FINANCIAL MANAGEMENT

2ND EDITION

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Preface

Solving particular tasks of economic and financial policy of a company is an important part of management. This study material aims at clarifying basic issues of financial management of a company and deals with factual application of the best known methods used in financial management in market economy, which will enable students of College of Polytechnics to master solving typical tasks they can encounter in practice. In its course it refers to topics which have been dealt with in the subject Company Economy at College of Polytechnics Jihlava and it is part of an overall view of finance and financing on a general level together with subjects Public Finance, Taxes, Financial Analysis, and Money, Banks and Financial Markets.

The study material is conceived for the teaching as one of mutual modules in English language and divided into single themes of financial management. Each theme (chapter) consists of three parts. The first theoretical part explains specialist issues connected with a given theme and it is the basic material for a lecturer’s explanation and for the content of seminars. The second part shows key terms and definitions of a given chapter for students to be able to make a short theoretical evaluation of the theme by return. The third part is practical and consists of solved examples. The solution of the tasks is particularized usually on schematic examples taken generally from used literature and information obtained from company sphere. In some exercises practical demonstrations of using important financial instruments are carried out; the instruments are then illustrated in the appendix.

Certain simplification of practical problems will enable students to understand faster and correctly single themes. For every type of exercise there is a procedure and method of solving with an explanation given then. Despite an effort to choose example with a proper predictive ability we have to take into account that the scale of possible alternative states in the sphere of financial management activity is quite wide so it is not possible to cover all the situations that may arise. Moreover we cannot consider this explanation of possible situations very standardized as economy is a living organism, which keeps evolving, and theory (including mathematical description and solution) in the sphere of finance as well only with difficulties follows real situations in the market economy, including the company segment.

The examples that were used to concretize the themes of financial management are thus only a chosen part of examined problems, which we face when financing companies and analyzing economic results and financial situation of companies. Their basic aim is to draw attention to spheres which it is necessary to concentrate on during the study, which are necessary to be further examined and on their basis to strengthen theoretical knowledge needed for managerial functions. We believe that this study material will become a practical aid for students and will enable them to understand better the content and importance of the tools of financial management of a company.

The authors
1 Introduction to Finance

1.1 Time Value of Money

The notion that money has a time value is one of the most important concepts in finance and investment analysis. Making decision today regarding future cash-flows requires understanding that the value of money does not remain the same forever.

A euro (crown, dollar) today is worth less than a euro (crown, dollar) sometimes in the future. We can give two essential reasons:

- cash-flows arising at various points in time have different value relative to any other point in time (inflation influence); this means we ought to use the time value of money to quantify the relation between cash-flows at different points in time
- cash-flows in the future are uncertain; uncertainty issues from the nature of forecasts of the timing and of when or what amount of cash-flows (i.e. receipt or expenditures of money) there will be in the future

Translating a current value into its equivalent future value is referred to as **compounding**.

Translating future cash-flows into its equivalent value in a prior period is referred to as **discounting**.

For example, the amount that you are willing to lend today is the loan’s present value. The amount that you require to be paid at the end of the loan period is the loan’s future value. Therefore, the future value of this financial investment is comprised of two parts:

\[
\text{Future value} = \text{Present value} + \text{Interest}
\]

where present value of lending money is referred to as **principal** and the time value of lending money is expressed by the term **interest**. **Interest rate** \((i)\) is defined as a return rate from the principal of the debt. We get the future value from the present value with help of mathematics formula:

\[
FV = PV + (PV \times i)
\]

or:

\[
FV = PV \times (1 + i)
\]

Solving for present value gives us:

\[
PV = \frac{FV}{1 + i}
\]
1.2 Interest

Simple Interest

The previous formula simplifies to:

\[
FV = PV \times (1+i)
\]

where:

- \( i \) = yearly interest rate (p.a., per annum)

Suppose we deposit money into a savings account at the bank. If this interest is withdrawn at the end of period, the principal makes it possible to earn interest at the given interest rate. You earn so called simple interest. It is simple because it repeats itself in exactly the same way from one period to the next as long as you take out the interest at the end of each period and the principal remains the same.

Compound Interest

On the other hand, both the principal and the interest from our deposit can earn interest. Earning interest on interest is called compounding because the balance at any time is compounded of the principal, interest of principal and interest on accumulated interest, i.e., interest on interest. The relation between the present value and the future value after two periods, breaking out second period interest into interest on the principal and interest on interest, is:

<table>
<thead>
<tr>
<th>Future value of deposit =</th>
<th>Principal +</th>
<th>First period’s interest on the principal +</th>
<th>Second period’s interest on the principal +</th>
<th>Second period’s interest on the first period’s interest</th>
</tr>
</thead>
</table>

To get the future value from the present value, we use the mathematical formula:

\[
FV_2 = FV_1 + i \times FV_1
\]

which leads to:

\[
FV_2 = [PV + (PV \times i)] + i \times [PV + (PV \times i)]
\]

or, collecting the PV from each term and applying an elementary algebra:

\[
FV_2 = PV \times (1+i)^2
\]

To determine the future value with compound interest for more than two periods, we follow along the same lines:

\[
FV_n = PV \times (1+i)^n
\]

where:

- \( n \) = the number of compounding periods
- term \((1+i)^n\) = compound factor (rate of exchange between present and future money)
This equation is the basic equation of financial mathematics. It relates a value at one point in time to a value at another point in time, considering the compounding of interest.

**Discounting**

Compounding translates a value at one point in time into a value at some future point in time. The opposite process translates future values into present values: discounting translates future value back in time. From the basic financial valuation equation

\[ FV_n = PV \cdot (1 + i)^n \]

we appoint:

\[ PV = \frac{FV_n}{(1 + i)^n} \]

- where the term \((1 + i)^n\) is referred to as **discount factor** since it is used to translate a future value to its equivalent – present value.

This principle of discounting cash-flows is often used in case of long-term investment decisions within capital budgeting by calculating present value of investment.

The correct way of calculating interest as the average annual return from financial investment is to use a geometric average return (because arithmetic average return ignores the process of compounding) as solution of the previous equation:

\[ i = \sqrt[n]{\frac{FV}{PV}} - 1 \]

### 1.3 Annuity

**Ordinary annuity**

Sometimes we need to evaluate a series of level cash-flows if each cash-flow is the same amount as the others and they are deposited on savings account at regular intervals. This series of cash-flows of equal amount, occurring at even intervals, is referred to as an annuity. Determining the value of an annuity, whether compounding or discounting, is simpler than valuing uneven cash-flows. If each cash-flow is equal and the first one occurs at the end of the first period, we may express the future value of the series payments as:

\[ FV_a = \sum_{t=1}^{n} CF \cdot (1 + i)^{t-1} = CF \* \sum_{t=1}^{n} (1 + i)^{t-1} \]

This equation tells us that the future value of a series of cash-flows, occurring at regular intervals beginning one period from today \(t\) starts at 1, is equal to the amount of cash-flow multiplied by the sum of compounding factors.

The sum of the compounding factors for a given interest rate \(i\) and number of periods \(n\) is referred to as the **future value annuity factor**. An alternative formula for the sum of the compound factors (calculated as the total sum of mathematical row) is:
The equation for the present value of a series of cash-flows beginning after one period simplifies to:

\[ PV_a = \sum_{t=1}^{n} \frac{CF_i}{(1+i)^t} = CF \times \sum_{t=1}^{n} \frac{1}{(1+i)^t} \]

The equation tells us that the present value of an annuity is equal to the amount of one cash-flow multiplied by the sum of the discounting factors. The sum of the discounting factors for a given interest rate (i) and the number of periods (n) is referred to as the present value annuity factor. An alternative formula for the sum of the compound factors (calculated as the total sum of mathematical row) is:

\[ PV\text{ annuity factor} = \left[ 1 - \frac{1}{(1+i)^n} \right] \times \frac{1}{i} \]

These equations are the valuation (future and present value) formulas for an ordinary annuity. An ordinary annuity is a special form of annuity, where the first cash-flow (payment) occurs at the end of the first period.

