Though, this security provides for the investor the flow of income very similar to that of the bond. The main difference between preferred stocks and bonds is that for preferred stock the flows are for ever, if the stock is not callable. The preferred stockholders are paid after the debt securities holders but before the common stock holders in terms of priorities in payments of income and in case of liquidation of the company. If the issuer fails to pay the dividend in any year, the unpaid dividends will have to be paid if the issue is cumulative. If preferred stock is issued as noncumulative, dividends for the years with losses do not have to be paid. Usually same rights to vote in general meetings for preferred stockholders are suspended. Because of having the features attributed for both equity and fixed-income securities preferred stocks is known as hybrid security. A most preferred stock is issued as noncumulative and callable. In recent years the preferred stocks with option of convertibility to common stock are proliferating.

The common stock is the other type of investment vehicles which is one of most popular among investors with long-term horizon of their investments. Common stock represents the ownership interest of corporations or the equity of the stock holders. Holders of common stock are entitled to attend and vote at a general meeting of shareholders, to receive declared dividends and to receive their share of the residual assets, if any, if the corporation is bankrupt. The issuers of the common stock are the companies which seek to receive funds in the market and though are "going public". The issuing common stocks and selling them in the market enables the company to raise additional equity capital more easily when using other alternative sources. Thus many companies are issuing their common stocks which are traded in financial markets and investors have wide possibilities for choosing this type of securities for the investment. The questions important for investors for investment in common stock decision making will be discussed in Chapter 4.

Speculative investment vehicles following the term "speculation" (see p.8) could be defined as investments with a high risk and high investment return. Using these investment vehicles speculators try to buy low and to sell high, their primary concern is with anticipating and profiting from the expected market fluctuations. The only gain from such investments is the positive difference between selling and purchasing prices. Of course, using short-term investment strategies investors can use for speculations other investment vehicles, such as common stock, but here we try to

- External or international market.

The internal market can be split into two fractions: domestic market and foreign market. *Domestic market* is where the securities issued by domestic issuers (companies, Government) are traded. *A country's foreign market* is where the securities issued by foreign entities are traded.

The external market also is called *the international market* includes the securities which are issued at the same time to the investors in several countries and they are issued outside the jurisdiction of any single country (for example, offshore market).

Globalization and integration processes include the integration of financial markets into an international financial market. Because of the globalization of financial markets, potential issuers and investors in any country become not limited to their domestic financial market.

1.4. Investment management process

Investment management process is the process of managing money or funds. The investment management process describes how an investor should go about making decisions.

Investment management process can be disclosed by ***five-step procedure***, which includes following stages:

1. Setting of investment policy.
2. Analysis and evaluation of investment vehicles.
3. Formation of diversified investment portfolio.
4. Portfolio revision
5. Measurement and evaluation of portfolio performance.

Setting of investment policy is the first and very important step in investment management process. *Investment policy* includes setting of investment objectives. The investment policy should have the specific objectives regarding the investment return requirement and risk tolerance of the investor. For example, the investment policy may define that the target of the investment average return should be 15 % and should avoid more than 10 % losses. Identifying investor's tolerance for risk is the most important objective, because it is obvious that every investor would like to earn the highest return possible. But because there is a positive relationship between risk and return, it is not appropriate for an investor to set his/ her investment objectives as just

8. Describe how investment funds, pension funds and life insurance companies each act as financial intermediaries.
9. Distinguish closed-end funds and open-end funds.
10. How do you understand why word "hedge' currently is misapplied to hedge funds?
11. Explain the differences between
    a) Money market and capital market;
    b) Primary market and secondary market.
12. Why the role of the organized stock exchanges is important in the modern economies?
13. What factors might an individual investor take into account in determining his/ her investment policy?
14. Define the objective and the content of a five-step procedure.
15. What are the differences between technical and fundamental analysis?
16. Explain why the issues of selectivity, timing and diversification are important when forming the investment portfolio.
17. Think about your investment possibilities for 3 years holding period in real investment environment.
    a) What could be your investment objectives?
    b) What amount of funds you could invest for 3 years period?
    c) What investment vehicles could you use for investment? (What types of investment vehicles are available in your investment environment?)
    d) What type(-es) of investment vehicles would be relevant to you? Why?
    e) What factors would be critical for your investment decision making in this particular investment environment?

References and further readings

1. Black, John, Nigar Hachimzade, Gareth Myles (2009). Oxford Dictionary of Economics. 3rd ed. Oxford University Press Inc., New York.
2. Bode, Zvi, Alex Kane, Alan J. Marcus (2005). Investments. 6th ed. McGraw Hill.
3. Fabozzi, Frank J. (1999). Investment Management. 2nd. ed. Prentice Hall Inc.
4. Francis, Jack C., Roger Ibbotson (2002). Investments: A Global Perspective. Prentice Hall Inc.

reality the stock produce returns that deviate from the characteristic line (see Fig. 2.8). In statistics this propensity is called the **residual variance.**

Residual variance is the variance in the stock's residuals and for the stock J can be calculated using formula:

$$\delta^2\varepsilon,t = \frac{\sum_{t=1}^{n} \varepsilon^2_{J,t}}{n - 2}, \quad (2.15)$$

here $\varepsilon_{J,t}$ - residual of the stock J in period t;

n - number of periods observed.

