

Course title: Selected economic and financial risks

Topic 6: Investment decision-making and tools to support it

T6 processors:

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Aims: The aim of the topic is to acquaint students with the tools of investment decision-making and its support

Tasks for work:

Answer the following questions

1. How do we classify investments?
2. What basic investment strategies do we distinguish?
3. What are the basic rules for financial decision making?
4. What is net present value and how do we calculate it?
5. What is the internal rate of return and how do we calculate it?

Content:

Investment decisions

Investment classification

Investment strategy

Investment financing

Rules for financial decisions

Specific criteria for investment decisions

Monetary criteria

Cost criteria

Investment evaluation methods

Static methods of investment evaluation

Dynamic methods of investment evaluation

Net present value index as an indicator of investment decisions

Internal rate of return as an indicator of investment decisions

Simple and discounted payback period as indicators of investment decisions

Investment decisions for several periods

Interest rate and its types

INVESTMENT DECISIONS [1]

In the national concept, a distinction is made between gross and net investment. Gross investment represents the total amount invested in capital goods throughout the country's economy, which represents the increase in, for example, buildings, machinery and equipment, vehicles and inventories over a period of time. Capital goods are to be used for the production of other goods, whether production or consumer goods. While net investment is formed by the year-on-year increase in the value of capital goods. Net investment can also be defined as the difference between gross investment and total impairment of capital, which is expressed in depreciation. (Scholle 2009, p. 13; Polách 2012, p. 9)

From a macroeconomic point of view, investment is a large and changing component of expenditure that can reduce current consumption, but nevertheless increase demand for capital and consumer goods, production and labor demand, thus providing long-term economic growth for society as a whole. From the corporate concept, investments can be viewed either from a narrower perspective or more broadly. An investment understood in a narrower sense is an asset that is not intended for consumption, but is intended for the creation of other assets that the company resells on the market. From a broader point of view, investments can be defined as funds currently being sacrificed for the acquisition of assets that will help the company increase its benefits over time and thus later help the company to gain greater financial effects. (Scholle 2009, p. 13)

Investment classification

The basic distinctions of investment groups are tangible investments, they create and expand the company's production capacity, financial investments, these relate to the purchase of securities, bonds, shares or lending money with the vision of earning interest, dividends or profit, and finally they are intangible investments, which may represent the purchase of know-how, expenditure on research, education or social development. (Synek and Kislingerová 2015, p. 293) Another aspect is investments according to the development of the company, where a distinction is made between renewal, development and regulatory investments, sometimes referred to as mandatory. Renewable investments are necessary for the actual reproduction of the existing production facility. Developers help the company increase its current ability to produce and sell its products and services, and regulatory ones are those that must be implemented, otherwise there is a risk of sanctions by the state, as they are given by legislation. (Scholle 2009, p. 15; Synek and Kislingerová 2015, p. 293)

Investment decisions, ie how much will be invested and when, are among the most important managerial decisions about the future development of the company and its efficiency. (Synek 2011, p. 284) However, the process of investment decision-making requires the implementation of elements from other sectors related to the overall management of the company. It is necessary for management to apply knowledge from the field of controlling, accounting, strategic management, crisis management, financial analysis, but also, for example, mathematics, so as to achieve the overall goal of the company, which the organization determines.

Investment strategy[3]

In order to achieve business goals, it is necessary to specify the investment strategy that will ensure the true fulfillment of business goals. These are various procedures that the investor must approach when assessing investment opportunities, and it is necessary to mention here the so-called magic triangle of investing, which consists of:

- the expected return on the investment,
- the expected risk of the investment,
- and the expected effect on the company's liquidity.

