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## **PORTFOLIO RISK MANAGEMENT IN INVESTMENT ACTIVITY OF BANKING SECTOR**

The purpose is to investigate the role of portfolio risk management in investment activities in banks as well as to examine the proper method of recognizing risk. It aims to assist the managers to integrate the risks calculating methods in more effective way into overall banking system, which could be included into general scheme of systemized analysis of banking activities.

One of the main problems concerning the evaluation and optimization of risk exposure is the choice of “good” risk measures. The study shows the example of combination Capital Asset Pricing Model with the elements of fundamental analysis. A set of the main rules of making investment portfolio was also added to this combination. The shown elements of different methods help business entities to avoid systematic risks and to receive adequate returns. The example of Deutsche Bank creates an assumption of having reliable methods of protection in its activity from the risks. That is why, authors concluded that chosen bank has mostly relations with “good risks” and on that score they can be predictable or determined. Such hypothesis was accepted with the provided methods. Nevertheless, due to some theories, other risk measures have been proposed.<sup>1</sup>

**Key words:** risk, portfolio risk, uncertainty, Capital Asset Pricing Model, variance

### **Introduction**

The modern banking system is one of the most dynamic sector of economy and at the same time this system should be the most reliable. In economic world banks are trying to focus on preserving depositors by minimizing risk and getting sufficient results, known as profits. In layman's terms, the important point of acting banks is to earn profit in the most safety way. Therefore its vital function can be treated as to be safety and profitable during all fluctuations on the world markets. In the meantime, the vital action of banks contains the main problem in banking activity. Such paradox exists in each spheres of business. Taking into consideration, that banking activity is more risky than others in view of that fact that just these institutions are connected with the public and all spheres of business world. Considering that, the bankers should be more detailed in risk management.

Investing is a good decision if banks would like to increase their capitals and take the leader positions on the market. Mostly companies are trying to get as much

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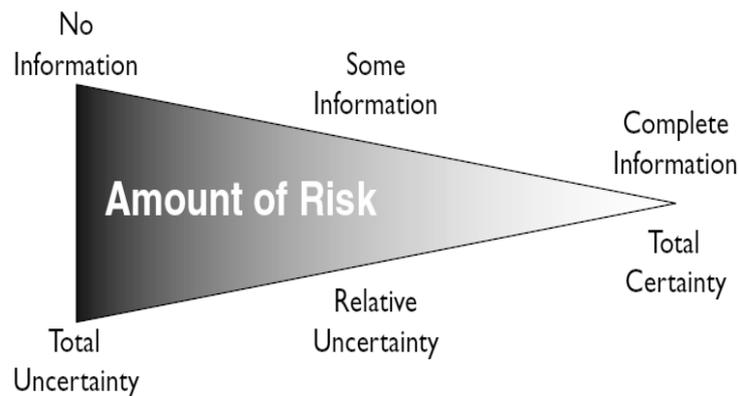
<sup>1</sup> Jean-Luc Prigent. Portfolio optimization and performance analysis. - Chapman & Hall/CRC financial mathematics series:2007- 438p

higher profit as possible, but only few of them could protect themselves against risks. Risk in investments is usual thing, which exists always with the opportunity to earn the money. Usually it looks like a game that one doesn't know the result until the game has been declared. That is why, the choice of right, suitable portfolio is very important. With the proper strategy one could protect the institution against the risk and at the same time earn maximum possible profit.

Nowadays, financial theory is one of the major economic fields where decision making under uncertainty plays a crucial part. Risk relates primarily to the extent of manager's ability to predict a particular outcome with certainty. Uncertainty is defined as an absence of information, knowledge, or understanding regarding the outcome of an action, decision, or event. Many sources of risk (market, model, liquidity, operational, etc.) have to be taken into account and carefully examined for most financial activities. Many sources of risk have been identified, such as market risk, credit risk, counterparty default, liquidity risk, operational risk and others.

### Portfolio risk management

Risk is an abstract concept. An economist considers risk to be expressed in a person's preferences. What one individual perceives as risky may not be perceived as risky by another. For most investors, risk means the uncertainty of future outcomes (Scheme 1).



Scheme 1 Risk relationships between information and uncertainty  
 Source: Garry.R.Heerkens. *Project Management*.-McGraw-Hill:2002,-P.142,247p.