To calculate residual variance the residual in every period of observations must be identified. ***Residual*** is the vertical distance between the point which reflect the pair of returns (stock J and market) and the characteristic line of stock J. The **residual of the stock J** can be calculated:

$$\varepsilon_{J,t} = r_{J,t} - (A_J + \beta_J \times r_{M,t}) \quad (2.16)$$

c.1 *c.2*

It is useful for the interpretation of residual for investor to accentuate two components in formula of residual (see 2.16):

- *Component 1* reflects the return actually generated by the stock J during period t;
- *Component 2* (in the bracket) represents investor's expectations for the stock's return, given its characteristic line and market's returns.

Note the difference ***between the variance and the residual variance:***

- The variance describes the deviation of the asset returns from its expected value ;
- The residual variance describes the deviation of the asset returns from its characteristic line.

Summary

1. The main characteristics of any investment are investment return and risk. However to compare various alternatives of investments the precise quantitative measures for both of these characteristics are needed.
2. General definition of return is the benefit associated with an investment. Many investments have two components of their measurable return: (1) a capital gain or

loss; (2) some form of income. The holding period return is the percentage increase in returns associated with the holding period.

3. Investor can't compare the alternative investments using holding period returns, if their holding periods (investment periods) are different. In these cases arithmetic average return or sample mean of the returns can be used.
4. Both holding period returns and sample mean of returns are calculated using historical data. However all the investors' decisions are focused to the future, or to expected results from the investments. The expected rate of return of investment is the statistical measure of return, which is the sum of all possible rates of returns for the same investment weighted by probabilities.
5. Risk can be defined as a chance that the actual outcome from an investment will differ from the expected outcome. The total risk of investments can be measured with such common absolute measures used in statistics as variance and standard deviation. Variance can be calculated as a potential deviation of each possible investment rate of return from the expected rate of return. Standard deviation is calculated as the square root of the variance. The more variable the possible outcomes that can occur, the greater the risk.
6. In the cases than the arithmetic average return or sample mean of the returns is used instead of expected rate of return, sample variance and sample standard deviation is calculated.
7. Covariance and correlation coefficient are used to answer the question, what is the relationship between the returns on different assets. Covariance and correlation coefficient are related and they generally measure the same phenomenon – the relationship between two variables.
8. The sample covariance is estimated than the investor hasn't enough information about the underlying probability distributions for the returns of two assets and then the sample of historical returns is used. The population covariance is estimated when the investor has enough information about the underlying probability distributions for the returns of two assets and can identify the actual probabilities of various pairs of the returns for two assets at the same time.
9. Analyzing relationship between the assets in the same portfolio using covariance for portfolio formation it is important to identify which of the three possible outcomes exists: positive covariance, negative covariance or zero covariance. If the

positive covariance between two assets is identified the common recommendation for the investor would be not to put both of these assets to the same portfolio, because their returns move in the same direction and the risk in portfolio will be not diversified; if the negative - the common recommendation for the investor would be to include both of these assets to the portfolio, because their returns move in the contrariwise directions and the risk in portfolio could be diversified; if the zero covariance - it means that there is no relationship between the rates of return of two assets.

10. The correlation coefficient between two assets is closely related to their covariance. But instead of covariance when the calculated number is unbounded, the correlation coefficient can range only from -1,0 to +1,0. The more close the absolute meaning of the correlation coefficient to 1,0, the stronger the relationship between the returns of two assets. Using correlation coefficients instead of covariance investor can immediately asses the degree of relationship between assets returns.
11. The coefficient of determination is calculated as the square of correlation coefficient and shows how much variability in the returns of one asset can be associated with variability in the returns of the other.
12. Theoretical interpretation of the market portfolio is that it involves every single risky asset in the global economic system, and contains each asset in proportion to the total market value of that asset relative to the total value of all other assets (value weighted portfolio). Investors can think of the market portfolio as the ultimate market index.
13. Stock's characteristic line describes the relationship between the stock and the market, shows the return investor expect the stock to produce, given that a particular rate of return appears for the market and helps to assess the risk characteristics of one stock relative to the market.
14. The slope of the characteristic line is called the Beta factor. The Beta factor of the stock is an indicator of the degree to which the stock reacts to the changes in the returns of the market portfolio.
15. The intercept is the point where characteristic line passes through the vertical axis. The interpretation of the intercept from the investor's point of view is that it shows

9. What is the interpretation of the coefficient of determination for the investor? If the coefficient of correlation for two securities is 0,7, what is the coefficient of determination?
10. Describe the Beta factor.
11. What does the characteristic line tells to investor? Why stock characteristic lines are different for the securities traded in the same market?
12. With which of stock's characteristic line definitions presented below you disagree?
    a) Stock's characteristic line describes the relationship between the stock and the market;
    b) Stock's characteristic line shows the return investor expect the stock to produce, given that a particular rate of return appears for the market;
    c) Stock's characteristic line describes the relationship between rate of return of any two different stocks in the market;
    d) I agree with all definitions presented above.
13. Refer to the following information on joint stock returns for stock 1, 2, and 3 in the table

Probability	Return for stock		
	Stock 1	Stock 2	Stock 3
0.20	0.20	0.25	0.10
0.30	-0.05	0.10	0.05
0.25	0.10	0.05	0
0.25	0	-0.10	-0.05

If you must choose only two stocks to your investment portfolio, what would be your choise?

a) stocks 1 and 2; b) stocks 1 and 3; c) stocks 2 and 3; d) other decision.

Present your arguments and calculations, to explain your decision.