Annuity Due

The ordinary annuity cash-flow analysis assumes that cash-flows occur at the end of each period. However, there is another quite common way of creating cash-flows in which cash-flows occur at regular intervals, but the first cash-flow occurs immediately (1.1.) This way of creating cash-flows is called an annuity due.

\[ FV_{a,\text{due}} = CF \times \sum_{t=1}^{n} (1+i)^{t-1} \]

Perpetuity

If the number of payments extends into infinity, the series of cash-flows that occur at regular intervals, forever, is called perpetuity. The present value of a perpetual annuity equals:

\[ PV_{\text{perp}} = \frac{CF}{i} \]

### 1.4 Practical Example

**Problem**

Suppose you deposit 20,000 EUR per year in an account for 10 years, starting today, and you make a total of 10 deposits.
**Task**
What will the balance in the account be at the end of the 10 years if the balance in the deposit account earns 5% per year?

**Procedure**
You have to solve it by means of deferred annuity formula:

\[ FV_{a,\text{due}} = CF \times \sum_{t=1}^{n} (1 + i)^{t-1} \]

**Solution**

\[ FV_{a,\text{due}} = 20,000 \times \sum_{t=1}^{10} (1 + 0.05)^{t-1} = 264,135.74 \text{EUR} \]

The balance in the deposit account at the end of ten years will be 264,135.74 EUR.

1.5 **Key Terms of the Theme**

<table>
<thead>
<tr>
<th>time value of money</th>
<th>compound factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>future value</td>
<td>discount factor</td>
</tr>
<tr>
<td>present value</td>
<td>annuity</td>
</tr>
<tr>
<td>compounding</td>
<td>annuity factor</td>
</tr>
<tr>
<td>discounting</td>
<td>ordinary annuity</td>
</tr>
<tr>
<td>simple interest</td>
<td>due annuity</td>
</tr>
<tr>
<td>compound interest</td>
<td>perpetuity</td>
</tr>
</tbody>
</table>
2 Property and Financial Structure of a Company

2.1 The Property of a Company and its Financing

The property and financial structure of a company is closely related with the business activities of the company, i.e. with acquiring property for business, creating and using the company’s own or external sources for financing property and with financial securing of the company’s operation\(^1\).

The optimal structure of the property is provided by the company with a view to its business plan, possibilities and prices of acquiring necessary property in the capital goods market and to always limited financing possibilities. The property structure is directly related to the sales of the company, to its production costs and it is reflected in profit.

The extent of using the company’s own or external capital to acquire company long-term property is the subject of capital structure optimization. The cost and availability of external capital is crucial both when choosing the external capital structure (some external capital is cheaper, other is more expensive but easier to obtain, other has a more advantageous pay-off period) and when deciding about the extent of the use of the company’s own capital, which also has its cost that can be expressed by an alternative yield of another activity, the so called opportunity costs.

Long-term Property

The long-term property of a company is defined at the property that serves to the company for a long time in the accounting sense, i.e. for more than a year. It enters the production process indirectly and as for the value, it mostly creates the basis of the property structure of the company. It is classified into three basic groups:

1. intangible property
2. tangible property
3. long-term financial property

**Intangible property** can be bought for money or created by the company’s own activity and it does not have a direct material form (licences, patents, royalties, software outputs from research and development, trademarks, copyright, software) or it raises the company’s value (goodwill).

**Tangible property** gradually wears down in the production process and its decreasing value is then expressed by depreciations in accounting; or it is property that does not wear down and theoretically does not depreciate (land). Internally it is divided into real estate (immovable property), which is fixed and cannot be relocated (buildings, lands), and movable property (machinery, cars, equipment), which can be relocated.

**Long-term financial property** is not used to participate directly in economy, production or trade process of the company, but it has been invested towards further (higher) valuation of capital (= financial investment).

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\(^1\) Difference between financial and capital structure: financial structure includes all source of finance of a company and capital structure refers to long-term sources of finance; however, some authors extend the notion of capital structure of the company to all sources of finance.
Current Property
Current property enters the production process in the company directly (it circulates), its value keeps changing in the course of a year. Internally it is divided into three parts:

1. inventory
2. receivable accounts
3. short-term financial property

One form of current property changes into another; receivables are collected and change into cash money, which is used to pay for inventories etc. The speed of its turnover is monitored and optimized. It is also used to pay the company’s debts, here we speak about the liquidity of a company, and in the case of convertibility of individual components of current property into cash money we speak about the liquidity of current property. *Inventories* can have the form of goods, products, semi-finished products, and animals. *Receivable accounts* to various subjects (customers, state, employees etc.) are classified into short-term and long-term ones (maturity over 1 year). Short–term financial property *(financial accounts)* includes not only cash money or non-cash money on bank accounts, but also short-term securities.

Other Property
The property of a company includes also special receivables raised by reason of not paying the basic capital of the company (e.g. shares not paid by new shareholders). In the balance sheet, this “property” is in the first place and it is called *stock subscriptions receivables*. Further the company’s property includes temporary accounts of assets, or *accruals*, like *prepaid expenses* and *prepaid income*.

Equity
In accounting, equity is divided into *basic capital* that was deposited on the foundation of the company or later increased or decreased again, further into *capital funds* (created e.g. as an additional source when issuing shares in a value higher than the nominal one, the so called *share premium account*), *funds created from profit* or *reserves* (statutory reserve fund, social fund etc.). Equity further includes *retained earnings/losses* in the form of retaining of non-allocated and kept earnings or growing losses from previous period and *profit/loss of current accounting period*. In case of loss, this is a negative item which decreases the height of equity.

Liabilities
Unlike the company’s own capital, external capital is borrowed in some way, so it is liabilities, i.e. debts of the company. For its obtaining, some sort of payment in the form of interest is required. The same way the property of the company is classified into short-term and long-term one when the criterion for classification is the maturity period (1 year is the division line).

*Provisions* are a special type of debts and they represent financial resources kept for covering internal or potential debts of an economic subject. It can be potential tax fee or credit losses, financing of worn down property (repairs of roads, buildings etc.) or a shorter-term financial reserve.

*Payables* to various subjects (suppliers, state, employees etc.) are further components of external capital, which are classified into short-term and long-term and no interest is mostly charged on them. *Bank loans*, i.e. debts that always include interest as the cost of borrowing capital, are another component.
Temporary Accounts of Liabilities
These are temporarily risen sources of financing. Among them there belong deferred expenses and deferred income.

2.2 Balance Sheet - Depiction of Property and Financial Structure
Information about property and financial structure of a company, about the output of its economy and the course of its cash-flows is provided by financial accounting by means of statements. The property and financial structure of a company is represented by a balance sheet, which is in principle mathematically based on a balance between property (i.e. assets) and sources of its financing, i.e. its own capital (equity) and external capital (liabilities).

It is a statement, where a company represents in monetary expression the state of its property and sources at a given time. This picture is viewed from two viewpoints:

1) According to functional specification of resources, it means in which particular types the property is bound, how it is appreciated and depreciated, how fast it turns. This property can be fixed, expressed as tangible assets, intangible assets and financial investments; further as current assets expressed in the form of inventory, receivables, and financial accounts. The last and minority part of property is temporary assets of a company (accruals). The entire company property represented in the balance sheet is defined as the company’s assets.

