloaded from the official websites of Romanian and Hungarian stock exchanges. The statistical analysis was made in R statistical system. Using such tools to uncover information and ask better questions will support the investors to make better and better investment decisions. The results of present research show a greater performance level for Romanian portfolio, but also a higher level of risk, with lower volatility toward market changes and major specific risk. For the Hungarian portfolio, the performance is more temperate, the level of risk is also smaller and the volatility to market factors is more relevant, so the specific risk is moderate in this case.*

Keywords: *diversification, portfolio theory, risk, efficient portfolio, return, performance analysis*

JEL classification: *G10, G11, G12, G19*

1. Introduction

In our days, economic environment is characterized by risk, volatility and uncertainty. The most of economic entities are profit oriented, therefore during their activity developing the risk taking is inevitable. In the case of company which carries out financial investments, the risk taking has a special role. According to well-known principle "who doesn't risk, doesn't win", in order to achieve higher returns, investors need to take higher risk on capital market. The risk level of financial assets is different, while the treasury bills could be considered the low risk or risk-free assets, the shares return and also risk level is higher. In accordance with modern portfolio theory, the rational investor doesn't invest its capital exclusively in one type of financial asset. He establishes its investment decision on the base of relationship between return and risk, so as to achieve maximum return with minimum risk possible. Measuring portfolio performance is one of the most important tools for portfolio optimization. Therefore, this article aims to examine two neighboring Central and Eastern Europe situated countries', major indices shares using three performance-based indicators and risk measuring methods.

2. Review of literature

In Hungarian, Romanian and international literature can be found various theories about general risk concept. We want to underline the most relevant of them. The one of the most known definition of general, overall risk is the likelihood of an adverse event occurs. Alastair in his Mastering Risk Modelling book gives more definition to risk. The most frequently mentioned are the follows: the probability of occurring different outcomes; deviations from the expected results; the chance of symmetric occurrence of profit or loss (Alastair, 2009: 59). Reto Gallati in his work, which is called Risk management and capital adequacy, defines risk like a "situation in which there is a possibility that the received results deviate from the expected results" (Gallati, 2003: 8). According to Gallati, the deviance from the expected results must be understood in positive and also in negative way. We consider that in the case of financial assets, the second definition is most characteristic, because the frequency and the amplitude of deviance from expected outcomes are larger. It is clear that in the case of risky assets the time factor plays a very important role, too.

One of the most well-known theories about risk is the Knight's theory, according to which there is a significant difference between the concept of risk and uncertainty. Knight's work (1921) especially is oriented by distinction between risk and uncertainty. According to him, the main difference between risk and uncertainty lies in the possibility of measurement, so while the risk can be measured, the uncertainty could not be. He also says, that if the risk could be quantified it also could be managed while in the case of uncertainty this is not specific, because it couldn't be measured and managed. Knight's risk quantification theory most strongest criticism comes from Keynes (1937), who said "the economic uncertainty of future cannot be solved by looking at statistical patterns of the past" and "the future human decisions (…) does not depend on strictly mathematical expectations, because these types of calculations have no basis." According to Keynes and his followers, the developments of future decisions will not be affected by "strictly mathematical expectations" (Bélyácz, 2011: 380).