According to this, the best investment is, of course, the investment, which has a high return, low risk and high liquidity. However, this may be what investors think about in practice. Therefore, it is necessary to apply and distinguish, according to the preferred factor, different types of investment strategies. (Valach 2006, p. 35) Such strategies are:

- Strategy of maximizing annual returns - the investor prefers higher annual returns and does not take into account the growth of the investment price. This type is good to apply in periods when inflation is lower.
- Investment price growth strategy - the investor assumes that there will be a high increase in value compared to the deposit. It is good to use this type of strategy at a higher rate of inflation. Here, future profit is preferred to annual income.
- Investment price growth strategy associated with maximum annual returns - this includes those selected investment projects that bring not only growth in investment prices in the future, but also growth in annual returns.
- Aggressive investment strategies - here projects are preferred that have a higher degree of risk, but the greater the future return on investment.
- Conservative strategy - this type of strategy is the opposite of an aggressive investment strategy. Therefore, the investor is cautious in relation to the risk and chooses 'security'.

- Maximum liquidity strategy - this type of strategy in turn prioritizes projects that quickly transform into money. An example could be an investment in term deposits or securities. However, they often have lower returns, as projects with higher returns are generally less liquid. (Gelding 2006, pp. 35–36)

Investment financing[4]

To cover investment expenditures, it is necessary to choose a suitable method of financing and thus ensure a sufficient amount of funds for the implementation of the investment project and to ensure its operation. (Žídková 2003, p. 21)

The financial resources needed for investment are divided into own and foreign. Own resources are owned by a business entity and are often the result of business activities, the organization is its own. These are capital contributions in cash or in non-monetary values, which in the case of joint-stock companies may be share capital recorded in the accounts as share capital, share premium from capital funds, silent partnership contributions or shareholders' contributions in excess of share capital. Furthermore, own resources include depreciation of fixed assets and profit allocated to funds so that it can be used to finance the further development of the company. Which belongs to the so-called self-financing. It also includes other revenues, which may be from the sale or liquidation of fixed assets, or also revenues from the sale of inventories. It also includes gifts of an investment nature, subsidies and subsidies earmarked for investment activities. (Žídková 2003, p. 22)

Rules for financial decisions: [5]

- at the same risk, he prefers a higher return to a smaller one
- at the same return, he prefers less risk to greater risk
- a higher return is required for a higher risk
- money received earlier is preferred to the same amount received later
- The motivation for investing is to expect a higher return than investing in another event
- The motivation for investing is to increase assets

Business financing and financial management tasks : [7]

P rounds of financial management

- provide capital for the current and extraordinary needs of the company and decide on its structure
- decide on the location of capital
- decide on the distribution of profits

- forecast, plan, record, analyze, control and manage the economic side of a company's activities to ensure financial stability
- **financing** - acquisition and allocation of funds

F actuator time - monetary unit paid or received at different times have different values

P deliberations :[8]

- determining the future value of money
- simple - the original amount will bear interest
- complicated - interest is also paid on the principal

$$BH = SH (1 + i)^n$$

BH - future value

SH - current value

Specific criteria for investment decisions [9]

The criteria of investment decision-making can be divided according to the final effect of the investment, which they focus on in their evaluation: monetary, cost and profit criteria.

Cash criteria - deal with the evaluation of expected investment cash flows. These include, for example, net present value, net present value index, internal rate of return, simple and discounted payback period. It is connected with basic methodological problems, the first is the identification and possibility of real evaluation of investment flows = IPT (investment cash flow). This is the difference between investment cash income and cash outflows m . Great emphasis is placed on the business estimate of sales based on marketing reports.

There are two basic approaches to IPT identification. Very simply, in the first procedure, we measure the company's cash flows in the variant without an realized investment and the variant with an realized investment, based on official financial planning documents. The second approach identifies individual cash receipts by simply listing them.

Cost criteria - focus on evaluating the expected cost savings that investments are to bring. An example is the criterion of discounted project costs.

Profit criteria - based on the evaluation of the expected economic result achieved through the investment. An example is the criterion of the average profitability of a project.