2) According to obtaining resources from which the property has been gained or created, it means either from the company’s own resources such as basic capital, funds created from profit, capital funds, and profit/loss, or from external resources like provisions, long-term payables, short-term payables, bank loans, and temporary accounts of liabilities. Resources viewed from this point, i.e. company’s own and external resources of financing, are called capital and liabilities in the balance sheet.

Basic Balance Equation
Assets, equity and liabilities express in fact the same, i.e. a set of economic means which a company uses. The difference is only in the point of view. As it is principally a parallel representation of the same means from two different points of view, the sum of the left side of a balance sheet (assets) must always equal to the sum of the right side (equity and liabilities). To understand the principles of financing a company it is important to introduce an equation that describes the balance between both sides of the balance sheet this way:

\[
\text{ASSETS} = \text{EQUITY} + \text{LIABILITIES}
\]

Assets = depiction of property used for a company’s business activities on one side of the balance sheet.
Equity (Owner’s Capital) = depiction of company’s own sources of financing on the other side of the balance sheet. Company’s own capital is thus artificially placed on the other side of the balance sheet, on the side of liabilities from the accounting viewpoint, as it is advantageous and necessary from the point of view of accounting principles to keep the balance point between property and sources of financing zero.

Equity is the most important category from the point of view of an entrepreneur. After a transposition of the balance equation to the form:
it can be defined – from the point of view of property impact on a company’s business activities – as unindebted property (it could likewise be defined e.g. on the economy of the sector of households). It thus expresses the real value of the company as well.

Entrepreneurs can evaluate the result of their business by comparing present owner’s capital with the capital invested in the company at the beginning (basic capital).

**Liabilities** = representation of external sources of financing recorded in the balance sheet on the other (capital) side. They are payments that have not been settled yet (payables) or money borrowed at a certain cost (loans) or that are potentially hidden and must be settled in future (provisions).

**Analysis of the Statement of a Balance Sheet**

A statement is created as a table system of rows with their unique order given by the numbering of items. It is used for compiling a cash-flow statement or for financial analysis for defining single indices.

The table system of columns is then used to identify items of property and financial sources. On the assets side of the balance sheet, there is the value of these items in gross or net pricing which is given by present accounting standards. Here we find out the values of corrections of these property pricings or values of depreciations. In columns we can also find historically comparable information about property and capital for a comparable period.

**2.3 Practical Example**

Compiling a balance sheet and calculating basic additive items of its structure.

**Problem**

ALFA, Ltd. company recorded following results (in thousands of Euro) in the balance sheet at the end of an accounting period:

<table>
<thead>
<tr>
<th>Assets</th>
<th>Capital (Equity + Liabilities)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intangible assets</td>
<td>25</td>
</tr>
<tr>
<td>Buildings</td>
<td>150</td>
</tr>
<tr>
<td>Machinery and equipment</td>
<td>35</td>
</tr>
<tr>
<td>Inventory</td>
<td>495</td>
</tr>
<tr>
<td>Short-term receivables</td>
<td>322</td>
</tr>
<tr>
<td>Money in cash desk and on</td>
<td>579</td>
</tr>
<tr>
<td>bank accounts</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total 1,606</td>
</tr>
<tr>
<td></td>
<td>Total 1,606</td>
</tr>
</tbody>
</table>

**Task**

Find out the amount of fixed assets, current assets, short-term (current) liabilities, next long-term (non-current) liabilities and equity.
Financial Management

Solution

Fixed assets
= intangible assets + buildings + machinery and equipment = 25 + 150 + 35 = 210

Current assets
= inventory + receivables + money = 495 + 322 + 579 = 1,396

Equity
= basic capital + reserve fund + retained earnings + profit of current acc. period
= 370 + 25 + 53 + 115 = 563

Current (short-term) liabilities
= payables from business + payables to the state + payables to employees = 197 + 164 + 114 = 475

Non-current (long-term) liabilities = long-term bank loan = 568

2.4 Key Terms of the Theme

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>balance sheet</td>
<td>Balance Sheet</td>
</tr>
<tr>
<td>stock subscriptions receivables</td>
<td>Stock Subscriptions Receivables</td>
</tr>
<tr>
<td>fixed assets</td>
<td>Fixed Assets</td>
</tr>
<tr>
<td>tangible assets</td>
<td>Tangible Assets</td>
</tr>
<tr>
<td>intangible assets</td>
<td>Intangible Assets</td>
</tr>
<tr>
<td>financial investments</td>
<td>Financial Investments</td>
</tr>
<tr>
<td>revaluation of assets</td>
<td>Revaluation of Assets</td>
</tr>
<tr>
<td>current (short-term) assets</td>
<td>Current (Short-Term) Assets</td>
</tr>
<tr>
<td>receivables</td>
<td>Receivables</td>
</tr>
<tr>
<td>cash</td>
<td>Cash</td>
</tr>
<tr>
<td>bank accounts</td>
<td>Bank Accounts</td>
</tr>
<tr>
<td>short-term financial assets</td>
<td>Short-Term Financial Assets</td>
</tr>
<tr>
<td>temporary accounts of assets</td>
<td>Temporary Accounts of Assets</td>
</tr>
<tr>
<td>to compile a balance sheet</td>
<td>To Compile a Balance Sheet</td>
</tr>
<tr>
<td>to represent items</td>
<td>To Represent Items</td>
</tr>
<tr>
<td>to depict in a statement</td>
<td>To Depict in a Statement</td>
</tr>
<tr>
<td>equity</td>
<td>Equity</td>
</tr>
<tr>
<td>basic capital</td>
<td>Basic Capital</td>
</tr>
<tr>
<td>capital funds</td>
<td>Capital Funds</td>
</tr>
<tr>
<td>reserves</td>
<td>Reserves</td>
</tr>
<tr>
<td>statutory reserve fund</td>
<td>Statutory Reserve Fund</td>
</tr>
<tr>
<td>retained earnings/losses</td>
<td>Retained Earnings/Losses</td>
</tr>
<tr>
<td>profit of a current accounting period</td>
<td>Profit of a Current Accounting Period</td>
</tr>
<tr>
<td>liabilities</td>
<td>Liabilities</td>
</tr>
<tr>
<td>optional provisions</td>
<td>Optional Provisions</td>
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<tr>
<td>statutory provisions</td>
<td>Statutory Provisions</td>
</tr>
<tr>
<td>short-term payables</td>
<td>Short-Term Payables</td>
</tr>
<tr>
<td>long-term payables</td>
<td>Long-Term Payables</td>
</tr>
<tr>
<td>short-term bank loans</td>
<td>Short-Term Bank Loans</td>
</tr>
<tr>
<td>long-term bank loans</td>
<td>Long-Term Bank Loans</td>
</tr>
<tr>
<td>short-term notes</td>
<td>Short-Term Notes</td>
</tr>
<tr>
<td>temporary accounts of liabilities</td>
<td>Temporary Accounts of Liabilities</td>
</tr>
</tbody>
</table>
3 Financial Management of the Company

3.1 The Role of a Financial Manager in a Company

A financial manager is a person responsible for important decisions about investment financing. But only in the smallest firms a single person is responsible for all the decisions. For small firms, the financial executive is likely to be the only financial manager. In most cases, responsibility is delegated. Top management takes continuously care of essential financial decisions. However, there are some other managers who deal with financing.