Nowadays economic environment's essential feature is riskiness. The distinction between risk and uncertainty is especially important in decision making process, so in his point of view, the risk refers to a situation in which the decision-maker could assign probabilities to random events, while in the case of uncertainty this is not possible. In the case of uncertainty, can't attach probability to a random event, because chance and odds characterize it better (Szász, 2011). While some authors deals with the dilemma between risk and uncertainty, another try to define the components of the risk, namely the uncertainty and variability (Molak, 1997; Cullen–Frey, 1999). Wilson and Shlyakhter (Molak, 1997) consider that the variability means the temporal and spatial heterogeneity of values. Because uncertainty is related with the lack of information, knowledge means that with information and knowledge acquisition it could be reduced. However, the variability couldn't be reduced with further information and knowledge. At financial assets, information and knowledge plays an essential role, because certain economic news and information records sudden, unpredictable changes. In our opinion, in the case of financial assets, the information serves not only the risk minimization, but sometimes they even increase the risk level. It is clear, the riskiness and the return of financial assets, highly depends on kind, quantity and quality of information. Vose (2008) also considers risk consists of two parts, but he regards that variability is the special case of uncertainty. This kind of uncertainty and variability together is called by Vose total uncertainty. We can see therefore, in the foreign literature becomes more and more involved setting the components of risk, rather than the distinction between risk and uncertainty in the foundation of economic decisions (Tarnóczi-Fenyves, 2010). According to Tapiero (2004), the global financial crisis is not the consequence of lack of information, knowledge, but the investors and decision-makers' "mental deficiency", because they overestimated certain information and in the context of economic crisis, they overreacted it (Bélyácz, 2011). For investors who invest in risky assets, the risk is unavoidable, and the more they want to gain, the more they have to risk. About the financial investments' risk, we consider the Molak and Cullen-Frey approach is more closely, because in the case of share prices, returns, risk displays in forms of variability and volatility. The risk, variability can't be completely eliminated, but there are various risk minimization techniques, among which the best known is the diversification which is presented in famous work of Harry Markowitz "Portfolio Selection" (Illés, 2007). In accordance with modern portfolio theory, a rational investor would not invest his money into a single financial assets, he shares it between various risk levels assets. In fact, this is the central role of portfolio theory. The investor can decide in accordance to relationship between risk-return, on how much is profitable to him to buy from some risky assets. The modern portfolio theory has a major impact on Capital Assets Pricing Model (CAPM) developing. The CAPM model developed a new guidance to relationship between risk and return. Based on Markowitz modern portfolio theory, Sharpe, Lintner and Treynor through their research leads to the conclusion that there is a strong correlation between market risk and assets' expected returns. In this context, it is essential mapping and assessment of general and market risk. The one of the best known risk measurement method is the variance and standard deviation, which could be also, calculated function of probability. The variance, or squared deviation, could be defined like weighted average of the squared deviations between possible values, which in finance could be returns, losses and expected value. But neither the variance,

neither the standard deviation are not a direct method of risk measurement, because express risk with deviation of return. Is cannot put equality between risk and deviation of return, so we can interpret the deviation of return like a proxy for risk (Holton, 2004). Both the high result of variance and standard deviations shows a high risk level, while low value shows the contrary. The standard deviation and variance it is also used for determining the risk of financial assets, but these methods express risk in absolute value, which is suitable only for comparing the identical returns' assets (Illés, 2002). The relative standard deviation or coefficient of variance is one of the quantifying methods, which is more recommended by experts in risk measurement. The coefficient of variance is the ratio between assets standard deviation and assets return. A key role in financial instruments' risk quantification plays a beta coefficient (β). Beta has an especially important significance in application of Capital Assets Pricing Model (CAPM), because measures the systematic, non-diversifiable, market risk level, using only one number. In fact, by knowing the systematic risk, the return of portfolio and the risk-free asset return, we could calculate the expected return of portfolio or asset. So, the beta coefficient is an expression of market risk level and also shows the sensitivity of financial asset to movements of market benchmark portfolio. A higher value of beta relates a higher level of risk and return (Mun, 2006). Mathematically, the value of beta is calculated like "ratio of covariance between an asset and market portfolio and market portfolio variance" (Illés, 2002: 141). When beta is equal with 1, it means that the asset return is near to market return. If beta value is less than 1 indicates a low sensitivity, otherwise the change of market factors has a little effect on asset return. If beta is greater than 1, it means that the asset is very sensitive to market changes, so changes of market risk factors cause more significant variation in return evolution (Aven, 2010: 45). The application of CAPM model was widely criticized, because according to some experts it's impossible to characterize the systematic, macroeconomic risk factors through one number. During the CAPM model application, the model developer assumed that the financial markets are perfectly balanced, the investors have homogeneous expectations, but the current economic environment and recently developed financial turbulences has strongly refuted these assumes. A very serious weakness of model is that market and inherent macroeconomic risk factors are completely static (Altăr, 2002: 70-71).

A key component of financial decisions foundation is the portfolio performance measurement. The performance measurement has an essential role to investment decisions foundation and contributes to the adding value of successfulness of investment and risk minimization. Portfolio performance ratios answers for three very important questions: what is the return on asset, why has the portfolio performed that way, how can be performance improved (Bacon, 2008: 1).