14. Refer to the following observations for stock A and the market portfolio in the table:

Month	Rate of return	
	Stock A	Market portfolio
1	0,30	0,12
2	0.24	0,08
3	-0,04	-0,10
4	0,10	-0,02
5	0,06	0,08
6	0,10	0,07

$$E(r_j) = R_f + \beta_{(j)} * (E(r_M) - R_f), \quad (3.4)$$

here: $E(r_j)$ - expected return on stock j;

R_f - risk free rate of return;

$E(r_M)$ - expected rate of return on the market

$\beta_{(j)}$ - coefficient Beta, measuring undiversified risk of security j.

Several of the assumptions of CAPM seem unrealistic. Investors really are concerned about taxes and are paying the commisions to the broker when bying or selling their securities. And the investors usually do look ahead more than one period. Large institutional investors managing their portfolios sometimes can influence market by bying or selling big ammounts of the securities. All things considered, the assumptions of the CAPM constitute only a modest gap between the thory and reality. But the empirical studies and especially wide use of the CAPM by practitioners show that it is useful instrument for investment analysis and decision making in reality.

As can be seen in Fig.3.5, Equation in formula 3.4 represents the straight line having an intercept of R_f and slope of $\beta_{(j)} * (E(r_M) - R_f)$. This relationship between the expected return and Beta is known as Security Market Line (SML). Each security can be described by its specific security market line, they differ because their Betas are different and reflect different levels of market risk for these securities.

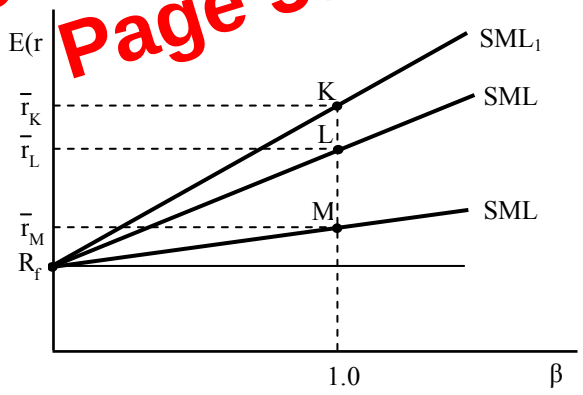

Fig.3.5. Security Market Line (SML)

Coefficient Beta (β). Each security has it's individual systematic - undiversified risk, measured using coefficient Beta. Coefficient Beta (β) indicates how the price of security/ return on security depends upon the market forces (note: CAPM uses the statistic measures which we examined in section 2.3, including Beta factor). Thus, coefficient Beta for any security can be calculated using formula 2.14:

In practice an investor can choose the macroeconomic factors which seems important and related with the expected returns of the particular asset. The examples of possible macroeconomic factors which could be included in using APT model :

- GDP growth;
- an interest rate;
- an exchange rate;
- a defaul spread on corporate bonds, etc.

Including more factors in APT model seems logical. The institutional investors and analysts closely watch macroeconomic statistics such as the money supply, inflation, interest rates, unemployment, changes in GDP, political events and many others. Reason for this might be their belief that new information about the changes in these macroeconomic indicators will influence future asset price movements. But it is important to point out that not all investors or analysts are concerned with the same set of economic information and they differently assess the importance of various macroeconomic factors to the assets they have invested already or are going to invest. At the same time the large number of the factors in the APT model would be impractical, because the models seldom are 100 percent accurate and the asset prices are function of both macroeconomic factors and noise. The noise is coming from minor factors, with a little influence to the result – expected rate of return.

The APT does not require identification of the market portfolio, but it does require the specification of the relevant macroeconomic factors. Much of the current empirical APT research are focused on identification of these factors and the determination of the factors' Betas. And this problem is still unsolved. Although more than two decades have passed since S. Ross introduced APT model, it has yet to reach the practical application stage.

The CAPM and APT are not really essentially different, because they are developed for determing an expected rate of return based on one factor (market portfolio – CAPM) or a number of macroeconomic factors (APT). But both models predict how the return on asset will result from factor sensitivities and this is of great importance to the investor.

- Market efficiency
- Markowitz Portfolio Theory
- Market Portfolio
- Nonsatiation
- Portfolio Beta
- Risk aversion
- Risk free rate of return
- Risk of the portfolio
- Security Market Line (SML)
- Systematic risk
- Standard deviation of the
- portfolio
- Semi- strong form of market
- efficiency
- Strong form of market
- efficiency
- Total risk
- Unsystematic (specific) risk
- Weak form of market efficiency

Questions and problems

1. Explain why most investors prefer to hold a diversified portfolio of securities as opposed to placing all of their wealth in a single asset.
2. In terms of the Markowitz portfolio model, explain, how an investor identify his / her optimal portfolio. What specific information does an investor need to identify optimal portfolio?
3. How many portfolios are on an efficient frontier? How is an investor's risk aversion indicated in an indifference curve?
4. Describe the key assumptions underlying CAPM.
5. Many of underlyong assumptions of the CAPM are violated in some degree in "real world". Does that fact invalidate model's calculations? Explain.
6. If the risk-free rate of return is 6% and the return on the market portfolio is 10%, what is the expected return on an asset having a Beta of 1,4, according to the CAPM?
7. Under the CAPM, at what common point do the security market lines of individual stocks intersect?
8. Given the following information:
    - Expected return for stock A = 18%
    - Expected return for stock B = 25%
    - Standartd deviation of stock A = 12%
    - Standard deviation of stock B = 20%
    - Correlation coefficient = 1,0.

    Choose the investment below that represents the minimum risk portfolio:

- Are the goods in this industry expensive? luxury goods? cheap? For day-to-day consumption?

II. Pricing:

- How consolidated (concentrated) is this industry?
- What are the barriers for entrance to this industry? Are they high?
- How powerful and demanding are the consumers in this industry?
- Is where in the market of industry's goods the surplus, how strong is the fight for market share?
- Is where in this industry a high competition in the international environment?