The treasurer is responsible for looking after the firm’s cash, raising new capital, financial planning and analysis, and maintaining relationship with banks, stockholders and other investors who own the firm’s securities. Larger companies also have a controller, who prepares the financial statements, leads the firm’s financial accounting office, and takes care of its tax obligations. The treasurer and controller have different roles - the treasurer’s main responsibility is to gain and manage the firm’s capital, whereas the controller ensures that the money is used efficiently.

The biggest firms usually appoint a chief financial officer (CFO) to oversee both ones. The CFO is deeply involved in financial policy and corporate planning. Often he has more general managerial responsibilities than just financial affairs and belongs among members of the board of directors.

Rules of Financing

Each financial manager should follow some rules that enable them to manage their company successfully and to preserve its good financial health. For decision-making of a financial manager there are moreover

- Golden rule of financing, which means that short-term sources shall finance short-term assets, long-term sources shall finance fixed assets.
- Rule of liquidity, which means to have financial sources ready to cover liabilities in a short time.
- Rule of profitability, which means that our profitability should be higher than the cost of capital.
- Rule of income maximizing, which means that we prefer higher income to lower.
- Rule of risk minimizing, which means that we prefer a lower risk to a higher one.
- Rule of time factor, which means that we prefer earlier received money.

Nevertheless, some of these rules act against themselves and a financial manager must seek the optimal level of following them.

Financial management objectives

Financial management ensures both strategic and political objectives of a company’s top management. Among them there is – besides the basic goal of creating profit and increasing the market value of the company – also ensuring financial solvency of the company and its efficient financing in the operational and investment field. In individual phases of the company activity, subsequent tasks for the financial management consist
Financial Management

moreover in:

1. **providing necessary capital** to set up and operate a company and to enable investment, i.e. providing the company’s financing – it is creating basic capital (issuing shares, deposits of partners), issuing bonds or obtaining a loan, etc.

2. **deciding about the allocation of the capital provided** – purchase of tangible, intangible or long-term financial assets, technology development, financing the company’s operation (store, receivables, operational costs)

3. **deciding about the distribution of created income** – payment of dividends or shares to partners, cumulating or reinvestment of earnings

4. **executing financial control** and audit, financial analysis, financial planning and forecasting

All financial management is influenced by three basic factors – we often speak about the so called **financial triangle**, which includes: **liquidity**, **profitability** and **risk**. These factors are in mutual opposition and maximum values of individual factors cannot be achieved. Hence the goal of financial management is ensuring as advantageous parameters of these three factors as possible.

### 3.2 The Theoretical Concept of Liquidity

One of the main aims of financial management of the company is ensuring its liquidity. The definition of the term of liquidity is broad and so two different meanings are known. First, it is a specification of a certain item of property, which expresses its ability of transformation into cash money.

Next, we speak of liquidity as the cash position of a company, which expresses its ability to pay its current debts from cash money or, as the case may be, from collecting receivables or sale of inventories.

This conception of the liquidity of a company is then further specified cash liquidity so called **cash ratio** (the 1st degree liquidity), available liquidity so called **acid test ratio** (the 2nd degree liquidity) and current liquidity so called **current ratio** (the 3rd degree liquidity) are distinguished here.

### 3.3 Working Capital Management

Fund conception of the management of short-term assets and short-term liabilities of a company is traditional in Anglo-Saxon countries. From there it has moved to the European continent as well and at present we can also find it in our economic practice. For financial management in our country this conception will certainly not become major but with regard to growing contacts with Anglo-Saxon economies, it is necessary to mention it.

This conception distinguishes so called monetary funds or financial resources funds that are understood as an aggregation of short-term state values from the balance sheet. This difference between active and passive items of the balance sheet is called a net fund.

**Net money** are defined as a difference between the assets item of financial accounts and liabilities fallen due. This fund contains the 1st grade liquidities.

**Net monetary assets** are the difference between the sum of net finance and short-term receivables as asset items and short-term liabilities (debts). This fund is used especially in the German area.

**Net working capital** is defined as the difference between short-term (current) assets and
short-term liabilities (mostly payables and short-term loans) and is used most often. It comes from the USA and it is also called the operational capital and used for international comparison. We can notice that this conception excludes long-term receivables, which are otherwise part of current assets in the balance sheet. As for evaluation, the actual value of a company’s funds does not have a predicative ability, what is important is the development in a comparable period. The basic criterion for judging operational finance is the improvement of the company’s liquid potential when financial resources funds are increasing.

**Working capital** is defined as the sum of inventories, short-term receivables and financial accounts. Managing working capital means:

a) inventory management:
   - providing optimal amount of inventory to ensure production cycle and sales
   - various normative and optimization methods are used
   - there are compared costs of supplying and costs of stocking

b) managing receivables
   - providing optimal structure and amount of receivables (issuing invoices, bills) in a company
   - collecting receivables

c) cash–flow management
   - providing optimal amount of money (cash, bank accounts) in a company

Although the working capital management itself consists in managing its individual components, a financial manager is expected to optimize its height and suggest measures so that the costs of preserving the existing height are the lowest possible. Working capital management also depends on the branch which the company is active in.

### 3.4 Practical Example

**Problem**

Gross balance sheet of the analyzed joint - stock company IOTTA at the beginning and the end of 2006 looks like this (values in thousands of EUR):
GROSS BALANCE SHEET OF THE IOTTA COMPANY

<table>
<thead>
<tr>
<th>ASSETS</th>
<th>1Jan2006</th>
<th>31Dec2006</th>
<th>CAPITAL</th>
<th>1Jan2006</th>
<th>31Dec2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current account</td>
<td>14,735</td>
<td>18,485</td>
<td>Short-term payables</td>
<td>31,702</td>
<td>18,884</td>
</tr>
<tr>
<td>Cash desk</td>
<td>1,000</td>
<td>1,500</td>
<td>Provisions for wages</td>
<td>4,595</td>
<td>7,744</td>
</tr>
<tr>
<td>Short-term receivables</td>
<td>26,062</td>
<td>32,180</td>
<td>Provisions for taxes</td>
<td>21,923</td>
<td>19,348</td>
</tr>
<tr>
<td>Bills of exchange to collect</td>
<td>400</td>
<td>500</td>
<td>∑ SHORT-TERM LIABILITIES</td>
<td>58,220</td>
<td>45,976</td>
</tr>
<tr>
<td>Inventory</td>
<td>19,733</td>
<td>23,529</td>
<td>Long-term credits</td>
<td>13,163</td>
<td>29,573</td>
</tr>
<tr>
<td>∑ CURRENT ASSETS</td>
<td>61,930</td>
<td>76,194</td>
<td>Long-term provisions</td>
<td>9,934</td>
<td>13,819</td>
</tr>
<tr>
<td>Land</td>
<td>3,887</td>
<td>4,048</td>
<td>Long-term payables</td>
<td>6,500</td>
<td>11,000</td>
</tr>
<tr>
<td>Buildings</td>
<td>29,615</td>
<td>38,805</td>
<td>∑ LONG-TERM LIABILITIES</td>
<td>87,817</td>
<td>100,368</td>
</tr>
<tr>
<td>Machinery and equipment</td>
<td>18,154</td>
<td>16,302</td>
<td>Current year profit</td>
<td>3,450</td>
<td>3,250</td>
</tr>
<tr>
<td>Tangible assets in progress</td>
<td>10,449</td>
<td>3,995</td>
<td>Common shares</td>
<td>22,750</td>
<td>22,750</td>
</tr>
<tr>
<td>∑ FIXED ASSETS</td>
<td>62,105</td>
<td>63,150</td>
<td>Funds from profit</td>
<td>10,018</td>
<td>12,976</td>
</tr>
<tr>
<td>TOTAL ASSETS</td>
<td>124,035</td>
<td>139,344</td>
<td>∑ EQUITY</td>
<td>36,218</td>
<td>38,976</td>
</tr>
<tr>
<td>TOTAL CAPITAL</td>
<td>124,035</td>
<td>139,344</td>
<td></td>
<td>36,218</td>
<td>38,976</td>
</tr>
</tbody>
</table>

Task No 1

Calculate ratio indices of the statistic liquidity of the company on 1st Jan 2006 and on 31st Dec 2006.

