The Management of Portfolio Risk on the Romanian Capital Market

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Abstract:

In a society strongly dependent and intensively industrialized such like the one we live in, risk cannot be an isolated event, but the consequence of some facts that determine its transfer from one point of the planet to another. As a result to the general tendency of increasing the volatility of the financial markets but also to the increasing complexity of the global financial system there was registered a continuous interest in the domain of risk management.

Within the article there are being presented methods of reducing risk for financial titles portfolio, coming to support the investors that want a greater security when making the portfolio. We will further present the way in which diversity can reduce risk, but at the same time in order to better understand the complete effect of diversity we will show the way in which a portfolio risk depends on an individual risk of each component title, exemplifying some titles quoted at Bucharest Stock Exchange.

1. Introduction

In the context of the last years, in which the financial markets are being integrated and affected by globalization in an accelerated rhythm, there appear new possibilities of placing the available resources and at the same time new opportunities of accessing the financing markets. The new global order in the finances' domain increases the circulation of financial flows in parallel with facilitating the access to the financing sources and thus leads to the diversification of the international strategies concerning the structure of portfolios.

The globalization of financial markets readdresses to an efficient system of economic levers, by increasing the financing capacity and through the fast transformation of economies in investment but simultaneously with the appearance of new risks.

After increasing the complexity of the global financial system as well as the general tendency of developing the volatility of the financial markets there appears an increasing interest for the management of risk domain.

The management of risk does not analyze what went wrong after things had been achieved as well as it is not an ex-post analysis but a process in which risk becomes transparent. It requires seeking for new risks, measuring and administrating them. We don't have to have in view a unique answer concerning risk. The management of risk is a cyclic process from which one can learn.

2. Modeling

The conceptual definition of risk as well as its analysis is made in the context of establishing criteria that are at the bases of the investment in financial titles and of the indicators that surprise in a complex frame the situation of risk.

Risk stands for a complex phenomenon that should be defined in a close correlation to human subjects that divide it into two categories: the persons with appetite for risk that take any risk for an adequate remuneration and the ones who fear risk trying to minimize it in almost all the situations.

As a consequence to this, the management of portfolio takes into consideration the individual investors' needs and preferences. Minimizing risk is a fundamental purpose in the administration of the portfolio of titles and allows the capital investment to be allocated according to the investor's attitude against risk. Nevertheless there can be made a possible estimation of the predicted gains for certain values without making reference to individual investors and without taking into account his needs or preferences. The results of the financial analyst on the capital market are determinant for the management of portfolio, but managers use the financial analyst's calculations only in correlation to the preferences and financial situation of individual investors.

The theory of portfolio is formed around the following central ideas:
- the relevant characteristics of a portfolio are the predicted gain and its risk;
- rational investors will prefer to own efficient portfolios that maximize the predicted gains at a certain level of risk or in an alternative equivalent way minimize risk at a given level of the predicted gain

The relation between the gain (profitability) of a portfolio and the rate of profit of each movable value that compose the portfolio is thus expressed as a balanced sum:

$$R_p = \sum_i x_i \cdot R_i$$

(1)

The weight of each movable value (x_i) is the percentage of the total value of the portfolio that is invested in the respective title.

In case the profitability of certain movable values is known with precision then the portfolio's profitableness can be accurately predicted. Taking into account that future is not secure the managers of portfolio must fundament their selections on the gains' prognoses.

If we think of a portfolio made up of 4 titles whose expected weights and rates of profitability are presented in the following chart:

Table 1

Title	Weight (x_i)	Predicted gain (R_i)
1	0,4	0,10
2	0,2	0,20
3	0,3	0,15
4	0,1	0,05

then the portfolio's profitability is:

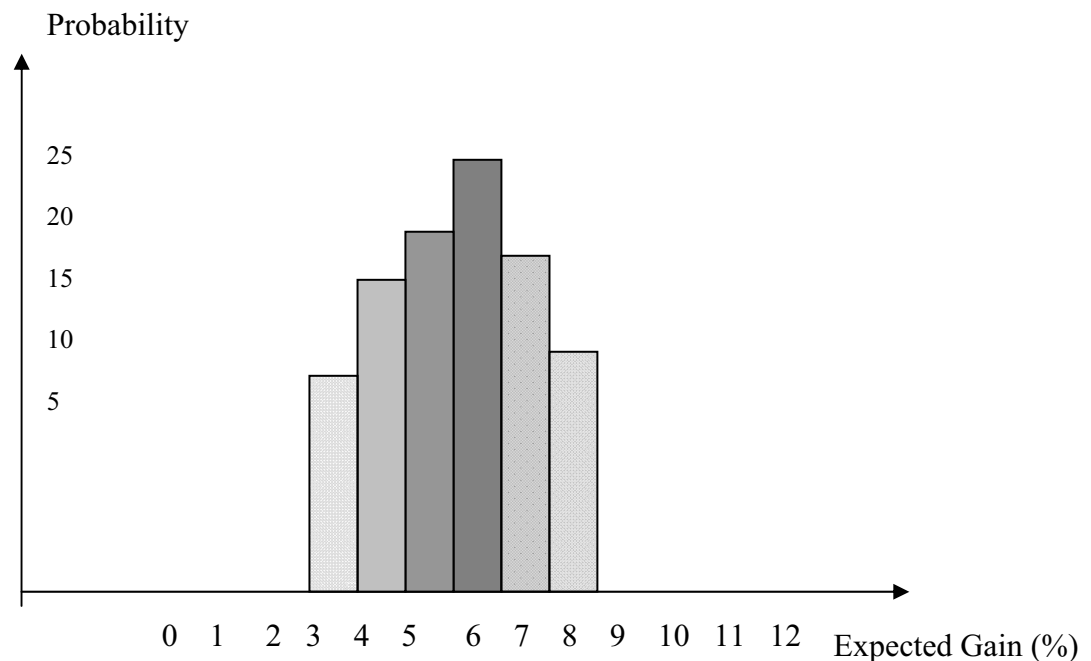$$R_p = 0,4 \times 0,10 + 0,2 \times 0,20 + 0,3 \times 0,15 + 0,1 \times 0,05 = 0,130 \, sau \; 13\%$$
(2)

The analyst predicts the following gains:

Table 2

Gains	Probability
9%	Very probable
6%	Possible, but improbable
11%	Possible, but improbable

The 9% prognosis is the analyst's best estimation, but this cannot be sure. For a deeper and more efficient prognosis there are being made supplementary calculations with the help of a histogram in the following picture:

Picture1. Analyst's prognosis concerning the possible gains

On the horizontal axis there are being represented the middles of the intervals, that is number 6 stands for the interval (5.5; 6.5) whereas on the vertical axis there are being represented the probabilities of appearance of the expected rates of profitableness.

This distribution reflects the probabilities through which the title can offer certain gains in a certain period of time. With a probability of 0.05, the expected income will be of 6% or 11% whereas with a probability of 0.25 the expected income will be of 9%. The predicted gain or the sense of distribution is equal to the balanced

sum of the possible gains, the weights being represented by probabilities. In this case the average or expected gain is of 8.66%.

Thus the expected gain of a portfolio can be defined as the balanced sum of the expected gains of the individual movable values.

Nevertheless one can stress the problem of estimating the risk of each movable value and the estimations of a portfolio risk. For this there are being used two statistic values: *standard variance and deviation.*

The two measures of estimating risk are relevant only if the expected results describe the normal law of probability (are normally distributed).

The risk of an asset is being defined by the probable variability of the asset's future profitability. If for instance an investor buys government titles with an anticipated rate of profitability of 6%, then the investment's profitability is of 6% and it can be predicted with precision because this type of investment is without risk. But if the investor buys shares from a recently appeared company, the investment's profitability cannot be estimated with precision. Studying the company's results, an analyst can estimate an expected rate of profitability of around 20%. The investor can also expect to fluctuations of the rates of profitability from for example +100% to -100%.

As a result to this one can say that risk is connected to the probability of having a reduced profitability than the expected one. The more frequent the opportunity of a reduced profitability appears, the more risky the investment is.

In case of a normal distribution (Gauss' bell) this is ascendant and the probabilities that a gain should be placed in the interval of expected value (E) plus or minus the standard deviation (s) are approximately 2 out of 3. The probabilities that a gain appears in the interval E+2s – E-2s are of around 95 out of 100.

The question that is often asked is how we get to these probabilities. The special publications offer indications, advice but not the appearance probabilities. Most analysts start with studying the previous variability and it is supposed that portfolios having a history with increased variability have the least predictable results.