3. Research methodology

In the comparative analysis of two neighboring countries shares portfolio we used the shares basket of Romanian (BET) and Hungarian (BUX) main stock exchange indices. The data included in present study are these two countries main stock indices shares daily closing prices, for 6 months back. The data used were collected from the official databases of Hungary, Budapest Stock Exchange website: www.bet.hu and Romania, Bucharest Stock Exchange website: www.bvb.ro. The statistical analysis was built on the R statistical software system. In the R statistical

system there are available all the packages (modules) which is necessary for this analysis. The R statistical system is open source software, that ensure many analyzing, modeling and visualization facilities and another advantage is that it could be connected with Excel spreadsheet, which permits the
usage of different databases. In this study, we used the 'PerformanceAnalytics' module, because this package aims to aid us in using the latest research for analysis of return streams, such as stock returns and portfolio performance ratios. In portfolio's financial assets selection, managing and establishing of efficient financial decisions, the risk, return and the relationship between risk-return determinations has an important function. In addition, in decision-making and risk minimization, the portfolio performance has an important role. Based on CAPM model, these two closely related concepts are used in portfolio performance ratios calculation. Foreign literature presents more performance based indicators, of which the well-known are Sharpe ratio, Treynor ratio and Jensen's alpha.
William Sharpe's (1966) indicator is based on modern portfolio theory and the essence of ratio consist in showing how much is the reward for variability, so this is why in foreign literature this ratio is also called as "reward-to-variability ratio". The Sharpe performance ratio is calculated according to (1) formula:

$$S_P = \frac{E(R_p) - R_F}{\sigma(R_P)} \qquad (1)$$

where, $E(R_P)$ – the expected return of the portfolio; R_F – the return on the risk-free asset; $\sigma(R_P)$ – standard deviation of the portfolio returns.
As it can be seen from the formula, the Sharpe ratio compares excess return above risk-free asset with total risk of portfolio (Amenc - Le Sourd, 2003: 109). The indicator can also be understood as the return per unit of variability. According to this, the higher value of Sharpe ratio indicates a more favorable risk-return combination (Bacon, 2008: 67).
While Sharpe ratio is based on modern portfolio theory, the Jensen's ratio or alpha (1968) is based on Capital Assets Pricing Model (CAPM) and can be described by the following (2) correlation:

$$\alpha_P = E(R_P) - R_F - \beta_P(E(R_M) - R_F) \qquad (2)$$

where, $E(R_P)$ – the expected return of the portfolio; R_F – the return on the risk-free asset; β_P – the systematic risk of portfolio; $E(R_M)$ – the expected return of market portfolio.
Jensen assumed that the portfolios are not perfectly diversified and therefore there is part of portfolio return which is missed from CAPM model, which in fact will be explained by Jensen, through Jensen's alpha. Essentially, the Jensen's performance ratio compares the portfolio excess return above risk-free rate with return received by application of market model. If Jensen's alpha has a positive result, means that the portfolio return is higher than the return received by using the CAPM model. The major weakness of this ratio consists in the fact that permits only the comparison of portfolios with similar risk levels.
The Treynor's performance ratio (1965), or otherwise "reward-to-volatility ratio" is also closely related with CAPM model. The indicator is very similar with Sharpe's

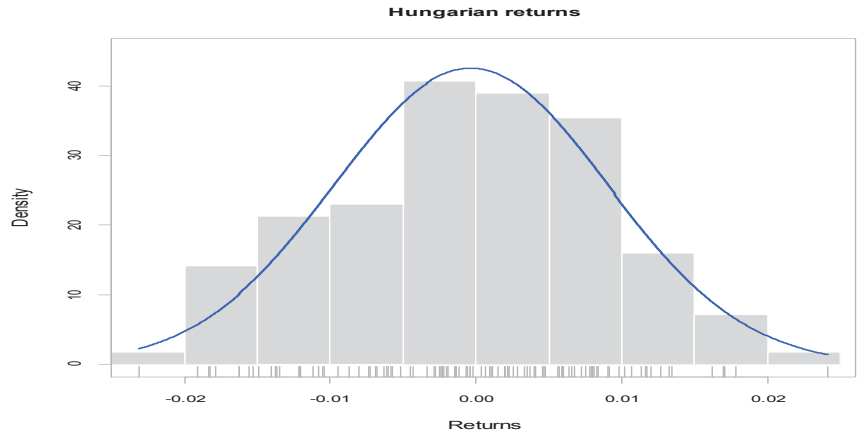
ratio, with the difference that Treynor compares the excess return above risk-free rate with the systematic risk, and not with the total risk of portfolio, how it is presented in the (3) formula:

$$T_P = \frac{E(R_p) - R_F}{\beta_P} \qquad (3)$$

where, $E(R_P)$ – the expected return of the portfolio; R_F – the return on the risk-free asset; β_P – the systematic risk of portfolio;
The indicator can be also explained as the return per unit of volatility. In case of this ratio, the portfolio with higher value will be preferable (Amenc - Le Sourd, 2003: 108). The Treynor ratio is a well-known indicator, but in practice it is rarely used, because not take into account the specific risk. If the portfolio is well diversified the Sharpe ratio and the Treynor ratio shows similar results.
In this study, at computation of last two ratios we have used as benchmark portfolio the returns of Hungarian stock indices (BUX) return, for analyzed period.

4. Results of the research

In analyzing of Hungarian and Romanian main indices shares basket returns, we start with presentation of portfolios returns distribution for studied period, which is illustrated in the Figure 1.



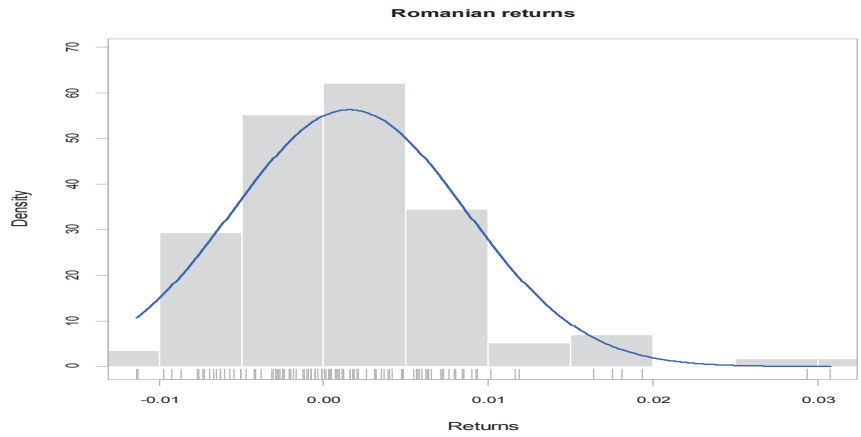


Figure 1: The distribution of Romanian and Hungarian portfolios returns
Source: Own computation

At first we can see, that the Hungarian portfolio returns is much closer to normal distribution then the Romanian. 50% of Hungarian portfolio returns are situated between -0.00630 and 0.00640, while 50% of Romania portfolio returns are situated between -0.0027 and 0.0050. We can also observe in the case of Romania, that the distribution of portfolio returns is much more right skewed, because there are some outliers returns near to 0.003, which is indicated by the value of skewness too, upper than 0. In the case of Hungarian portfolio this is not specific; here the value of skewness is closer to 0, and the histogram is moderate tailed. In terms of kurtosis, neither in two cases is not specific the normal distribution kurtosis, which represent a kurtosis value at 3. At Romanian returns distribution, this is upper than 3, which illustrates a slightly leptokurtic distribution, closer to normal distribution, while at Hungarian data kurtosis we can observe a kurtosis value lower than 3 and upper than -3, which is also further by recommended value.

Table 1: Hungarian and Romanian returns statistics

	Hungarian portfolio returns	**Romanian portfolio returns**
Minimum	-0.0231	-0.0114
Quartile 1	-0.0063	-0.0027
Median	-0.0002	0.0004
Arithmetic Mean	-0.0004	0.0015
Quartile 3	0.0064	0.0050
Maximum	0.0242	0.0307
LCL Mean (0.95)	-0.0021	0.0002
UCL Mean (0.95)	0.0014	0.0029
StdDev	0.0094	0.0071
Skewness	-0.1390	1.3089
Kurtosis	-0.3682	3.3447