The company records neither long-term financial investment, nor long-term receivables, nor retained earnings from previous years.

Procedure

Statistic relative liquidity is most often measured by ratio indices of the 1st, 2nd and 3rd grade liquidity. It is a statistic event, it means that the index is valid always in a certain moment in time, and it is a relative (ratio) index, it means that it is a ratio of asset items and debt items. Nevertheless these liquidity indices only work with current assets and short-term capital. The data included in the balance sheet are the starting point.

1st grade liquidity (cash ratio) = financial accounts / short-term liabilities

2nd grade liquidity = (fin. accounts + short-term receivables) / short-term liabilities

3rd grade liquidity (current ratio) = short-term assets / short-term liabilities

Terminology varies at this point. Among financial accounts item we can usually find above all cash money, deposits at banking institutions, and due bills. Short-term receivables are those with a term of expiration under 1 year. Consequently, short-term assets represent current assets minus long-term receivables. Then, short-term liabilities are the sum of short-term payables, short-term provisions and short-term bank loans. In the practice of western countries, these values are usually recommended:

1st grade liquidity: minimally 0.2 – 0.5

2nd grade liquidity: around 1 – 1.5

3rd grade liquidity: around 2 – 2.5

But there are of course differences among various branches and countries.
### Solution

<table>
<thead>
<tr>
<th></th>
<th>1 Jan 2006</th>
<th>31 Dec 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>1\textsuperscript{st} grade liquidity</td>
<td>0.28</td>
<td>0.45</td>
</tr>
<tr>
<td>2\textsuperscript{nd} grade liquidity</td>
<td>0.72</td>
<td>1.15</td>
</tr>
<tr>
<td>3\textsuperscript{rd} grade liquidity</td>
<td>1.06</td>
<td>1.66</td>
</tr>
</tbody>
</table>

### Task No 2

Find out the value of three monetary funds of this company (net money, net monetary assets, and net working capital) on 1 January 2006 and on 31 December 2006. Monetary or also financial funds are understood here as state indices of liquidity.

### Procedure

Monetary funds are detected from data included in balance sheet always on a certain date.

<table>
<thead>
<tr>
<th>FUND</th>
<th>BALANCE SHEET ITEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net money</td>
<td>= money + short-term financial assets</td>
</tr>
<tr>
<td>Net monetary assets</td>
<td>= net money</td>
</tr>
<tr>
<td></td>
<td>+ short-term receivables</td>
</tr>
<tr>
<td></td>
<td>− short-term liabilities</td>
</tr>
<tr>
<td>Net working capital</td>
<td>= net money</td>
</tr>
<tr>
<td></td>
<td>+ short-term receivables</td>
</tr>
<tr>
<td></td>
<td>+ inventory</td>
</tr>
<tr>
<td></td>
<td>− short-term liabilities</td>
</tr>
</tbody>
</table>

In “net money” item we usually include monetary resources in cash, on a bank account, cheques and bills of exchange fallen due – corresponds to short-term financial accounts in the balance sheet.

In short-term receivables we include above all receivables from customers, but also from a social insurance company, health insurance authorities, and tax receivables etc., i.e. all receivables with supposed maturity not longer than 1 year.

In short-term liabilities we include all debts due within 1 year, i.e. short-term payables, eventually short-term provisions.
Solution
(values in thousands of EUR)

<table>
<thead>
<tr>
<th>FUND</th>
<th>On 1 Jan 2006</th>
<th>On 31 Dec 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net money:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>money + due bills of exchange</td>
<td>16,135</td>
<td>20,485</td>
</tr>
<tr>
<td>Net monetary assets:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net money</td>
<td>16,135</td>
<td>20,485</td>
</tr>
<tr>
<td>+ receivables</td>
<td>+ 26,062</td>
<td>+ 32,180</td>
</tr>
<tr>
<td>- short-term liabilities</td>
<td>− 58,220</td>
<td>− 45,976</td>
</tr>
<tr>
<td>= total</td>
<td>= − 16,023</td>
<td>= + 6,689</td>
</tr>
<tr>
<td>Net working capital:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net money</td>
<td>16,135</td>
<td>20,485</td>
</tr>
<tr>
<td>+ receivables</td>
<td>+ 26,062</td>
<td>+ 32,180</td>
</tr>
<tr>
<td>+ inventory</td>
<td>+ 19,733</td>
<td>+ 23,529</td>
</tr>
<tr>
<td>- short-term liabilities</td>
<td>− 58,220</td>
<td>− 45,976</td>
</tr>
<tr>
<td>= total</td>
<td>= + 3,710</td>
<td>= + 30,218</td>
</tr>
</tbody>
</table>

3.5 Key Terms of the Theme

- financial manager
- financial executive
- chief financial officer
- treasurer
- controller
- profitability
- risk rate
- liquidity
- golden rule of financing
- ensuring liquidity
- net money
- net monetary assets
- net working capital
- managing of working capital
- to provide optimal structure
- to follow rules of financing
- to calculate ratio indices
- providing capital
- executing control
- managing receivables
4 Receivables Management

4.1 Trade Credit and Invoice

One of the basic ways of financing short-term needs of a company in the form of goods and material inventory is trade credit. This is finance that companies give to one another during the goods supply in the form of payment postponing. The funds are recorded in the company’s balance sheet as payables to suppliers (capital side) or receivables from customers (assets side) and they have various forms – most often they are invoices, cheques, and bills of exchange. A trade credit consists in a time difference in the process of a sale contract or supply contract realization that occurs after delivering a product, goods or material. The supplier then draws a commercial invoice or a bill of exchange with a postponed due date for the consignment. However, this so called “trade credit” is not a true credit like those provided by commercial banks or financial institutions for an interest. “Trade credit” may not bear interest, though invoices with maturity over 90 days usually bear interest from the due amount through a drawn bill of exchange where the amount of the bill is higher by a so called discount that represents the interest as the time value of the contract.

In practice we often say that something is given “against an invoice”, which means that a supplier does not require a payment in cash but there is a postponed maturity date on the invoice – an accounting document that represents a simplified supply contract. This postponed maturity is not given by law; it is a result of a contractual relation between a supplier (seller) and a customer (buyer).

4.2 Receivables

Invoice selling increases demand on one hand, but on the other hand it creates differences between cash and accounting realization of sales. These differences then lead to the rise of receivables. Until they are paid, receivables must be financed, it means that the missing money for the postponed payment of the supply must be obtained from other sources. With receivables, there is always a risk that a customer will make a payment late or will not pay at all. According to whether the contractual period of the postponed payment in the invoice or sales (supply) contract has already passed or not, we classify receivables in a company as receivables before maturity and overdue (receivables after maturity). Receivables after maturity that have not been paid and are not supposed to be paid in future are called uncollectible receivables (bad debts). To manage receivables, a manager must:

1) evaluate the impacts of trade credits on the company’s financial position and their effectiveness
2) focus control activities on recording and checking the amount and maturity of receivables
3) implement an active policy towards debtors thoroughly in cooperation with a company lawyer and use various opportunities of collecting receivables and getting money back to a company (cession, ensuring receivables, factoring receivables).
4.3 Practical Example

Calculation of the state of receivables for a certain period including monitored indices and finding out the convenience of trade credit in comparison with a required cash payment.