An alternative definition might be the probability of an adverse outcome. Institutional money managers call a measure of uncertainty. A variant of this definition is target semivariance, generalization of semivariance that focuses on returns below a target, instead of just below the mean.<sup>2</sup> Also the dictionary defines risks as “hazard, peril, and exposure to loss or injury”. With respect to investment, investors have used a

<sup>2</sup> Richard C.Grinfeld,Ronald N.Kahn. *Active portfolio management:a Quantative approach for providing superior returns and controlling risk*. McGraw-Hill.USA:2000, p.596, P.41-46

variety of definitions to describe risk. The importance of risk and uncertainty in economic analysis was suggested for the first time by Frank H. Knight in his seminal treatise “Risk, Uncertainty and Profit”. Previously, very few economists considered that risk and uncertainty might play a key role in economic theory, except for some notable examples like Carl Menger<sup>3</sup>, Irving Fisher and Francis Edgeworth. Professor Harry Markowitz changed how the investment community thought about risk by quantifying the concept of risk. He defined risk as terms of a well-known statistical measure known as the variance. Specifically, Markowitz quantified risk as the variance about an asset’s expected return.<sup>4</sup> Within a financial institution, the purpose of the risk management function is twofold. It studies all the quantifiable and non-quantifiable factors that in relation to each individual person or legal entity pose a threat to the return generated by rational use of assets and therefore to the assets themselves. Also it provides the following solutions aimed at combating these factors<sup>5</sup>:

- Strategic. The onus is on the institution to propose a general policy for monitoring and combating risks, ensure sensible consolidation of risks at group management level where necessary, organize the reports sent to the management committee and participate actively in the asset liability management committee and so on.
- Tactical. This level of responsibility covers economic and operational assessments when a new activity is planned, checks to ensure that credit has been spread safely across various sectors, the simulation of risk coverage for exchange interest rate risk and their impact on the financial margin and so on.
- Operational. These are essentially first-level checks that include monitoring of internal limits, compliance with investment and stop loss criteria, trader’s limits, etc.

Markowitz proposed to measure risk of portfolio returns by means of their variances which involve judiciously the joint distribution of returns of all assets. Despite its simplicity and tractability, the Markowitz model has two pitfalls<sup>6</sup>:

- First, the probability distribution of each asset return is characterized only by its first two moments. In the case of non Gaussian distributions even symmetrical), the Markowitz model and utility theories are mainly compatible for quadratic utility functions.
- Second, the dependence structure is only described by the linear correlation coefficients of each pair of asset returns. It also may imply incorrect results when probability distributions are not elliptic. In that case, severe losses can be observed if extreme events are too underestimated.

So, risk was defined as the standard deviation around the expected return. In effect, one equated a security’s risk with the variability of its return. More dispersion or

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<sup>3</sup> Menger, C., (1871): Grundsätze der Volkswirtschaftslehre, Vienna: Braunnalter. Translated as Principles of Economics, by J. Dingwall and B.F. Hoselitz, Glencoe, Ill.: Free Press, 1951. Reprinted in 1976 and 1981, New York University Press: New York.

<sup>4</sup> Fabozzi J. Frank. Investment management. Prentice Hall international, Inc. USA: 1995. p.780, P.63

<sup>5</sup> Louis Esch, Robert Kieffer, Thierry Lopez. Asset and risk management. Risk oriented Finance. John Wiley and Sons, Ltd. England: 2005, p.396, P.11

<sup>6</sup> Jean-Luc Prigent. Portfolio optimization and performance analysis. - Chapman & Hall/CRC financial mathematics series: 2007- 438p

variability about a security's expected return meant the security was riskier than one with less dispersion. The simple fact that securities carry differing degrees of expected risk leads most investors to the notion of holding more than one security at time, in an attempt to spread risks by not putting all their eggs into one basket. Diversification of one's holdings is intended to reduce risk in an economy in which every asset's returns are subject to some degree of uncertainty. Even the value of cash suffers from the inroads of inflation. Most investors hope that if they hold several assets, even if one goes bad, the others will provide some protection from an extreme loss.