Capital expenditures and cash receipts [10]

The evaluation of the effectiveness of the planned investment depends on the quantification of capital expenditures and expected revenues at any stage of the project. Capital expenditures include expenditures that have been calculated since the acquisition of an investment with a return of more than one year, and expenditures on a permanent increase in

net working capital caused by a new investment. The increase in net working capital is the result of the difference between the increase in current assets and the increase in current liabilities. It is therefore necessary to take into account the costs of pre-supplying future operations. However, acquisition costs can sometimes be reduced by income from the sale of existing fixed assets, which becomes unnecessary with a new investment. It is also necessary to take into account the possible tax burden when selling existing equipment, which then increases capital expenditures. (Koudela and Schejbalová 2000, pp. 37–38)

The cash income generated by the project for the year consists exclusively of the after-tax profit that the project brings each year, annual depreciation, changes in current assets (net working capital), where the increase decreases income and increases it, and income from the sale of fixed assets, lifetime is over, adjusted for tax. [11]

Determining cash receipts is many times more difficult than determining capital expenditures, because the time for which cash receipts need to be determined is much longer than just the time of acquisition of assets, so great account must be taken of the influence of the time factor. As a result, there is a risk that the calculation of cash receipts will be incorrect and will differ from the expected amount of cash receipts. (Gelding 2006, p. 65)

The flow of capital expenditures and cash receipts is expressed as cash flow (CF). Determining cash flows is the most difficult task a company has to perform, as it is often a multi-variable and a large number of departments in the organization work together to create it. This is a difficult task mainly because incorrect or inaccurate determination of cash flows can lead to an erroneous decision to accept or reject individual projects. It is also a matter of anticipating cash flows for a longer period, which needs to be determined each future year of project implementation. For machines, it is a prediction of cash flows for 10-15 years, for buildings for 40-50 years. (Koudela and Schejbalová 2000, p. 37; Fotr and Souček 2011, p. 92; Valach 2006, p. 60) [13]

The most common causes are incorrect content of project cash flows in terms of their components, so things that should be included are not included. Another reason is incorrectly determined values of individual components of the project's cash flow during its lifetime. (Fotr and Souček 2011, p. 92) [14]

Cash flows for evaluating the economic efficiency of projects[15]

The cash flow for evaluating the economic efficiency of a project is composed of all income and expenses that are generated by the project, throughout its life. Therefore, during

its construction, operation and liquidation, provided full financing. (Fotr and Souček 2011, p. 92)

Investment evaluation methods [16]

It is most often possible to meet with the division of investment evaluation methods into static and dynamic methods. Static methods do not take into account the time factor and dynamic ones do, so it is necessary to update all input data, ie discounting. (Synek et al. 2007, p. 291) Static methods are most often used for projects with shorter payback periods, with lower resource requirements or projects with a low discount factor. In other cases, it is appropriate to use dynamic methods, where it does not hurt to have the right computer technology on hand with programs evaluating investments. (Synek et al. 2007, p. 292)

Static methods of investment evaluation[17]

Static methods focus primarily on capturing the monetary benefits of the investment and, if necessary, comparing them with its expenditures. Their use most often appears in the pre-selection phase of projects and is often a handy tool for eliminating completely unsuitable projects. (Scholle 2009, p. 50)

Total return on investment

The total income (CP) from the investment is equal to the sum of all expected cash flows, with the acceptable investment being the one whose total income exceeds the initial investment expenditure. (Scholleová 2009, p. 51) The relation can be expressed according to the formula [6]. (Scholle 2009, p. 51):

Net total investment income

Net total investment income (NCP) represents total investment income less initial investment expenditure. In order not to exclude the investment variant, the number must not be negative. (Scholle 2009, p. 52) The relationship can be expressed as follows (Scholle 2009, p. 52):

Average annual income

The average annual income ($\bar{CF}$) is calculated by dividing the total income from the investment by the total useful life (life) of the investment in years. However, this indicator is not in itself informative, so it does not serve to exclude a certain variant, but rather as an indicative measure for considerations on the repayment of liabilities caused by the acquisition of fixed assets. (Scholle 2009, p. 52)

Average annual return

This indicator determines what percentage of the invested amount is returned annually on average, ie it represents the share of average cash flow and initial invested expenditure. However, the average annual return does not respect the time value of money, as we work with average values. The main requirement is a maximum percentage of annual return, at least so that the amount is finally paid at least 100%.

Average payback period

The average payback period ($\varnothing$ period) indicates how long it takes for an investment to be repaid when a balanced cash flow is realized . Thus, 1 divided by the average annual return, as explained above, is calculated.