III. Costs:

- How is the industry supplied with the implements of production?
- Are the tendencies of the prices for raw materials used in this industry substantially influencing the profit?
- Are the labor costs the main component?
- Is the question of qualification for the human resources in this industry?

IV. The influence of the whole economics and financial market to the industry:

- Is this industry defensive or growing? How it could function in period of economic recession?
- How is this industry influenced by interest rates?
- Are severe stocks dominated in this industry?
- Is this sector global?
- How the fluctuations in currency exchange rate are influencing the sector? Are these fluctuations of currency exchange rate influencing the amount of profit received from abroad or the competitiveness of the sector?
- Is it possibility that political and/ or regulation risk could influence the sector?

4.2.2. Fundamental analysis

The base for the company analysis is fundamental analyses are the publicly ***disclosed and audited financial statements of the company***:

paid a dividend and publicly state they have no plans to do so. By default it seems these should be a growth stocks, because a stock that pays no dividend and does not increase in value would not be a very attractive investment. Though the analysts and the experienced investors themselves spend the time trying to discover little-known growth stocks.

Speculative stocks are the stocks issued by relatively new firms of unproven financial status and by firms with less than average financial strength. Speculation, by definition, involves a short time horizon, and the speculative stocks are those thet have a potential to make their owners a lot of money quickly. At the same time, though, they carry an unusually high degree of risk. Some analysts consider speculative stocks to be a most risky growth stocks. However, some new established technological companies that paid no dividends and had short history would probably be considered a speculative rather than a growth stock.

Penny stocks are low-priced issues, often highly speculative, selling at very small price a share. Thus, such stocks could be affordable even for the investors with small amounts of money.

The categories of the stocks presented above are not really mutually exclusive. As an examples show, some blue chip stocks at the same time can be an income stock. Similarly, both cyclical and defensive stocks can be income stocks.

4.4. Strategies for investing in stocks

In this section we focus on the three main types of strategies than investing in stocks:

- Sector rotation and business cycle strategy;
- Market timing strategy;
- Value screening strategy.

Sector rotation and business cycle strategy. *The essentiality of this strategy*: each economic sector as potential investment object has the specific patterns of market prices which depend upon the phase of the economic (business) cycle.

Sector rotation and business cycle strategy intends the movement of invested funds from one sector to the other depending on the changes in the economic (business) conditions.

This strategy use the classification of all stocks traded in the market on the bases of their behavior in regard to business cycle. The following groups are identified:

5. Investment in bonds

Mini-contents

5.1. Identification and classification of bonds

Bonds are securities with following basic characteristics:

- They are typically securities issued by a corporation or governmental body for specified term: bonds become due for payment at maturity, when the par value/ face value of bond are returned to the investors.
- Bonds usually pay fixed periodic interest installments, called coupon payments. Some bonds pay variable income.
- When investor buys bond, he or she becomes a creditor of the issuer. Buyer does not gain any kind of owner ship rights to the issuer, unlike in the case with equity securities.

The main advantages of bonds to the investor:

- They are good source of current income;
- Investment to bonds is relatively safe from large losses;
- In case of default bondholders receive their payments before shareholders can be compensated.

A major disadvantage of bonds is that potential profit from investment in bonds is limited.

Currently in the financial markets there are a lot of various types of bonds and investor must understand their differences and features before deciding what bonds would be suitable for his/ her investment portfolio.

nor taxed, it offers substantial advantages for many issuers and investors in bonds.

➢ ***Quality***:

- *Gilt-edged bonds* – high-grade bonds issued by a company that has demonstrated its ability to earn a comfortable profit over a period of years and to pay its bondholders their interest without interruption;
- *Junk bonds* - bonds with low rating, also regarded as high yield bonds. These bonds are primarily issued y corporations and also by municipalities. They have a high risk of default because they are issued as unsecured and have a low claim on assets.

➢ ***Other types of bonds:***

- *Voting bonds* - unlike regular bonds, these bonds give the holder some voice in corporation management;
- *Senior bonds* - bonds which having prior claim to the assets of the debtor upon liquidation;
- *Junior bonds* – bonds which is subordinated or secondary to senior bonds.

5.2. Bond analysis: structure and contents

Similar to analysis when investing in stocks investor before buying bonds must evaluate a wide range of the factors which could influence his/ her investment results. The key factors are related with the results of the performance and the financial situation of the firm which is issuer of the bonds. Various indicators are used for the evaluation of these factors.

Bond analysis includes:

- Quantitative analysis.
- Qualitative analysis.

5.2.1. Quantitative analysis.

Quantitative indicators – the financial ratios which allows assessing the financial situation, debt capacity and credibility of the company –issuer of the bonds.

Since the bonds are debt instruments and the investor in bonds really becomes the creditor the most important during analysis is the assessment of the credibility of the firm – issuer of the bonds. Basically this analysis can be defined as the process of assessment the issuer's ability to undertake the liabilities in time. Similar to the

the firm in the market shows the power of the firm to set the prices for its goods and services. Besides, the large firms are more effective because of the effect of the production scale, their costs are lower and it is easier for such firms overcome the periods of falls in prices. For the smaller firms when the prices are increasing they are performing well but when the markets are slumping – they have the problems. Thus it is important for the creditor to take it in mind.