Sharpe notes that proper diversification and the holding of a sufficient number of securities can reduce the unsystematic component of portfolio risk to zero by averaging out the unsystematic risk of individual stocks. The Sharpe model attaches considerable significance to systematic risk and its most important measure, the beta coefficient ( $\beta$ ). According to the model, the risk contribution to a portfolio of an individual stock can be measured by the stock's beta coefficient. The market index will have a beta coefficient of +1.0. Since efficient portfolios eliminate unsystematic risk, the riskiness of such portfolios is determined exclusively by market movements. It is easy to see the central role played by the beta coefficient in the determination of expected return and risk for stocks as well as portfolios.<sup>7</sup>

As common sense suggests, the closer the correlation coefficient approaches 1, the more likely it is that risk will be reduced through diversification. But even if the correlation coefficient is much above 0,5, the advantage of diversification will not be significant. The practical implications of all this are of immense importance for any investment manager who is prepared to implement these principles in order to increase return. Risk can usually be decreased by diversification, so a fund manager knows that he can increase the number of 'high-return' investments in his portfolio without incurring greater risk.<sup>8</sup> So, assuming all definitions, one can say, that:

- Risk is standard deviation of return;
- Risk do not add;
- Many institutional investors care more about active and residual risk than total risk;
- Active risk depends on the size of the active position and not the size of the benchmark position;
- The cost of risk is proportional to variance
- Risk models indentify the important sources of risk, and separate risk into components.<sup>9</sup>

As many scientists noticed the risk is uncontrolled system, which exists everywhere and anytime, that is why for investors are very important immediately to identify what kind of risk is related to its activity.

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<sup>7</sup> Donald E.Fischer, Ronald J.Jordan. Security Analysis and Portfolio Management. Prentice Hall, Englewood Cliffs. USA:1991, p.768, P.680-681

<sup>8</sup> Essinger James, David Lowe. The Handbook of investment Management. FT pitman Publishing. GB:1997.p331. P.248

<sup>9</sup> Grinold C. Richard,Ronald N.Kahn. Active portfolio management. Probus publishing.USA:1995, p.388,P.37

Table 1. Classification of risks on the stock market

Types of systematic risk	Types of unsystematic risk
<p><i>Macroeconomic, industries, regional risks</i></p> <ul style="list-style-type: none"> <li>• Risk inside country (economic, political and etc.)</li> <li>• Risk of changes in law system</li> <li>• Risk of exchange losses</li> <li>• Inflation peril</li> <li>• Industries risk</li> <li>• Regional risk</li> </ul>	<p><i>Risk of joint-stock growth</i></p> <ul style="list-style-type: none"> <li>• Credit (business) risk</li> <li>• Risk of liquidity</li> <li>• Interest rate risk</li> <li>• Risk of unprincipled operations on the market</li> </ul>
	<p><i>Risks of portfolio management, including the technical risks:</i></p> <ul style="list-style-type: none"> <li>• Fundamental</li> <li>• Risk of selection</li> <li>• Revocable</li> <li>• Risks of delivering securities</li> <li>• Operational</li> <li>• Risk of adjustment payments</li> </ul>

Source: *Bocharov V. Investment Management.-SPb:St.Petersburg,2000,P.29 /Бочаров.В Инвестиционный менеджмент. — СПб: Питер, С.29*

Many approaches can be used to address risk and the threats it produces. However, the most processes for managing risk tend to follow some variation of this basic four-step approach<sup>10</sup>:

**Step 1.** Identification (determining what threats exist). Identify all significant uncertainties (sources of risk), including specific threats (also called potential problems or risk events) that could occur throughout the life of the project.

**Step 2.** Quantification (determining how big the threats are). Obtain information on the range of possible outcomes for all uncertainties and their distribution and/or probabilities of occurrence, to better understand the nature of the threats and their potential effects on the project.

**Step 3.** Analysis (determining which threats are of greatest concern). Use the knowledge gained through risk assessment to determine which potential problems represent the greatest danger to achieving a successful and predictable project outcome, ordinarily by considering the probability that a specific problem will occur and its anticipated impact on the project.

**Step 4.** Response (dealing with the threats). Determine the best approaches for addressing each high-threat potential problem, which may include evaluating and choosing among a number of alternatives, and create specific action plans.

Risk management plays an important role in banking operations. Investments, also like credit transactions, bring a main share of the bank's profit, and therefore are

<sup>10</sup> Grinold C. Richard, Ronald N. Kahn. Active portfolio management. Probus publishing. USA: 1995, p.388, P.38/with autor's additions

subject to risks. As for example Deutsche Bank sets exactly for these reasons the basic principles of risk management, the main purpose is to protect the bank from significant risks, and to allow it thus achieve the planned targets. Through the developed risk management system the bank manages them. In order to minimize the overall risk of investment bank carries out a preliminary form of portfolio investment proposals, the basic principles of which are:<sup>11</sup>

- Optimal resource allocation by type of securities (stocks, bonds, bills, etc.) that should accounts the degree of return and risk;
- Taking into account the probability of deviation from the actual characteristics of their planned level;
- Operational (under the chosen strategy and tactical variability of market conditions) restructuring the investment portfolio;
- Building a portfolio, taking into account the particular situation of macro-and microenvironment (securities market development, the period of their circulation, statistical characteristics of the market, fluctuations in interest rates, etc.).