Task 1

We consider that BETA, PLC strictly claimed supplying goods to their customers against cash payment in the past. At present, their sales revenue is 28,550 thousand Euro.

By liberalization of payment terms in the form of providing trade credit for 30 days, the company estimates an increase of their present revenue by 50%, i.e. reaching the amount of 42,825 thousand Euro. BETA, PLC also has spare production capacity for this increase. After offering the trade credit – an invoice for 30 days – they have to consider that all the company's customers who used to pay in cash will switch to it. That is why BETA, PLC has offered marketing support (material bonus) to those customers who will keep paying in cash. The company supposes that this support will be exploited by the former customers who paid in cash and further by 40% of new customers.

Judge the impact of the implemented trade policy of the company on their activities and evaluate the convenience or inconvenience of introducing trade credit. Make the evaluation in these indices:

a) Sales revenue amount estimate (in thousand Euro) – based on statistic data, BETA, PLC had a total turnover of 28,550 in 2007 in the following way: the sales revenue in January was 1,800, in February 2,200, in March 2,500, in May 2,700, in June 2,600, in July 3,000, in August 3,100, in September 2,800, in October 2,000, in November 1,900, and in December 1,450 (all in thousand Euro).

In accordance with the liberalization of payment terms they suppose that:
- sales revenue will increase 1,5 times equally in single months due to the influence of growing number of customers in comparison with the reality of 2007.

b) Receivables amount estimate – unlike the original version of cash sales when there were no receivables, receivables will rise in the new version of combined sales. When calculating them, start from the supposed sales for single months (see a).

Periodical running of the invoice sales in the course of the year and a stable schedule of their payment will proceed so that trade credit purchase will be used by 60% of new customers, which corresponds to 60% revenue increase.

Payment of receivables risen this way will proceed like this:
1) 80% of customers will pay in the first month after sale, i.e. in 30 days after delivery (in accordance with the contractual payments terms)
2) 20% of customers will pay in the second month after sale, i.e. in 60 days after delivery
3) therefore uncollectible receivables (bad debts) will not rise

Task 2

1) Based on the calculation of mentioned indices, determine how the present version of sales for cash payment differs from the new combined version of sales for invoices with a month maturity or cash payment. For this purpose use the calculation of the state of receivables at the end of the months and an average state of receivables for a year.
2) From the point of view of receivables managing, calculate annual and quarterly indices of turnover ratio and Days of Sales in Receivables (DSR) for the new combined version of sales.

**Procedure**

For Task 1 – evaluation of the efficiency of introducing combined sales for both invoices and cash in the company:

a) Evaluate the impact of the company’s trade credit policy on the revenue increase in single months. Determine the total sales revenue, supposed cash sales and trade credit sale (sales revenues in receivables).

b) Calculate the state of receivables at the end of single months to provide information how to solve their financial cover.

For Task 2 – receivables managing – we need to calculate values of following items:

a) invoice sales for single quarters and for the year
b) receivables at the end of single quarters of the year
c) turnover ratio of receivables for quarters and for the year
d) turnover period of receivables (days of sales in receivables, DSR) in days for single quarters and for the year

Formulas:

\[
\text{Receivables turnover} = \frac{\text{sales revenues in receivables}}{\text{receivables}}
\]

\[
\text{Days of sales in receivables (DSR)} = \frac{\text{receivables}}{\text{average daily sales revenues in receivables}}
\]

**Solution:**

**Task 1:**

a) Based on the premises given above about the even increase of sales revenues in single months (in thousands EUR) of the next year (total in the new year = S₂) we will calculate :

   a. the sales revenues from the customers who will keep paying cash thanks to the promotion (S_C)

   b. the amount of sales revenues from customers who will take goods for invoices, i.e. they will receive a trade credit (S_TC).
### SALES IN BETA, PLC (THOUSANDS EUR)

<table>
<thead>
<tr>
<th>Month</th>
<th>Original sales (2007) $S_1$</th>
<th>Sales increase ratio</th>
<th>Supposed new sales (2008) $S_2$</th>
<th>Sales for cash* $S_C$</th>
<th>Sales for trade credit $S_{TC}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>1,800</td>
<td>1.5</td>
<td>2,700</td>
<td>2,160</td>
<td>540</td>
</tr>
<tr>
<td>February</td>
<td>2,200</td>
<td>1.5</td>
<td>3,300</td>
<td>2,640</td>
<td>660</td>
</tr>
<tr>
<td>March</td>
<td>2,500</td>
<td>1.5</td>
<td>3,750</td>
<td>3,000</td>
<td>750</td>
</tr>
<tr>
<td>1st quarter</td>
<td>6,500</td>
<td>1.5</td>
<td>9,750</td>
<td>7,800</td>
<td>1,950</td>
</tr>
<tr>
<td>April</td>
<td>2,500</td>
<td>1.5</td>
<td>3,750</td>
<td>3,000</td>
<td>750</td>
</tr>
<tr>
<td>May</td>
<td>2,700</td>
<td>1.5</td>
<td>4,050</td>
<td>3,240</td>
<td>810</td>
</tr>
<tr>
<td>June</td>
<td>2,600</td>
<td>1.5</td>
<td>3,900</td>
<td>3,120</td>
<td>780</td>
</tr>
<tr>
<td>2nd quarter</td>
<td>7,800</td>
<td>1.5</td>
<td>11,700</td>
<td>9,360</td>
<td>2,340</td>
</tr>
<tr>
<td>July</td>
<td>3,000</td>
<td>1.5</td>
<td>4,500</td>
<td>3,600</td>
<td>900</td>
</tr>
<tr>
<td>August</td>
<td>3,100</td>
<td>1.5</td>
<td>4,650</td>
<td>3,720</td>
<td>930</td>
</tr>
<tr>
<td>September</td>
<td>2,800</td>
<td>1.5</td>
<td>4,200</td>
<td>3,360</td>
<td>840</td>
</tr>
<tr>
<td>3rd quarter</td>
<td>8,900</td>
<td>1.5</td>
<td>13,350</td>
<td>10,680</td>
<td>2,670</td>
</tr>
<tr>
<td>October</td>
<td>2,000</td>
<td>1.5</td>
<td>3,000</td>
<td>2,400</td>
<td>600</td>
</tr>
<tr>
<td>November</td>
<td>1,900</td>
<td>1.5</td>
<td>2,850</td>
<td>2,280</td>
<td>570</td>
</tr>
<tr>
<td>December</td>
<td>1,450</td>
<td>1.5</td>
<td>2,175</td>
<td>1,740</td>
<td>435</td>
</tr>
<tr>
<td>4th quarter</td>
<td>5,350</td>
<td>1.5</td>
<td>8,025</td>
<td>6,420</td>
<td>1,605</td>
</tr>
<tr>
<td>Year</td>
<td><strong>28,550</strong></td>
<td><strong>1.5</strong></td>
<td><strong>42,825</strong></td>
<td><strong>34,260</strong></td>
<td><strong>8,565</strong></td>
</tr>
</tbody>
</table>

*) cash sale = original cash sale + 40% for sale increase

b) One of the important factors of managing receivables is making estimations of the supposed state of receivables at the end of single months. Data about receivables gained this way are then further analysed. In our case, to get these estimations we have to start from premises that:

- production will be done gradually but on the last day of a month it will be invoiced as a whole (a receivable will rise) and delivered to customers. For clarity, let’s take a month as average 30 days
- according to the task, we will suppose that from the invoice sales 80% sales revenue will be paid in the first month after the delivery, i.e. in the stated 30 days, and 20% after the period of stated maturity in the second month after the delivery, i.e. in 60 days (that means that no uncollectible receivables/bad debts will rise).