Source: Own computation

In terms of data deviation between maximum and minimum value of returns, we can see the greater deviation in the case of Hungarian portfolio. Standard deviation illustrates the same fact, which means more significant variability, uncertainty in case of Hungarian portfolio returns. The LCL (Lower Confidence Level) and the UCL (Upper Confidence Level) Mean compute a confidence interval mean based on the StdDev (standard deviation) of analyzed data and the z value of 95% confidence interval. The lower and upper confidence level estimation gives an indication of how much is the uncertainty in true mean computation. The LCL Mean and the UCL Mean is more significant at Romanian portfolio in comparison with Hungarian portfolio. The results show that at Romanian shares returns, the uncertainty is greater than in the Hungarian case, on this aspect.
For analyzing the portfolio performance and risk, it is important to interpret the indicators from Table 2. First three indicators illustrate the Sharpe ratios which measure the return per unit of risk by using different risk measure indicators as denominator: StdDev (standard deviation), VaR (value at risk) and ES (expected shortfall). By analyzing these three indicators, we can see that "the reward to variability" has greater values in the case of Romanian portfolio, what means a better combination of risk and return. The negative results for Hungarian Sharpe ratios are caused primarily by the negative values of returns. Analyzing Jensen's alpha, we have see positive value in both of situations, which means that there is a part of return which isn't it explained by using of CAPM model.

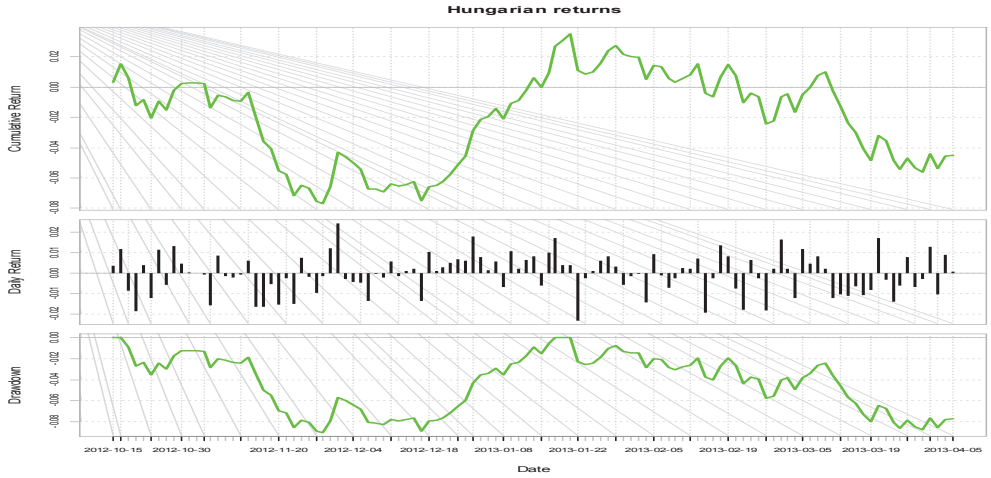
Table 2: Performance and risk ratios of Hungarian and Romanian returns

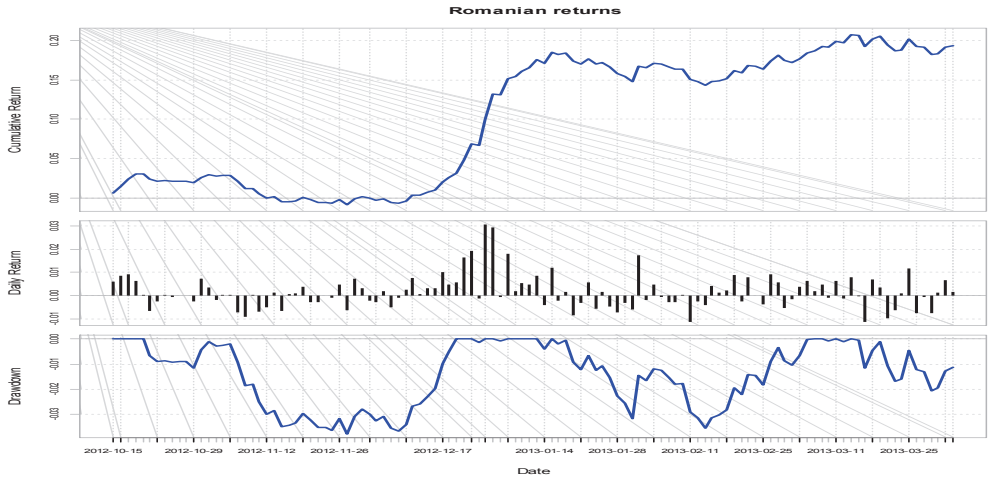
	Hungarian portfolio returns	**Romanian portfolio returns**
StdDev Sharpe	-0.03865	0.21857
VaR Sharpe	-0.02244	0.23021
ES Sharpe	-0.01842	0.15353
Jensen Alpha	0.02512	0.48000
Treynor Ratio	-0.09639	3.75783
Semivariance	0.00965	0.00559
ES	-0.01966	-0.01009
VaR	-0.01614	-0.00673
Skewness/ Kurtosis Ratio	-0.05281	0.20630
Total risk	0.14875	0.11207
Systematic risk	0.14850	0.01828
CAPM beta bull+	1.01577	0.01828
CAPM beta bear-	1.00111	0.07861