For illustration of risk management in investment activity we have chosen the investment bank – Deutsche Bank, which is a key player on the financial markets of the Central Europe and America, Deutsche Bank. A criterion of choosing this investment bank was its credit rating, shown in table 2.

One can see that Deutsche Bank has strong protection system, which has been built during years. This Bank structures the levels of credit risk it undertakes by placing limits on the allowable amount of risk in relation to the borrowers of the bank, its products and other segments. Restrictions on the structure of loan portfolio established the Division of Risk Management and approved by the Committee on Asset and Liability Management. The actual amounts of possible losses of limitations comprise on a daily basis. The bank also supervises and conducts the annual review of the loans are not guaranteed and without support.

Table 2. Credit rating of Deutsche Bank

Ratings	Short term	Long term	Outlook	Individual rating
Moody's Investors Service	P-1	Aa3	stable	C+
Standard and Poor's	A-1	A+	stable	A
Fitch Ratings	F+1	AA-	negative	B/C

*Source: based on materials from annual reports of Deutsche Bank*

The Bank monitors the term to maturity of the off-balance sheet contingent liabilities as long-term commitments generally have a higher degree of credit risk than short-term obligations. The maximum amount of credit risk varies greatly and depends on individual risks inherent in specific assets, and the overall market risk.

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<sup>11</sup> <http://www.db.com>

Essence of market risk arises from the fact that unforeseen circumstances in the securities market or economic attractiveness of securities as the object of monetary investments can be partially lost, resulting that the sale will be possible only with the great discounts. Along with the market showing the percentage of risk is associated with fluctuations in interest rates, which can lead to losses in investment activity.<sup>12</sup> The process of increasing or decreasing in interest rates are negatively affected by the difference between interest income and interest expense. For example, rising interest rates leads to lower market prices. Deutsche Bank is also exposed to the risk of changing interest rates as companies borrow money in the bank at fixed and floating rates. The bank manages this risk by maintaining an appropriate balance between loans with fixed and floating rates. Financial Controlling department monitors the current financial performance of the bank and the bank assesses sensitivity to changes in interest rates and their impact on bank profitability. It monitors the interest rate margin and consequently does not consider that it is a significant risk of changes in interest rates or a serious risk of changes in cash flows. The bank manages the risk of changes in fair value by changing interest rates through periodic estimation of potential losses that may arise from adverse changes in market conditions. Financial Controlling department monitors the current financial performance of the bank, the bank assesses sensitivity to changes in fair value due to interest rate changes and their impact on bank profitability.<sup>13</sup>

In practice, managers uses different sets of techniques in compliance with the methods of protection against the risk of damage and loss of liquidity. Deutsche Bank can be presented as an example of such activity. The Bank implemented the different methods in its investment activities, for instance, a short-term method of acceptance, it means the bank is fully formed from short-term investment portfolio securities increases bank liquidity, but does not consider profitability as a priority target. This method combines the bank with the method "bar" at which tries to maintain an appropriate maturity structure of securities.<sup>14</sup> By placing funds in securities of different customers and types, the Bank protects itself from risk. In combination with the above mentioned methods, the method of diversification is feasible and effective for activities of Deutsche Bank. Bank forms the reserves to cover potential losses and liquidity losses from operations with securities. Depending on the particular economic situation, the bank chooses a variety of methods. Sometimes the bank applies the interest method of expectations that is associated with forecasting the dynamics of interest rates and speculation on the changes. However, under the global financial crisis, the bank combines the method of diversification and the short-term acceptance in order to predict the market situation for long-term investing.

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<sup>12</sup> Cherep A.V., Androsova O.F. Banking's operations.-К:Kondor,2008-р.410,Р.100./Череп А.В., Андросова О.Ф. Банківські операції: Навчальний посібник.-К: Кондор, 2008-410с

<sup>13</sup> www.db.com

<sup>14</sup> Cherep A.V., Androsova O.F. Banking's operations.-К:Kondor,2008-р.410,Р.105./Череп А.В., Андросова О.Ф. Банківські операції: Навчальний посібник.-К: Кондор, 2008-410с

## Capital Market Theory and the Capital Asset Pricing Model

The Capital Asset Pricing Model proposes a way that the market accounts for the undiversified or systematic risk in a portfolio. According to this theory, investors are not compensated for risks that can be diversified. The risk that cannot be diversified is the market return.<sup>15</sup> Portfolio theory is a description of how rational investors should build efficient portfolios and capital market theory tells us how assets should be priced in the capital markets if, indeed, everyone behaved in the way portfolio theory suggests. The capital asset pricing model (CAPM) is a relationship explaining how assets should be priced in the capital markets.