Payback time

The method of return or repayment - (The Payback Period - PP), represents a period (usually the number of years) for which the flow of income or cash flow will bring a value equal to the initial capital expenditure on the investment. This is actually the time when the accumulated cash flow resulting from the investment equals the initial capital expenditure. (The company then determines the period for which it would like to have the investment repaid and the project whose cash flows offset the capital expenditure first or within a specified period is therefore the most acceptable for the company. (Scholle 2009, pp. 93-94)

The Payback Period method is a static method because it does not respect the time and risk factor, but it can also be included among dynamic methods of investment evaluation, thanks to discounting cash flow in individual years using a discounted corporate rate that respects the time and risk factor of the investment.

Average carrying amount

Or the Average Accounting-Based Profitability Measures (ABPM) is the ratio of the average predicted earnings to the average net book value of the investment. The project, which is characterized by the highest percentages, is then taken as the most effective. (Scholle 2009, pp. 56-57)

Dynamic methods of investment evaluation[18]

Dynamic methods of evaluating the effectiveness of investments should be used for projects whose acquisition and subsequent life is predicted for a longer period of time, which is the case for most projects. The main feature of these methods is mainly respecting the time

factor, which helps to make the right decision about the final variant and faithfully assesses its effectiveness. (Gelding 2006, p. 77)

Net present value

Net Present Value (NPV / ČSH - Net Present Value) is one of the most widely used methods for evaluating the effectiveness of investments. This method can simply be defined as the difference between the discounted cash receipts from an investment project and capital expenditures. In the case where capital expenditures are made for a longer period of time, it is the difference between discounted cash receipts and discounted capital expenditures in individual years. The effect is expressed by the project's cash income, the basis of which is the expected profit after tax, depreciation, or other possible income from the project. (Gelding 2006, p. 94)

According to the subsequent results of the net present value, a suitable variant can already be assessed. When the NPV is greater than 0, it means that the discounted cash income exceeds the capital expenditure and the investment project is therefore acceptable to the company as it guarantees the required rate of return, thus increasing its market value, which is a priority goal of every organization. (Gelding 2006, p. 96)

Net present value as an indicator of financial decision-making[19]

The net present value represents the difference between the present value of the investment income and the present value of the investment expenditure.

If the net present value of *NPV* is positive, then the present value of income from the *SHP* investment must be greater than the present value of expenditure on the *NPV* investment , and therefore this investment will be more acceptable to a rational investor than other alternative investments. The value of the net present value in this case indicates how much the investment we consider will be more profitable than the alternative investment. If the net present value is negative, it means that the present value of the investment income will be less than the present value of the expenditure, and therefore we will not realize it, and we will prefer a possible alternative investment. In the event that the net present value is zero, then when abstracting from other factors are indifferent between the implementation of this and other alternative investments. At the same time, the higher the net present value, the more profitable the investment under consideration, and therefore if we choose between two mutually exclusive investments with different amounts of net present value, we will always prefer the investment with a higher net present value. [20]

Net present value index as an indicator of investment decisions [21]

The second criterion is the net present value index, or profitability index, which is calculated as the ratio of the present value of investment income and the present value of investment expenditure.

A higher value of the net present value *index* than 1 means that the present value of *SHP's* income will be greater than the present value of investment expenditure, and therefore, from the point of view of a rational investor, such an investment is advantageous. Conversely, if the value of the net present value index is less than 1, we will not make the investment. An investment with an index of net present value exactly at level 1 is just as advantageous to realize as not to realize when abstracting from other factors. In the case of deciding between two mutually exclusive investments, we will always prefer the investment that will have a higher value of the net present value index. [23]

Internal rate of return as an indicator of investment decisions [24] ,[25]

IRR - (Internal Rate of Return - IRR) is another dynamic methods of investment evaluation, which is considered as the effect of monetary income of the project and respects the temporal aspect. Together with the net present value, it is one of the most used and appropriate methods for assessing investment projects. (Scholle 2009, p. 64)