Management capability reflects the performance of the management team of the firm. It is often very difficult to assess the quality of the management team, but the result of this part of analysis is important for the investor attempting to evaluate the quality of the debt instruments of the firm. The investors seeking to buy only high quality (that means – low risk) bonds most often are choosing only those firms managers of which follow the conservative policy of the borrowing. Contrary, the risk-taking investors will search for the firms which management uses the aggressive policy of borrowing and are running with the high financial leverage. In general the majority of the holders of the bonds first of all are want to know how the firm's managers control the costs and what they are doing to control and to strengthen the balance sheet of the firm (for this purpose the investor must analyze the balance sheet for the period of 3-5 years and to examine the tendencies in changes of the balance sheet main elements.

Bond market factors (term of maturity, financial sector, bond quality, supply and demand for credit). The investor must understand which factors and conditions have the influence on the yield and the prices of the bonds. The main factors to be mentioned are:

- **Term to maturity**. Generally term to maturity and the interest rate (the yield) of the bond are directly related; thus, the bonds with the longer term to maturity have the higher yield than the bonds with shorter terms to maturity.
- **The sector in the economy** which the issuer of the bonds represents. The yields of the bonds vary in various sectors of the economy; for example, generally the bonds issued by the utility sector firms generate higher yields to the investor than bonds in any other sector or government bonds.
- **The quality of the bonds**. The higher the quality of the bond, the lower the yield. For the bonds with lower quality the yield is higher.

- **The level of inflation;** the inflation decreases the purchasing power of the future income. Since the investors do not want to decrease their real yield generated from the bonds cash flows, they require the premium to the interest rate to compensate for their exposure related with the growing inflation. Thus the yield of the bond increases (or decreases) with the changes in the level of inflation.
- **The supply and the demand for the credit;** The interest rate o the price of borrowing money in the market depend on the supply and demand in the credit market; When the economy is growing the demand for the funds is increasing too and the interest rates generally are growing. Contrary, when the demand for the credits is low, in the period of economic crises, the interest rates are relatively low also.

Bond ratings. The ratings of the bonds sum up the majority of the factors which were examined before. A bond rating is the grade given to bonds that indicates their credit quality. Private independent rating services such as Standard & Poor's, Moody's and Fitch provide these evaluations of a bond issuer's financial strength, or it's the ability to pay a bond's principal and interest in a timely fashion. Thus, the role of the ratings of the bonds as the integrated indicator for the investor is important in the evaluation of yield and price for the bonds. The rating of the bond and the yield of the bond are inversely related: the higher the rating, the lower the yield of the bond. Bond ratings are expressed as letters ranging from 'AAA', which is the highest grade, to 'C' ("junk"), which is the lowest grade. Different rating services use the same letter grades, but use various combinations of upper- and lower-case letters to differentiate themselves (see more information about the bond ratings in Annex 1 and the relevant websites of credit ratings agencies).

5.2.3. Market interest rates analysis

It s very important for the investor to the bonds to understand what causes the changes in the interest rates in the market in the different periods of time. We could observe frequent changes in the interest rates and the wide amplitude of it fluctuations during last decade, thus the interest rates became the crucial factor in managing fixed income securities portfolios as well as stock portfolios. The understanding of the macroeconomic processes and the causality of the various economic factors with the interest rates helps the investors to forecast the direction of the changes in interest

- If YTM = YTM * - bond is valuated at the same range as in the market and its current market price shows the intrinsic value.

(2) approach:

- If P > V - decision to buy or to keep the bond as it is under valuated;
- If P < V - decision to sell the bond as it is over valuated;
- If P = V - bond is valuated at the same range as in the market and its current market price shows the intrinsic value.

5.4. Strategies for investing in bonds. Immunization

Two types of strategies investing in bonds:

- Passive management strategies;
- Active management strategies.

Passive bond management strategies are based on the proposition that bond prices are determined rationally, leaving risk as the portfolio variable to control. ***The main features of the passive management strategies:***

- They are the expression of the little volatile in the investor's forecasts regarding interest rate and/ or bond price;
- Have a lower expected return and risk than do active strategies;
- The small transaction costs.

The passive bond management strategies include following two broad classes of strategies:

- ✓ Buy and hold strategies;
- ✓ Indexing strategies.

Buy and hold strategy is the most passive from all passive strategies. This is strategy for any investor interested in nonactive investing and trading in the market. An important part of this strategy is to choose the most promising bonds that meet the investor's requirements. Simply because an investor is following a buy-and-hold strategy does not mean that the initial selection is unimportant. An investor forms the diversified portfolio of bonds and does not attempt to trade them in search for the higher return. Following this strategy, the investor has to make the investment decisions only in these cases:

- The bonds held by investor lost their rating, it decreases remarkably;
- The term to maturity ended;
- The bonds were recalled by issuer before term to maturity.

The immunization is the strategy of immunizing (protecting) a bond portfolio against interest rate risk (i.e., changes in the general level of interest rates).Applying this strategy the investor attempts to keep the same duration of his portfolio.

Duration is the present value weighted average of the number of years over which investors receive cash flow from the bond. It measures the economic life or the effective maturity of a bond (or bond portfolio) rather than simply its time to maturity. Such concept, called duration (or ***Macaulay's duration***) was developed by Frederick Macaulay. ***Duration (Macaulay duration)*** can be calculated using formula:

$$DR = \frac{\sum_{t=1}^{n} \{[Ct/ (1 + YTM)^t] \times t\} + [Pn / (1 + YTM)^n] \times n}{P}, \qquad (5.9)$$

here: DR - duration (or Macaulay's duration);

n - term to maturity, years;

C_t - interest rate of the bond during period t;

Pn - face value of the bond;

YTM - yield-to-maturity of the bond;

P - current market price of the bond.