The model begins with the belief that there are two efficient assets. One asset is risk free and provides a low rate of return. This risk-free asset should be free of default risk and sensitivity to market pricing. Investors and academics usually use either the return on United States bills or the Libor bank lending rate as the rate of return on risk-free assets. The second efficient asset that an investor might hold is the market portfolio. The expected return on the market portfolio compensates investors for a risk premium above the risk-free rate to compensate for systematic risk. The expected return does not compensate for diversifiable risk because the market portfolio has diversified away as much unsystematic (diversifiable) risk as possible. Investors get the maximum amount of risk reduction if they invest in only risk-free assets and the market portfolio. Investors who want to avoid all risk should invest all of their money in risk-free assets. Investors who tolerate risk well might invest all of their money in the market portfolio. Investors with a modest tolerance for risk could invest some of their money in risk-free assets and some in the market portfolio.<sup>16</sup>

The real world is complex, to be sure. To understand it and build models of how it works, one needs to sweep away those complexities, to have only a minor effect on its behavior. Most of the complexities that have to be removed in the stock market concern institutional frictions. These include such things as commissions, taxation, short-selling rules, and margin requirements, to name a few.

The model has only one systematic risk factor – the risk of the overall movement of the market. This risk factor is referred to as “market risk”. So, in the capital market theory, the terms “market risk” and “systematic risk” are used interchangeably. By “market risk” it is meant the risk associated with holding a portfolio consisting of all assets, called the “market portfolio”.<sup>17</sup> The market portfolio an asset is held in proportion to its market value. For, example, if the total market value of all assets is \$X and the market value of asset j is \$Y, then asset j will comprise \$Y/\$X of the market portfolio. The capital asset pricing model is given by the following formula:

$$E(R_i) = R_f + \beta_i[E(R_m) - R_f], \text{ where}$$

$E(R_i)$  = return required on asset

$E(R_m)$  = expected return on „a market portfolio“

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<sup>15</sup> Stuart A McCrary. Mastering Corporate Finance Essentials. John Wiley and Sons, Inc., New Jersey, 2010.- p174, P.49

<sup>16</sup> Stuart A McCrary. Mastering Corporate Finance Essentials. John Wiley and Sons, Inc., New Jersey, 2010.- p174, P.50

<sup>17</sup> Frank J.Fabozzi, Harry M.Markowitz. The theory and practice of Investment management. John Wileyand Sons, Inc. USA:2002, p.894, P.66-67

$R_f$  = risk free rate

$\beta_i$  = measure of systematic risk of asset I relative to the “market portfolio”

The expected return for an asset I according to the capital model is equal to the risk-free rate plus a risk premium. The market risk premium is  $[E(R_m) - R_f]$ .

First look at beta ( $\beta_i$ ) in the risk premium component of the capital model.  $\beta_i$  is a measure of the sensitivity of the return of asset I to the return of the market portfolio. A beta equal 1 means that the asset or a portfolio has the same quantity of risk as the market portfolio. A beta greater than 1 means that the asset or portfolio has more market risk than the market portfolio and a beta less than 1 means that the asset or portfolio has less market risk than the market portfolio.

In practice, the method of calculating beta-coefficient is using very often, especially if an institution is connected with investment activity. As example, one can investigate Deutsche Bank, which is in the top of 10 best global investment banks.

Following to assumptions of economists one should know that the market risk premium in 2011 is 5,20% and the rate of risk free is 3,29% (table 3).<sup>18</sup> And now it could be estimated beta of portfolio, which is summarized all betas of its shares – 1. As one said above, if the beta is 1 and has positive value, than the shares of portfolio are trying to follow the market’s returns, but it could be said the portfolio of Deutsche Bank is neither more nor less volatile and risky than the wider market. As for required rate of portfolio return is 5,20%. Such rate is a part of the methodology of the Capital Asset Pricing Model, which proposes a way that the market accounts for the undiversifiable or systematic risk in a portfolio.