The internal rate of return can be defined in relation to the net present value as an interest rate at which the net present value is zero. Thus, such an interest rate, whose current monetary value of cash income from the project is equal to capital expenditures (or the current value of capital expenditures). (Gelding 2006, p. 110)

Formulas for investment decisions [27]

- **Calculation of capital expenditures**
- **Calculation of monetary income**
- **Calculation of total investment income**
- **Net total investment income**
- **Average annual income**
- **Average annual return**
- **Average payback period**
- **Payback period**
- **Average return on book value**

- **Net present value**
- **Net present value with discounted capital expenditures**
- **Profitability Index**
- **Internal rate of return**
- **Internal rate of return at discounted capital expenditures**

Simple and discounted payback period as indicators of investment decisions[28]

The simple payback period represents the number of years for which investment income equals investment expenditure. In terms of interpreting the simple payback period, we will prefer the investment that will be characterized by a shorter payback period. However, compared to the previously explained criteria / indicators, its use is associated with significant shortcomings. First, it does not take into account the time factor and therefore the fact that the income earned earlier is of greater value to us than the income earned later. Second, this indicator does not consider cash flows that are after the return on investment, although it could be, for example, high extraordinary income. Third, a simple payback period can be applied to realization decisions only in the case of investments with conventional cash flows. [29]

The discounted payback period is the number of years for which the present value of the investment income equals the present value of the investment expenditure. Investment with a shorter payback period should be given priority when investing . Compared to a simple payback period, the discounted payback period differs by applying a time factor. However, two other shortcomings associated with a simple payback period also appear in this criterion: abstracting from cash flows to payback periods and the impossibility of applying this criterion to investments with unconventional cash flows. [30]

Annuity calculation and perpetuity calculation - Investment decisions for several periods [31]

For several periods, the same criteria apply as for decision-making in one period. The investor can recalculate his future income to their present value and choose the investment that will bring him the greatest total income. The investor can recalculate the value of his current income to their value at some future point and choose the investment that will bring him the greatest total income. Another option is to calculate the internal rate of return on individual investments and choose the one that will bring him the highest rate of return

- here, however, it is necessary to calculate income from different periods at the same time

Two situations can occur:

- The final number of periods the income is called the lifetime annuity, or annuity
- infinite number of periods, the income is called perpetual annuity (perpetuity)

As inflation rises, the structure of investment changes in favor of shorter-term ones (longer-term ones are more affected by changes in nominal interest rates) and the volume of investment also decreases, as higher nominal interest rates cause the present value of all future income to fall and the PV of some future income even fall below the value of the current costs to be incurred to obtain that future income. [35]

Time values of money and interest rate and its types[36]

The time value of money is a financial method that is used to compare two or more amounts of money from different time periods.

The interest rate is the ratio of the return (remuneration for borrowing money) to the total amount of invested (borrowed) capital. The period over which the capital was provided (borrowed) is called the capital period (maturity). We distinguish between nominal and real interest rates.

- **Nominal interest rate** : represents the agreed interest rate between the borrower and the provider of capital, which is not primarily intended to take into account the inflation rate. As such, it is subsequently mentioned in the loan agreement, printed on the cover of the bond, or otherwise displayed in a valid document, or is at least tacitly respected by the parties to the agreement. The nominal interest rate is also considered to be the arithmetic average or other mean value calculated from several interest rates agreed in this way. Its two important characteristics are the length of time (we distinguish: annual, semi-annual, quarterly and monthly nominal interest rates - when we measure the annual, semi-annual, etc. amount of remuneration or interest paid to the creditor to the total amount of capital), for which it is measured, and frequency of accrual of interest.
- **Real interest rate** = nominal interest rate adjusted for the effect of inflation. It reflects the difference between the purchasing power of nominally (based on interest) the increased certain amount of money for the period under review and the purchasing power of the original amount.
- **Net interest rate** (after tax) = most income is taxable. It considers in the numerator the income (remuneration from the loan of capital) after taxation.

- **Gross interest rate** (before tax) = measures the return (remuneration for borrowing capital) before taxation to the total amount of invested (borrowed) capital.

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