The duration is expressed in years, because using formula (5.5) a weighted average of the number of years is calculated. Duration will always be less than time to maturity for bonds that pays coupon interest. For the zero coupon bonds the duration will be equal to the term to maturity.

The duration concept is the basis for ***the immunization theory.*** *A portfolio is said to be immunized if the duration of the portfolio is made equal to a selected investment horizon for the portfolio.* The immunization strategy will usually require holding bonds with the maturities in excess of the investment horizon in order to make the duration match the investment horizon. The duration of the portfolio consisting of several bonds can be calculated using the technique of weighted average, similar to calculation of portfolio expected rate of return:

$$DR_p = \sum_{i=1}^{n} w_i DR_i = w_1 DR_1 + w_2 DR_2 + \ldots + w_n DR_n, \qquad (5.10)$$

here w_i - the proportion of the portfolio's initial value invested in bond i;

Key-terms

- Active management strategies
- Asset-Backed Securities (ABS)
- Bond ratings
- Bonds swaps
- Buy and hold strategy
- Callable (redeemable) bonds
- Cash flow / Debt service ratio
- Convertible bonds
- Corporate bonds
- Coupon bonds
- Current Yield
- Debenture bonds
- Debt / Equity ratio
- Debt / Cash flow ratio
- Debt coverage ratio
- Deferred –interest bonds
- Duration (Macaulay duration)
- Fully-coupon bonds
- Floating-rate bonds
- External bonds
- Eurobonds
- General obligation bonds
- Gilt-edged bonds
- Guaranteed bonds
- Immunization
- Income bonds
- Industrial bonds
- Indexing strategy
- Indexed bonds
- Interchangeable bonds
- Internal bonds
- Intrinsic value of the bond
- Junior bonds
- Junk bonds
- Liquidity preference theory
- Market expectations theory
- Market segmentation theory
- Mortgage bonds
- Municipal bonds
- Noncallable (irredeemable) bonds
- Noninteresting bearing bonds
- Optional payment bonds
- Passive management strategies
- Participating bonds
- Public utility bonds
- Regular serial bonds
- Revenue bonds
- Quantitative indicators
- Qualitative indicators
- Secured bonds
- Senior bonds
- Sinking fund bonds
- Term structure of interest rates
- Treasury (government) bonds
- Unsecured bonds
- Voting bonds
- Yield-to-Call
- Yield-to-Maturity
- Zero-coupon bonds

Questions and problems

1. How the zero coupon bond provide returns to investors?
2. Is any mortgage bond or asset backed security necessarily a more secure investment than any debenture? Comment.
3. What features of the Eurobond market make Eurobonds attractive both for issuers and investors?
4. What is the purpose of bond ratings? If the bonds ratings are so important to the investors why don‘t common stock investors focus on quality ratings of the companies in making their investment decisions?
5. How would you expect interest rates to respond to the following economic events (what would be the direction of the interest rates changes)? Explain why.
    a) Increase in investments;
    b) Increase in savings level;
    c) Decrease in export;
    d) Decrease in import;
    e) Increase in government spending;
    f) Increase in Taxes.
6. Distinguish between an interest rate amortization swap and a substitution swap.
7. What is a key factor in analyzing bonds? Why?
8. Distinguish between yield-to-call and yield-to-maturity.
9. What is the difference between the market expectation theory and the liquidity preference theory?
10. Bond with face value of 1000 EURO, 2 years time to maturity and 10 % coupon rate, makes semiannual coupon payments and provides 8% yield-to-maturity.
    a) Calculate the price of the bond.
    b) If the yield-to-maturity would increase to 9%, what will be the price of the bond? How this change in the yield-to-maturity would influence bond price?
11. The callable bond has a par value of 100 LT, 8% coupon rate and five years to maturity. The bond makes annual interest payment. Investor purchased this bond for 90 LT when it was issued in May 2008.
    a) What is the yield-to-maturity of this bond?
    b) What is the duration of this bond if currently its market price is 95 LT?

the mental account. Each mental account has an amount of money designated for that particular goal. As a result, investor's portfolio diversification comes from the investment goals diversification rather than from a purposeful asset diversification according to the portfolio theory.

13. The mood affects the predictions of the people about the future. Misattribution bias predicts that people often misattribute the mood they are in to their decisions. People who are in bad mood are more pessimistic about the future than people who are in a good mood. Translating to the behavior of investors it means that investors who are in good mood give a higher probability of good events/ positive changes happening and a lower probability of bad changes happening.
14. General level of optimism and pessimism or social mood changes over time. Investors tend to bee most optimistic when the market reaches the top and they are most pessimistic when market is at the bottom. This fluctuating social mood is defined as market sentiment.
15. A market bubble could be explained by the situation when high prices seem to be generated more by investors (traders in the market) optimism then by economic fundamentals.

Key-terms

- Cognitive dissonance
- Disposition effect
- Emotions
- Endowment effect
- "House-money" effect
- Market bubble
- Market sentiment
- Memory
- Mental accounting
- Misattribution bias
- Overconfidence
- "Snakebite" effect
- "Sunk-cost" effect

Questions and problems

1. Why the portfolios of overconfident investors have a higher risk? Give the reasons.
2. Give the characteristic of the overconfident investor.
3. Why do the investors tend to sell losing stocks together, on the same trading session, and separate the sale of winning stocks over several trading sessions?
4. Explain how mental accounting is related with the disposition effect.