Table 3. Beta-coefficient of shares’ portfolio in Deutsche Bank

Companies	Risk free	Beta, $\beta_i$	Risk Premium	Shares in portfolio, %	Beta portfolio (3/5)	The required portfolio rate of return $\text{total2} + \text{total6} * (\text{total4} - \text{total2})$
1	2	3	4	5	6	7
ALV.DE	0,0329	0,90	0,052	31	0,279	0,05200764
MRK.DE	0,0329	0,71	0,052	16	0,1136	
SAP.DE	0,0329	1,20	0,052	20	0,24	
LHAG.DE	0,0329	1,00	0,052	10	0,1	
HEN.DE	0,0329	0,71	0,052	10	0,071	
SIE.DE	0,0329	1,60	0,052	11	0,176	
BMW.DE	0,0329	1,04	0,052	2	0,0208	
Total	0,0329	x	0,052	100	1,0004	

Source: calculations made by authors

<sup>18</sup> <http://aswathdamodaran.blogspot.com/2011/02/equity-risk-premiums-2011-edition.html>

The second component of the risk premium in the model is the difference between the expected return on the market portfolio,  $E(R_m)$ , and the risk-free rate. It measures the potential reward for taking on the risk of the market above what can be earned by investing in an asset that offers a risk-free rate.

The capital model is an abstraction of the real world capital markets and, as such, is based upon some assumptions. These assumptions simplify matters a great deal, and some of them may even seem unrealistic. However, these assumptions make the model more tractable from a mathematical standpoint. The capital model assumptions are as follows:

1. Investors make investment decisions based on the expected return and variance of returns.
2. Investors are rational and risk averse.
3. Investors subscribe to the Markowitz method of portfolio diversification
4. Investors all invest for the same period of time.
5. Investors have the same expectations about the expected return and variance of all assets.
6. There is a risk-free asset and investors can borrow and lend any amount at the risk-free rate.
7. Capital markets are completely comparative and frictionless.

The key to the capital pricing model's contribution to the investment management theory is clearly stated by Barr Rosenberg, who said, that people should keep in mind that this model is "not true," since many of its assumptions are not exactly satisfied in the real world. And that is, even though the pricing model is not true it does not mean that the constructs introduced by the theory are not important. Constructs introduced in the development of the theory include the notion of a market portfolio, systematic risk, diversifiable risk, and beta. As Rosenberg notes that these ideas play an important role in the methods of 'modern portfolio theory'.<sup>19</sup>

Using CAP models in reality the financial managers could receive an illustration of prevention some types of risks. An example of the investment activity could be the created portfolio of Deutsche Bank that contains the shares of the following companies: Allianz (ALV.DE), Merck (MRK.DE), SAP (SAP.DE), Deutsche Lufthansa (LHAG.DE), Henkel (HEN.DE), Siemens (SIE.DE), BMW (BMW.DE). This short-term portfolio was created from 20 December 2010 till 18 February 2011 (for 43 days), so it means the shares of these companies were bought in December and would be sold in February. Many financial managers recommend diversifying portfolio and Deutsche Bank has quite well diversified portfolio. Analyzing investment portfolio of Deutsche Bank, one could notice, that all companies compose the index DAX, known as DAX companies. It means that Deutsche Bank is a very scrutinous in choosing company for portfolio and the chances are that this bank chose such companies, because it is well-known companies and giants in its industry. If it some happens on the market such companies are not falling down and not so easy deliver their positions. This strategy could be also rather for some additional constant return instead of getting maximal possible profit. Investing to these companies means possibility to earn return in short

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<sup>19</sup> Frank J.Fabozzi, Harry M.Markowitz. The theory and practice of Investment management. John Wileyand Sons,Inc. USA:2002, p.894, P.83

period of time actually as acting Deutsche Bank. So, basing on formulas above one could know the required return of portfolio of Deutsche Bank.