If we start from these premises we can make estimations of receivables in single months. These values are then following:
Since receivables are a state value, not a flow one like sales revenue, the sum of single states of monthly receivables will not provide the amount of receivables at the end of a period.

If we suppose a statistically normal division, the representative of this year’s receivables will be an arithmetic average of single states of receivables in months. The result then represents \((540+768+882+900+942+1,056+1,110+1,026+768+690+549):12 = 849.2\)

The above mentioned list of receivables at the end of single months then provides company managers with an instruction how to solve their financial coverage in single months.

**Task 2:**

When we manage receivables we both evaluate the estimated state at the end of single months and also compare the indices of their turnover ratio and turnover period in days. Thus obtained data are then necessary to be further analyzed.

**INDICES OF RECEIVABLES (IN THOUSANDS OF EUR, A YEAR = 360 DAYS)**

<table>
<thead>
<tr>
<th>INDEX</th>
<th>1(^{\text{st}}) quarter</th>
<th>2(^{\text{nd}}) quarter</th>
<th>3(^{\text{rd}}) quarter</th>
<th>4(^{\text{th}}) quarter</th>
<th>year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales revenues in receivables</td>
<td>1,950</td>
<td>2,340</td>
<td>2,670</td>
<td>1,605</td>
<td>8,565</td>
</tr>
<tr>
<td>Average receivables</td>
<td>730</td>
<td>934</td>
<td>1,064</td>
<td>669</td>
<td>849.25</td>
</tr>
<tr>
<td>Receivables turnover ratio</td>
<td>2.67</td>
<td>2.51</td>
<td>2.51</td>
<td>2.40</td>
<td>10.09</td>
</tr>
<tr>
<td>Daily sales</td>
<td>21.66</td>
<td>26</td>
<td>29.66</td>
<td>17.83</td>
<td>23.79</td>
</tr>
<tr>
<td>Days of sales in receivables (days)</td>
<td>33.70</td>
<td>35.92</td>
<td>35.87</td>
<td>37.52</td>
<td>35.70</td>
</tr>
</tbody>
</table>

We can see that in year indices the receivable turnover period is 35.70 days – it corresponds to the average delay of invoice payments as part of customers do not pay in
the stated 30-day period. The year turnover ratio corresponds with the fact that in the given year money will return about ten times. Amounts unpaid in time will be missing in current finance and the company will have to solve it either by taking a bank loan or by applying penalties and sanctions to delinquent customers or by extending the due date of its accepted invoices.

### 4.4 Key Terms of the Theme

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>to sell contract</strong></td>
<td><strong>receivable turnover</strong></td>
</tr>
<tr>
<td><strong>to supply contract</strong></td>
<td><strong>sales revenues</strong></td>
</tr>
<tr>
<td><strong>to postpone due date</strong></td>
<td><strong>days of sales in receivables (DSR)</strong></td>
</tr>
<tr>
<td><strong>to deliver goods</strong></td>
<td><strong>state of receivables</strong></td>
</tr>
<tr>
<td><strong>to draw commercial invoice</strong></td>
<td><strong>monitoring/collecting receivables</strong></td>
</tr>
<tr>
<td><strong>terms of contract</strong></td>
<td><strong>cession</strong></td>
</tr>
<tr>
<td><strong>trade credit sale</strong></td>
<td><strong>selling receivables</strong></td>
</tr>
<tr>
<td><strong>cash sale</strong></td>
<td><strong>receivables per curiam exaction</strong></td>
</tr>
<tr>
<td><strong>receivables</strong></td>
<td><strong>payment of invoices</strong></td>
</tr>
<tr>
<td><strong>due date of receivables</strong></td>
<td><strong>payment in advance</strong></td>
</tr>
<tr>
<td><strong>receivables before maturity</strong></td>
<td><strong>mode of payment</strong></td>
</tr>
<tr>
<td><strong>overdue (receivables after maturity)</strong></td>
<td><strong>receivable turnover</strong></td>
</tr>
<tr>
<td><strong>bad debts (uncollectible receivables)</strong></td>
<td><strong>receivables per curiam exaction</strong></td>
</tr>
</tbody>
</table>
5 Short-term Financing

5.1 Sources of Short-term Financing
In case of short-term financing or current or operational financing we talk about financing the current assets of the company. In the Anglo-Saxon conception we talk about the financial management of working capital. Since according to the financing rules, the fixed assets (long-term property) should be financed by long-term capital, i.e. basic capital, next by retained earnings and long-term debts, it then arises from the balance sheet that current assets are fully financed from short-term sources and also from part of long-term sources.

Partial financing or current assets from long-term sources corresponds to the situation when part of receivables is not covered in a short-term horizon (debts not covered for a long time or uncollectible claims – bad debts) and also part of reserves is present or permanently fixed in the company for a long time. However in light of financing rules, financing current assets from short-term sources should prevail, because keeping a large amount of long-term reserves and fixing financial assets in bad debts undermines the financial position of the company.

The main sources of short-term financing by external capital are especially trade payables (the so called customers credit), short-term payables to employees from wages and salaries with delayed payment of wages and further delayed payments of short-term payables (taxes) and sources from temporary accounts of liabilities (accruals). From bank sources of external capital, there are various types of short-term loans aimed at financing receivables. The bill is an important source of short-term financing. In case of its sale, bill discounting, a bank provides a company with a discount credit.

5.2 The Bill Terms
In a functional market economy a trade credit is an important means of companies’ sales support and short-term financing. In a competitive market, terms of delivery and payment are significant factors in decision making of potential customers. It depends onto business partners whether the price of goods includes a certain interest expressing higher costs and risks of the supplier. The supplier has delivered the goods, has expended certain material, wage and other costs, pays interest from a loan; he is in debt and does not cover these costs from immediate cash sales. That is why different entrepreneurs can afford different setting of trade credit terms. On the other hand competitiveness on the market makes entrepreneurs provide their customers with delivery and payment benefits. The tool that enables to solve these problems is a bill of exchange.

The bill of exchange is a security implying bill obligatory written down in a specified form and giving its owner an indisputable right to require on the due date a payment of the sum of money presented on the bill (amount of a bill) that may also include an appropriate interest (bill discount).

The bill of exchange probably originated in Lombardy in the north of Italy in the Middle Ages. In Lombard towns, merchants from various countries gathered and they brought various coins that were exchanged by Lombard bankers. The original role of the bill has been expanded and now the bill of exchange has more functions.

The bill of exchange has stayed a means of payment, i.e. a debtor pays to their creditor
Financial Management

(payee) by negotiating their rights of the bill on them by an endorsement. But a bill of exchange cannot be forced to anyone; it is not a currency that everybody is obliged to receive.

The bill of exchange can also be a means of warranty because as a security it can be put in pledge to a creditor including the so called blank bill where the due amount is filled in by the creditor.

The bill of exchange is also a good means to receive a bank credit, either a discount credit or an acceptance credit.

The bill of exchange can also be traded by companies specializing in receivables surrender (factoring or forfeiting companies).

Some commercial banks offer acceptance of bills as a further service to exporters, they are called acceptance houses.