9. Klos, Alexander, Elke Weber, Martin Webre (2005), Investment decisions and Time Horizon: Risk Perception and Risk Behavior in Repeated Gambles.// Management Science, p. 1777-1790.
10. Lim, Sonya Seongyeon (2006). Do Investors Integrate Losses and Segregate Gains? Mental Accounting and Investor Trading Decisions. // Journal of Business, 2006, 79, p. 2539-2573.
11. Nofsinger, John R. (2008). The Psychology of Investing. 3rd ed. Pearson/Prentice Hall.
12. Nofsinger, John (2001). The Impact of Public Information on Investors // Journal of Banking and Finance, 2001, 25, p. 1339-1366.
13. Shapira, Zur, Itzhak Venezia (2001). Patterns of Behavior of Professionally Managed and Independent Investors. // Journal of banking and Finance, 2001, 25, p. 1573-1587.
14. Shefrin, Hersh Meir Statman (1985). The disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence. // Journal of Finance, 1985, 40, p. 777-790.
15. Statman, Meir, Steven Thorley, Keith Vorkink (2006). Investor Overconfidence and Trading Volume // Review of Financial Studies, No 19, p. 1531-1565.

European options can be exercised only on their expiration dates.

American options can be exercised any time during their life (defined by the option contract).

The major advantages of investing in options:

- possibility of hedging: using options the investor can "lock in the box" his/ her return already earned on the investment;
- the option also limits exposure to risk, because an investor can lose only a set amount of money (the purchase price of option);
- put and call options can be used profitably when the price of the underlying security goes up or down.

The major disadvantages of investing in options:

- the holder enjoys never interest or dividend income nor any other ownership benefit;
- because put and call options have limited lives, an investor have a limited time frame in which to capture desired price behavior;
- this investment vehicle is a bit complicated and many of its trading strategies are to complex for the non-professional investor.

Further in this chapter we focus only on some fundamental issues of investing in stock options including some most popular strategies.

7.2. Options pricing

The value of put or call options is closely related with the market value/ price of the security that underlies the option. This relationship is easily observed just before the expiration date of the option. The relationship between the intrinsic value of option and price of underlying stock graphically is showed in Fig. 1. (a – for call option, b – for put option). These graphs demonstrate the intrinsic value of the call and put options. In the case of call option (a), if the underlying stock price at the end of expiration period is less than the exercise price, intrinsic value of call option will be 0, because the investor does not use the option to buy the underlying stock at exercise price as he/ she can buy it for more favorable price in the market. But if the underlying stock price at the end of expiration period is higher than the exercise price, intrinsic value of call option will be positive, because the investor will use call option to buy the underlying stock at exercise price as this price is more favorable (lower) than price in the market. However it is not necessarily for the option buyer to exercise this option.

Outcomes are shown for each of 6 strategies. Because the profit obtained by a buyer of option is the writer's loss and vice versa, each diagram in Fig. 7.2, 7.3 and 7.4 has a corresponding mirror image.

Fig. 7.2 shows the profits and losses associated with buying and writing a call respectively. Similarly, Fig.7.3 shows the profits and losses associated with buying and writing a put, respectively. If we look at the graphs in these figures we identify that the kinked lines representing profits and losses are simply graphs of the intrinsic value equations (7.1. 7.2), less the premium of the options.

Thus, the profit or loss of using options is defined as difference between the intrinsic value of the option and option premium:

$$\textbf{Profit (or loss) on call option} = IVc - P_{op} = \max\{0, P_s - E\} - P_{op} = \max\{-P_{op}, P_s - E - P_{cop}\}, \quad (7.5)$$

$$\textbf{Profit (or loss) on put option} = IV_p - P_{op} = \max\{0, E - P_s\} - P_{op} = \max\{-P_{op}, E - P_s - P_{pop}\}, \quad (7.6)$$

here P_{cop} - premium on call option;
P_{pop} - premium on put option.