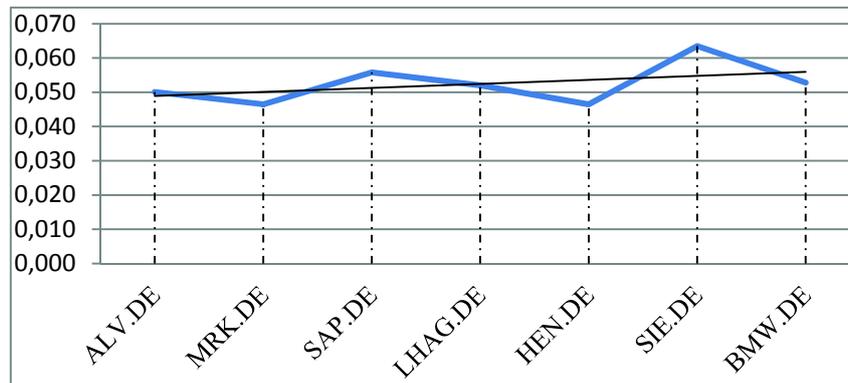
Table 4 Capital asset pricing model on example of Deutsche Bank

Companies	Risk free (rf)	Beta of shares, $\beta_i$	Risk Premium E(r <sub>m</sub> )	Required return on asset E(r <sub>i</sub> )
ALV.DE	0,0329	0,90	0,052	0,0501
MRK.DE	0,0329	0,71	0,052	0,0465
SAP.DE	0,0329	1,2	0,052	0,0558
LHAG.DE	0,0329	1,0	0,052	0,0520
HEN.DE	0,0329	0,71	0,052	0,0465
SIE.DE	0,0329	1,6	0,052	0,0635
BMW.DE	0,0329	1,04	0,052	0,0528

Source: calculations made by authors

Capital assets pricing model provides a way to determine the return required by the shareholders. This return is also called the equity cost of capital. As one said above, the stocks that have a beta equal to 1 have no more or less systematic risk than the market portfolio, as it has been known that the portfolio of Deutsche Bank has beta coefficient of 1. So it means that bank prefers to create portfolio that is not dependable on systematic risks as “market stocks”.

Diagram 1 Required rate of return particular stocks of Deutsche bank’s portfolio



Source: made by authors

Under most market conditions, some part of an individual stock return can be eliminated through diversification, but other risks remain. The portion of a company’s

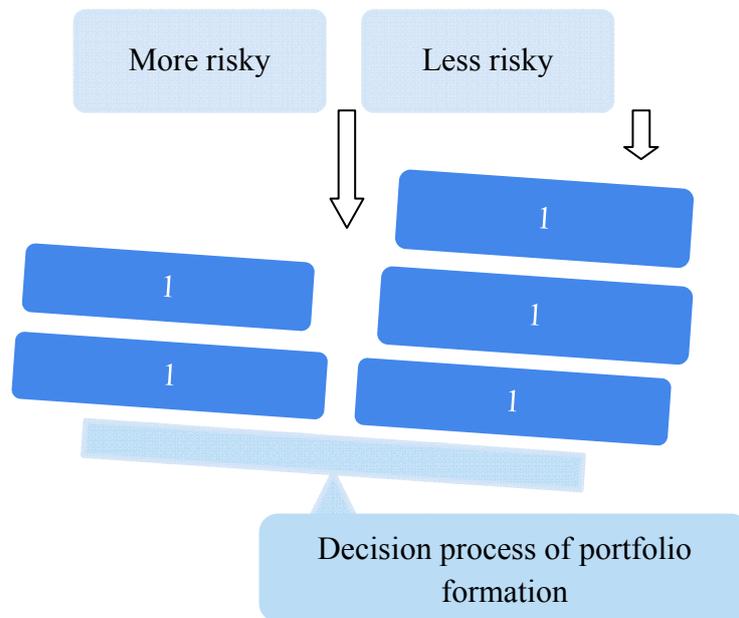
stock return that cannot be diversified is called systematic risk. The portion of the company's stock return that can be diversified away is called unsystematic risk. Also quantities of shares in portfolio, which are between each other are diversified, protect from risk (Scheme 2).

As already mentioned, an additional relevant risk associated with the securities investments is the liquidity risk. Typically, distressed securities have a quarterly, six-month or annual liquidity due to the illiquidity of the securities and the long time horizons to finalize the manager's strategy.

There are additional risks associated with the complexity of bankruptcy laws and the intricacies of default situations: claim priority, the setting up of the creditor's committee, the bankruptcy negotiation process, etc.