Source: Own computation

Treynor ratio, or return per unit of systematic risk shows a greater result for Romanian portfolio, which can be interpreted as more favorable than in the case of Hungary. The Semivariance, as a measure of risk, shows the deviation between values situated below mean and target value (mean). At Hungarian portfolio, the Semivariance shows a greater result, which means that this portfolio has a higher risk than the Romanian portfolio. VaR (value at risk) as main measure of risk reveals

the value of worst expected possible loss, at a given confidence level, while the ES (expected shortfall) or CVaR (conditional value at risk), as an alternative for VaR reveals the shape of loss distribution, because it is known like a more precise risk measure alternative. These two risk measure indicators shows related results, which point out the higher possible loss and also risk in case of Romanian portfolio. Skewness-Kurtosis ratio is used as Sharpe ratio's additional indicator, which is computed as ratio between skewness and kurtosis values. The higher then lower result is preferred. As a complementary of Sharpe ratio, shows the same, the Romanian portfolio is more favorable on this aspect. Although, the performance and the risk calculated reveals higher values in the case of Romanian portfolio, the Total risk shows the contrary, a higher value for Hungarian portfolio. While for the Hungarian portfolio the total risk is composed largely from systematic risk, for the Romanian portfolio it isn't specifically, because here the systematic risk has fewer proportion in total risk, probably the major part of total risk represent the specific risk. The beta reflects the sensitivity of return to market factors volatility. In this study, because the returns have also positive and negative values, it is recommended to compute the CAPM beta bull for the positive returns and CAPM beta bear for the negative values. In this analysis, the both two beta results show a higher sensitivity of returns for Hungarian portfolio.





2. Figure: The cumulative, daily, drawdown of Hungarian and Romanian returns
Source: Own computation

The Figure 2 presents first the cumulative returns, which shows the aggregate amount of gains or loss in certain period. By analyzing this figure, we can observe a more abrupt line in the case of Hungarian returns, with significant decreases at the end of year 2012, and increases in next period, the begin of 2013. Approximately, the same trend can be observed in the case of Romania, with difference that in the first period, the amplitude of decreases it isn't very important, and in the last period, at Romania, we assist to a slowly increase, while in Hungary the contrary can be observed. The drawdown represents a very good measure of portfolio risk, because shows the decline between peak of return to trough in certain period. At Hungarian portfolio, the trend of drawdown follows nearly the evolution of cumulative return, while at Romanian portfolio the evolution is sharper. The Romanian returns drawdown's also follows the line of cumulative returns, with more accented evolution in some places.

Conclusion

At first seeing we can observe that for analyzed period, the evolution of Hungarian exchange index returns, follows a distribution which is much closer to the normal distribution. We also can observe on aspect of risk, the StdDev and semivariance shows a higher risk for Hungarian portfolio, while VaR, ES reveals the contrary. The performance ratios illustrate a higher performance for Romanian portfolio. On aspect of the most relevant risk measure methods, VaR and ES, the results of present research sustain the relationship between performance and risk. We can summarize, that Romanian portfolio seems to be more performance, but also riskier, with lower volatility toward market changes and greater specific risk. For the Hungarian portfolio, the performance is more temperate, the risk is also smaller and the volatility to market factors is more relevant, so the specific risk is moderate. These facts are very important, because means that Hungarian exchange index returns are more vulnerable to the changes of market conditions, in comparison with Romanian exchange index returns. Despite the fact, that Hungarian portfolio risk level is