The modern financial theory shows that the previous evolution of the course of a financial title is not sufficient in order to predict the future behavior of the respective title but depends on the following factors:

- the offer and request for the respective title, existing on the market at that moment (a title for which the request is greater than the offer can determine the price to grow or vice versa);

- the market's liquidity on which the title is being operated (a title operated daily shows the high interest of the investors and its course will be sensitive to the events connected to the market or issuer; a title occasionally operated is less attractive, its course modifies occasionally and changes are usually greater than in the case of a title currently operated);

- the general evolution of the market on which the respective title is being operated (the price of a title operated on a market with an ascendant evolution will generally register an increasing trend. The ascendant evolution of the market is given by the value increase of the stock exchange indices, the ascendant tendency of the total volume and of the total value of daily transactions as well as of the number of investors on market);

- the general status and the registered performances of the issuing society of a title (a real increase of the issuer's economic activity will determine a great level of security for the issued titles investment);

- future certain events that will affect the issuing company (fusions, future acquisitions, payments of dividends and so on);

- the title's previous evolution (if there is being registered an increasing trend of a title's course one can predict with the help of a graphic analysis that the market price can grow continuously);

- unpredicted events that affect the stock exchange market (the economic events – government's decisions, then those of monetary authority; juridical events – the adoption of new laws, the change of the functioning, operating and discounting rules and stipulations; other events such like natural catastrophes, wars, terrorist attacks, etc.).

The standard deviation is a useful synthetic indicator in appreciating the level of spreading as compared to the expected value. Within the estimations, the variable's dispersion is more used as compared to the standard deviation. While the standard deviation on each invested monetary unit does not change together with the invested sum, the dispersion on each invested monetary unit increases together with the invested sum.

The standard deviation is marked with σ, whereas variance is market with σ^2. If the rates of profitability are calculated according to some alternative scripts then the standard deviation can be obtained through the formula:

$$\sigma = \sqrt{\sum_s \left(R_s - \overline{R}\right)^2 \cdot p_s} \tag{3}$$

in which $\overline{R}$ stands for the balanced average of the real values of the rates of profitability R_s, and p_s stands for the balanced average probability of deviation from the expected value that indicates how much greater or smaller the real value is as compared to the expected one.

If the only available data are the values of profitability in a past period then the standard deviation of profitability is being estimated using this formula:

$$\sigma = \sqrt{\frac{\sum_{i=1}^{N} \left(R_i - \overline{R}\right)^2}{N-1}} \tag{4}$$

N being the number of observations, and N-1 is the level of availability.

The portfolios that are efficient from the variable's dispersion point of view are efficient as well from the standard dispersion's and vice versa.

Though the net gain of a portfolio is the balanced sum of the expected gains of the component values, the portfolio's dispersion is not calculated as a balanced sum of the component movable values dispersion.

The portfolio's dispersion is calculated with the formula:

$$\sigma_p^2 = \sum_{i=1}^{n}\sum_{j=1}^{n} x_i \cdot x_j \cdot \mathbf{cov}_{ij} \tag{5}$$

in which cov_{ij} is the covariance between the predicted gains of the movable values i and j.

Analyzing the Romanian capital market, one can observe that some of the operated titles have a greater variability than others, but for all of them the standard deviation is greater than the one corresponding to the market.

As the standard deviation of the market (measured through the standard deviation of the stock exchange indices) is a composition of standard deviations corresponding to each title that makes up the portfolio, there can be concluded that diversity spreads the risk. Even a short diversity produces a substantial reduction of risk.

When two titles are combined and the covariance is smaller than 1, the risk of the portfolio will be smaller than the balanced average of the risks belonging to the two titles.

In order to exemplify we consider a portfolio of shares issued by the Romanian Bank of Development and Transylvania Bank. The dates of the shares' analysis in 2007 are presented in the following chart:

Tabel 3

TITLE	Average Profitability	Average deviation of profitability (dispersion)	Average deviation of the estimated profitability (estimated dispersion)
BRD	0,2054%/day	24.1656%	24.2278%
TLV	-0,0223%/day	1,7196%	2,7267%