Finally, there is the problem of the valuation of distressed securities: in the absence of trades, prices do not change and are often based on a purely accounting reckoning. Hence, investors must make sure that the distressed securities portfolio is valued by an independent administrator, who prices the securities based on criteria that must not change over time.<sup>20</sup>

Scheme 2. Illustration of quantities shares in portfolio versus risk

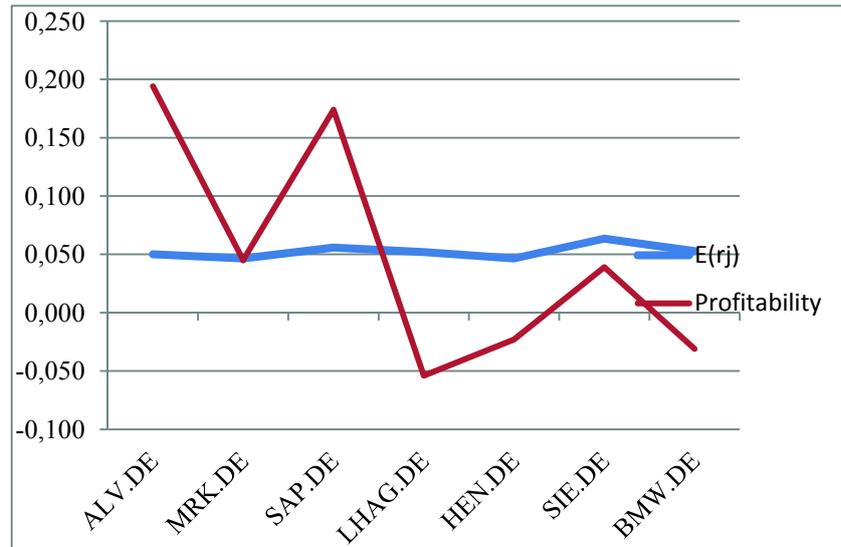


Source: made by author

<sup>20</sup> Stefanini F. Investment strategies of hedge funds.-Wiley:2006, p315

Analyzing the portfolio of Deutsche Bank above, one has already externalized conclusions about investment strategy. The bank has quite measured investment strategy, as it was investigated before the shares of its portfolio are not dependable on market and using of method diversification, the bank tries to protect its portfolio from risks, chose the securities from different sectors and industries.

Diagram 2. Comparative analyses between required return and real rate of profitability



Source: made by authors

Such investor as Deutsche Bank could invest some part of its money in free-risk assets and another part in the market portfolio. If evaluating just share portfolio of this bank, the bank could have mixed investment strategy, but if we are making conclusions in general, one should say, that bank abides the traditional investment strategy, investing to stable and well-known companies. Usually the diversification can eliminate unsystematic risk as possible. Financial theory holds that the best possible diversification occurs when all conceivable assets are merged into a single portfolio. No investor could buy all assets in the marketplace for many practical reasons. However, as a standard for pricing, it is convenient to assume that an investor could completely diversify away unsystematic risk.<sup>21</sup>

## Conclusions

To summarize, the purpose of the management of risk is to choose among a set of alternatives with different consequences. But some of requirement tool of investigation of risk should do: First, the environment is certain: the agent perfectly knows the event that will occur in the future. Second, the environment is risky: this

<sup>21</sup> Stuart A McCrary. Mastering Corporate Finance Essentials. John Wiley and Sons, Inc., New Jersey, 2010.-p174, P.50

means existence of uncontrollable random events for which the modelling of a probability space can be proposed, in particular a probability distribution can be determined. Finally, the environment is uncertain: in that case, the probability distribution is unknown.<sup>22</sup> Financial theory is mainly concerned with the second situation. However, for the third case, note that under some assumptions a subjective probability may exist, as proved by Savage.

There is a huge amount of literature concerning static portfolio management and risk optimization. In particular, it provides from the both from theoretical and empirical points of view and investor just should decide, what of existing theories of measurement risks he will follow.

An activity of investment banks traced adherence of so-called "golden rule investing." That bank invests in securities that are directly proportional to risk, an investor who is ready to go for the desired income. In this case, the income will be composed by the increase in market value, interest on government securities (verdodohidnymy bonds), as well as dividend payments. Following this rule, the Bank provides a desired number of stable incomes with minimal risk. Such a balanced investment policy currently provides prosperity of the bank on the international banking market.

According to example of Deutsche Bank one could conclude that its portfolio is diversified and protected from unsystematic risks. The profitability of portfolio is equalled 0,098, it is higher than required rate of portfolio return. It means that Deutsche bank built portfolio on more than minimal level of profitability, because required rate of portfolio return was 0,052, which is lower on almost in two times of real portfolio profitability. Deutsche bank's investments were focused to the well-known companies and beta portfolio was not much higher as 1, which means not strong connection with the market risks and markets return.

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<sup>22</sup> Bessis J. Risk management in banking.-Wiley:2002, p.785

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