smaller, nowadays, when the changes of economic environment are more frequently, a very important aspect to take into account is the vulnerability to these changes. So in aspects of portfolio investment alternatives choosing and ranking, we can say the Romanian portfolio is for risk-averse investors, while the Hungarian alternative is specific for less risk-averse investors.
In conclusion we can affirm that in studied cases, there is direct relationship between portfolio's performance and risk level, so this is why in context of these day's financial environment, performance and risk analyzing can be considered necessary tools in decision making process for managing and optimize portfolios.

References:

Alastair,I.D. (2009) 'Mastering Risk Modelling'Prentice Hall, Financial Times, Pearson Education, 59 pp Altăr, Moisă (2002) 'Teoria portofoliului', Academia de Studii Economice, Bucureşti, pp 70-71.
Amenc, N. and Le Sourd, V.(2003) 'Portfolio Theory and Performance Analysis', John Wile& Sons, Ltd., England
Aven,T(2010) 'Misconceptions of risk', John Wiley and Sons, pp 45.
Bacon,C.R.(2008) 'Practical Portfolio Performance Mesurement and Attribution', Second Edition, John Wile& Sons, Ltd.
Bélyácz,I.(2011) 'Kockázat és bizonytalanság a döntésbeli alkalmazhatóság tükrében', Hitelintézeti szemle, X-ik évfolyam 4 szám, (379-385), pp 380.
Cullen, A.C. and Frey C.H. (1999) 'Probabilistic Techniques in Exposure Assessment: A Hand-book for Dealing Variability and Uncertainty in Models and Inputs', Plenum Press, New York, pp 335.
Gallati, R. (2003) 'Risk management and capital adequacy', The McGraw-Hill Companies, Inc., United States of America, pp 577, 8.
Holton, Glyn A. (2004) 'Defining Risk' , Financial Analysts Journal, Vol. 60, No. 6 (2004, 19-25 pp, http://www.jstor.org/stable/4480615
Illés, Ivánné (2007) 'Vállalkozások pénzügyi alapjai', SALDO Pénzügyi Tanácsadó és Informatikai Zrt.,Budapest, pp 213.
Keynes,I.M.(1937) 'The General Theory of Employment'. Quarterly Journal of Economics,Vol. 51, pp 209–223.
Knight,F.(1921) 'Risk, Uncertainty and Profit'. Reprint London School of Economics
Lintner, J., (1965) 'The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets', Review of Economics and Statistics, 47: pp 13-37.;
Molak,V.(1997) 'Fundamentals of risk analysis and risk management'.Lewis Publishers (CRC Press, Inc.), New York, pp 457.
Mun, J.(2006) 'Modeling Risk Applying Monte Carlo Simulation', Real Options Analysis, Forecasting, and Optimization Techniques, John Wiley & Sons, USA
Saunders, A. and Allen, L (2010) 'Credit Risk Measurement In and Out of the Financial Crisis.New Approaches to Value at Risk and Other Paradigms', Third Edition, John Wiley & Sons, Inc., pp 152.
Sharpe, W. F., (1961) 'Capital asset prices: A theory of market equilibrium under conditions of risk', Journal of Finance, 19 (3), pp 425-442;
Szász, J.(2011)'Valószínűség, esély, relatív súlyok. Opciók és reálopciók', Hitelintézeti Szemle X-ik évf. 4. szám, pp 336–348.
Tapiero,Charles (2004) 'Risk and financial management. Mathemathical and Computational Methods',John Wiley& Sons Ltd., England, pp 12.

Tarnóczi,T. and Fenyves,V. (2010) ‘A vállalatértékelés komplex szimulációs modellje’, Társadalomtudományi Csoport. Acta Scientiarum Socialium. Universitas Kaposváriensis. Kaposvár. ISSN 1418-7191, pp 95-107.
Treynor, J.(1961) ‘Towards a theory of market value of risky assets’, unpublished manuscript.
Vose, D. (2008) ‘Risk analysis: a quantitative guide’. John Wiley & Sons, Ltd, Chichester, pp 735.