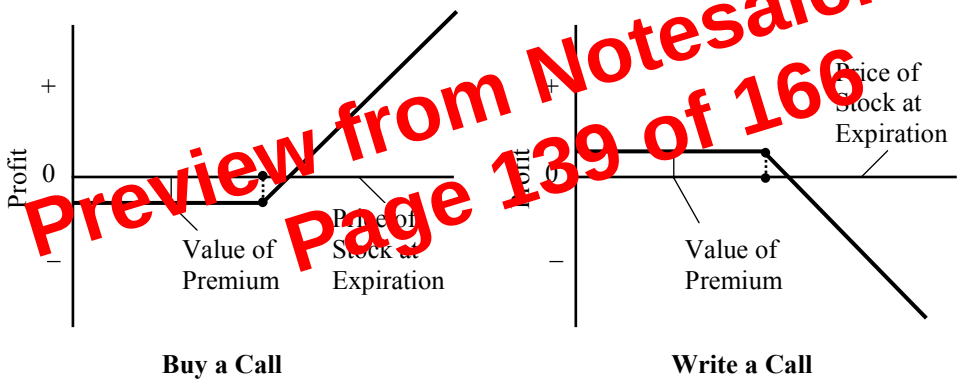

Fig. 7.2. Profit/ loss on the call options

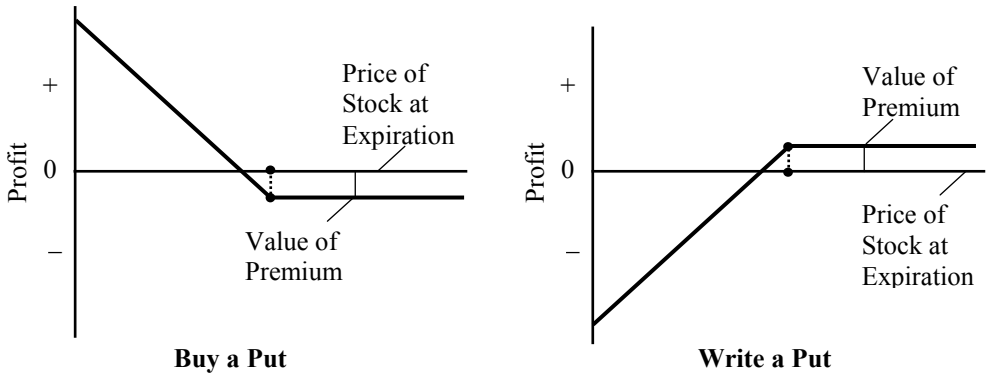

Fig. 7.3. Profit/ loss on the put options

Hedging portfolios of shares using index options. Large investors usually manage varied portfolios of shares so, rather than hedging individual shareholdings with options they may hedge their portfolios through the options on the entire index of shares

Index option is based on stock index instead of an underlying stock. When index option is exercised, settlement is made by cash payment, not delivery of shares. The most often index options are settled on the bases of such indexes as Standard&Poor's 500 (USA); FTSE 100 (UK); DAX (Germany), CAC (France), etc.

Suppose, the investor manage a well diversified portfolio of shares and currently is concerned that the market may fall over the next 3 months. One of possible investment strategies for the investor is to buy the put option on the stock index. If the market does fall, losses on the portfolio will be offset by gains on the value of the index put option. If the portfolio is unhedged, the investor suffers from the market fall substantially. But it is important to remember about the expenses of the insurance of portfolio: when the options premiums are high (during periods of market volatility caused by economic crises), hedging of the portfolio of stocks with index options over longer period could be expensive.

Using hedging strategies very important characteristic is the hedge ratio of the portfolio. ***Hedge ratio*** *is a number of stocks to buy or sell with options such that the future portfolio value is risk-free.* ***The hedged portfolio*** consists of m purchased shares and n options written (issued) on these shares.

Hedge ratio (HR) can be estimated using formula:

$$HR = m / n, \qquad (7.5)$$

here: m - number of shares in the portfolio;

n - a number of options written on the shares in the portfolio.

Riskless (perfect) hedge is when for m and n are chosen such a values which allow in each moment given to compensate the decrease in prices of the stocks by increase in value of options. This meaning of hedge ratio is called as a ***perfect hedge ratio.*** But *perfect hedge ratio could be achieved only under following assumptions:*

- There are no transaction costs in the market;
- There are no taxes;
- The numbers of all traded securities is unlimited (including fractional numbers);

stock; (4) exercise price of the option; (5) time remaining before expiration, expressed as a fraction of a year.

17. Option strategy known as straddle involves buying (or writing) both a call and put options on the same stock, with the options having the same exercise price and expiration date.
18. Hedging with options is especially attractive because they can give protection against loss or the stock protects the option against loss. Hedging reduces the dispersion of possible outcomes to the investor. There is a floor below which losses cannot be increased, while the size of the loss would be limited to the option premium paid.
19. Index option is based on stock index instead of an underlying stock. When index option is exercised, settlement is made by cash payment, not delivery of shares.
20. Using hedging strategies very important characteristic is the hedge ratio of the portfolio. Hedge ratio is a number of stocks to buy or sell with options such that the future portfolio value is risk-free.
21. Riskless (perfect) hedge is such a hedge which allows in each moment given to compensate the decrease in prices of the stocks by increase in value of options.

Key-terms

- American options
- „At the money“
- Black-Scholes model
- Call option
- European options
- Exercise price (strike price)
- Expiration date
- „In the money“
- Intrinsic value of option
- Hedger
- Hedging
- Hedge ratio
- Option
- Option buyer
- Option premium
- Option writer
- „Out of money“
- Riskless (perfect) hedge
- Perfect hedge ratio
- Put option
- Profit or loss on option
- Straddle
- Time value
- Underlying security

Questions and problems

1. Distinguish between a put and a call.
2. What does it mean to say „an option buyer has a right but not an obligation?
3. Explain the following terms used with the options:
    a) „In the money“
    b) „Out of money“
    c) „At the money“
4. What is the difference between option premium and option price?
5. What is the relationship between option prices and their intrinsic value?
6. Why is the call or put writer‘s position considerably different from the buyer‘s position?
7. What is an index option? What are the main differences between index option and stock option?
8. How can a put used to protect a particular investor‘s position?
9. What is the maximum amount the buyer of an option can lose?
10. Draw the profit/ loss graph for the following option strategies:
    a) Buy a put with 3 EURO premium and 70 EURO exercise price;
    b) Write a call with 2 EURO premium and 50 EURO exercise price.
11. Robert has only one day left to decide whether to exercise a call option on the Company X stock, which he purchased six months ago for 300 dol. (3 dol. per share). The call option exercise price is 54 dol.
    a) For what range of stock price should Robert exercise the call on the last day of the call life?
    b) For what range of stock price would Robert realize a loss (including the premium paid for the call option)?
12. Using information about several call and put options in the table below, identify, which of these options are „in the money“, „at the money“ or „out of money“ and fulfill the last column in the table.

Type of option	Exercise price	Premium	Current price of underlying stock	Your evaluation
Call	18	0,25	19,50	
Put	30	0,50	31,20	
Call	24	0,25	21,40	
Call	45	0,30	46,10	
Put	60	1,25	56,25	
Call	20	0,25	20,00	