- Source: Dates from BVB, www.bvb.ro

Investing sums in the two categories of shares, we will get a portfolio's rate of profitability of 0,0916 (9,16%) and the risk $\sigma_p = 0,127$ that is 12,6953%.
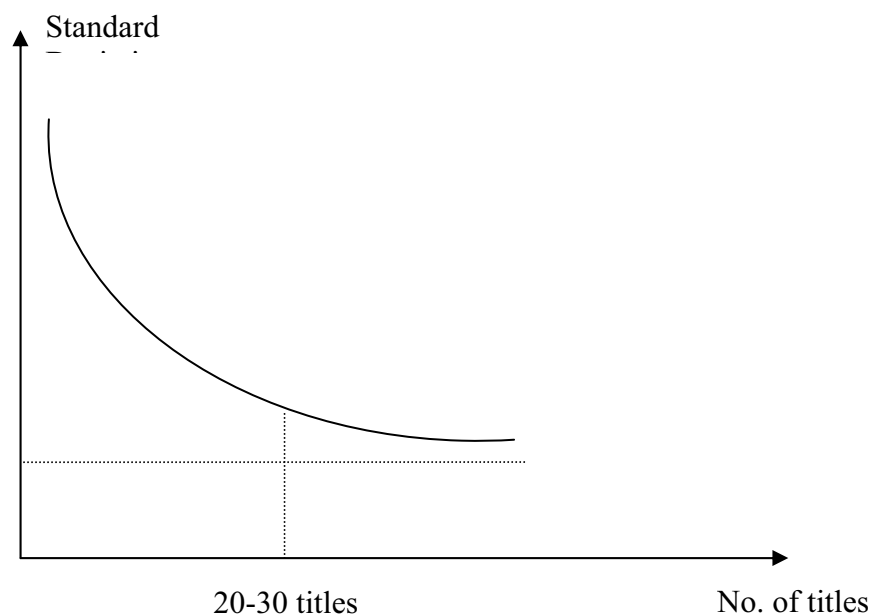
Calculating the balanced average of the risks of the two titles we get:
$M_{12} = x_1\sigma_1 + x_2\sigma_2 = 0,5 \cdot 24,1656 + 0,5 \cdot 2,7196 = 0,13443$ That is 13,44%.

The covariance between the two titles is $\sigma_{12} = 0,3794153$

One can observe that the portfolio's risk is smaller than the balanced average of the risk of the two categories of shares as a consequence to the fact that there were combined two kinds of shares for which covariance is smaller than 1, fact that permitted a risk reduction.

Comparing the standard deviation for portfolios formed of a title, 2 titles, 3 titles and so on, one can notice that the size of the standard deviation is being reduced as the number of titles within the portfolio increases. But the reduction is smaller and smaller if the number of titles within the portfolio exceeds 20 or 30 (picture no. 2).

Standard

Picture 2: Risk reduction through diversification

From the picture no.2 one can notice that a part of risk cannot be eliminated through diversification (the potion graphically situated and abscissa) and this is the market risk (systematic, undiversified) that refers to those articles that threatens all the business inside the market.

The Romanian capital market amplifies the risks that the investors take and offers a few variants for investment diversification. Bucharest Stock Exchange wasn't a very attractive market. But though generally speaking, the emergent markets are characterized by increased volatility and performance, Bucharest Stock Exchange rather offered a large volume of uncertainty without satisfying the investors.

Most risks are connected to the stage of development of the Romanian capital market as compared to other countries.

The liquidity of Bucharest Stock Exchange is quite reduced, the average value of daily transactions not exceeding 10 million euros.

The high volatility of the operations from the Romanian capital market is another risky factor and is due to the investors' behavior, present on the market (rather speculators than investors).

Within the category of risky factors there is also included the lack of instruments with a fixed income, including here corporatist or mortgage obligations, of derived instruments for certain assets and reduced possibilities of hedging on the derivatives market.

In order to minimize risks on the Romanian capital market there is not being imposed the formation of portfolios combining investment in listed shares on the Romanian stock exchange market and the ones on the international markets with a greater liquidity.

Taking into consideration the economic increase in our country, in the last period of time, with much more over the average of the countries with a mature economy, one can see that Romania tends to become the preferred destination of foreign capitals.

The Romanian companies listed at the stock exchange have a great potential of development of a short and long term and that's why local investors especially the foreign ones will be interested to have investment in these companies.

A capital market that tends towards maturity, such like the Romanian capital market, needs three main categories of factors:
- portfolio investors of small and middle size that invest on middle and long term according to the expectations of the companies' economic evolution;
- speculators moving on the spot and giving liquidity to the market;
- great local investors such like local investment funds, pension funds, assurance societies, etc.

An equilibrated development of all these investors contributes to the increase of the market's stability and to the reduction of vulnerability that otherwise they might have in the actions, sometimes completely unpredictable and unjustified of the foreign capitals.

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