The Bill Types

After articles of the Bills of Exchange Act we distinguish:

- bills after date (payable on presentation after drawing with fixed due date)
- sight bills or drafts at sight (payable at sight/on demand)
- bills after sight or time drafts (payable e.g. 2 days after drawing or after presentation)

We know some types of bills:

a) promissory notes, where 2 persons participate (drawer which is payer, and payee) and the unconditional bill order says: „I will pay“

b) true bills of exchange, where 3 persons participate (drawer, drawee as bill creditor, and payee) and the unconditional bill order says: „Pay on order“ of the 3rd person. With a bill of exchange, where only 2 persons participate, the unconditional bill order says: „Pay on my own order“.

The drawer, before negotiating or before handing a bill of exchange to the payee, sends it to the drawee for acceptance. The drawee accepts by writing his name across the face on the bill. The drawer or following holder has to wait until the bill matures. The holder (payee) presents the bill for payment when it is due.

The notations of the bill:

- unconditional order to pay
- name and address of drawee and drawer
- due date and place (domicile), and issue date and place
- drawer and drawee signature, guarantor (aval) signature.
- protest of a bill of exchange as the right to raise objections against a bill

5.3 Discount Credit

The basis of discounting of bills is that before its maturity, a bill of exchange is sold (endorsed) to a special buyer – a discounting house (endorsee), which will pay a sum of money called discount credit for the bill to the holder of the bill (endorser). For discounting, bills must contain formal terms, must be valid and indisputable and they must be trade bills, not finance bills. The amount of a discount credit, decreased by an interest (bill discount) collected in advance, is granted after a verification of financial position of
both participants of the bill trade. The bill is negotiated to a bank by endorsement and saved in a vault. Expenditures of a discount credit are created by:

- paying of interest from the amount of the bill (bill discount), which is one of the lowest short-term interest rates of banks
- discount commission (percentage of the sum on the bill) for dealing the credit
- bank charges for keeping a credit account

When due, the bill is presented for payment to the drawee (acceptor) by the discounting bank. If the drawee is not cashable the bank requires paying the credit back by the bill drawer (endorser, it does not hold for promissory notes).

5.4 Practical Example

Calculation of the amount of a discount credit after the deduction of the bill discount and the total expenditures for the receiver of the discount credit.

Problem

On 2 September 2006, EPSILON Company, a partnership, discounted to a bank a bill of exchange which it had received from its supplier for a goods supply instead of a cash payment. The amount stated on the bill is 150,000 CZK. The maturity date of the fixed bill is 22 December 2006. The bank set a discount interest rate of 6% p.a. The bank uses a year interest period of 360 days.

Task

1/ What was the amount of the discount credit that the discounting bank provided to its client, EPSILON company?
2/ What were the total expenses of the company on the discount of the bill, if the discount commission is 1.2% and the bank charges 250 CZK per month for keeping a credit account?

Procedure

1/ We will calculate the amount of the bill discount \( bd \) from the stated bill amount \( BA \), discount rate in % p.a. \( r_d \) and the lifetime of the discount credit \( t_{DC} \) from the formula. The year interest period was set by the bank as standard 360/360 days, so a month has 30 interest days.

\[
bd = BA \times \frac{r_d \times t_{DC}}{100 \times 360}
\]

As a discounting bank does not pay to its client the sum which they should have received for the goods supply (the amount of the bill), but it deducts its profit in the form of interest deduction – bill discount, we have to deduct this sum from the amount of the bill. Thus we will get the amount of the discount credit \( DC \) that the bank provides.

\[
DC = BA - bd
\]

2/ The total expenditures on the discount of the bill then equal to the sum of the bill discount, paid discount commission and the payment for charges for keeping the credit account – these are paid according to a tariff for every started month.
Solution

1/ Calculation of the amount of discount credit

bill discount: \[ \text{bd} = 150,000 \times \frac{6}{100} \times \frac{110}{360} = 2,750 \text{ (CZK).} \]

amount of discount credit: \[ \text{DC} = 150,000 - 2,750 = 147,250 \text{ (CZK)} \]

2/ The total expenditures of the company on the discount of the bill

The total expenditures of the discount credit = bill discount + discount commission +
charges for keeping a credit account = 2,750 + 1.2/100 x 150,000 + 3 x 250 = 5,300
(CZK).

5.5 Key terms of the Theme

<table>
<thead>
<tr>
<th>o short-term sources</th>
<th>o drawer</th>
</tr>
</thead>
<tbody>
<tr>
<td>o trade payables</td>
<td>o drawee</td>
</tr>
<tr>
<td>o customers credit</td>
<td>o payee</td>
</tr>
<tr>
<td>o payables to employees</td>
<td>o payer</td>
</tr>
<tr>
<td>o to accept a bill</td>
<td>o bill guarantor/aval</td>
</tr>
<tr>
<td>o to draw bills</td>
<td>o acceptance of the bill</td>
</tr>
<tr>
<td>o to be due on</td>
<td>o bill protest</td>
</tr>
<tr>
<td>o to negotiate a bill</td>
<td>o presentation of the bill</td>
</tr>
<tr>
<td>o bills after date</td>
<td>o negotiation of the bill</td>
</tr>
<tr>
<td>o sight bills/drafts at sight</td>
<td>o bill endorsement</td>
</tr>
<tr>
<td>o bills after sight/ time drafts</td>
<td>o endorser</td>
</tr>
<tr>
<td>o promissory notes</td>
<td>o endorsee</td>
</tr>
<tr>
<td>o bills of exchange</td>
<td>o discount credit</td>
</tr>
<tr>
<td>o trade bill</td>
<td>o bill discount</td>
</tr>
<tr>
<td>o due date</td>
<td>o discounting house/bank</td>
</tr>
<tr>
<td>o holder</td>
<td>o acceptance house/bank</td>
</tr>
</tbody>
</table>
6 Bank Loans

6.1 Bank Loan – A Source of Financing

When lacking financial sources, every entrepreneur is forced to solve the problem how to gain the necessary finance and which way of obtaining it is more appropriate for them. One of the most often used methods of solving these problems is using bank loans (credits). Bank loans are products of financial institutions (banks) providing the business sector, public sector (regions, municipalities) or household with money for a set price. This price of the loan is interest, which in principle is set as an annual per cent rate (per annum, shortly p.a.) in respectable financial institutions. The basic principle of providing bank loans is ensuring a return in the agreed payback period and banks usually require a guarantee of the loan.

Credit transactions are classified by banks into short-term loans (payback period up to 1 year), medium-term loans (payback period 1 to 4 years) and long-term loans (payback period over 4 years, up to about 30 years with mortgage credits).

Short-term loans are used for financing short-term needs of entrepreneurs – i.e. current assets, operational costs.

Medium-term and long-term loans are used for financing business or municipal investments, sometimes they are a combination of financing investments and operational costs related to these investments. Mortgage loans are a special type of long-term loans and they are used for financing real estate. Their source is issuing special bonds – mortgage bonds.

According to the type of drawing and paying back we distinguish classical loans drawn and paid back gradually, revolving credits and bank overdrafts.

With “classical” loans, after the drawing phase we pay off gradually or by a single payment until a zero balance (cipher-proof) – here the interest is calculated always from the current balance of a loan.

With revolving credits, a limit of credit is set on the credit account of the entrepreneur and both limit of credit and the due date are dealt in a loan agreement. From concluding a loan contract till maturity date the client can draw the credit repeatedly within the limit, e.g. when they need to buy goods and to pay back when they sell the goods.

The bank overdraft is based on the same principle as the revolving, but the limit of the credit is set as a debit of a company’s current account. If the limit is overdrawn, the client pays penalty interest rate (commonly 25% p.a.).

Loans are granted by financial institutions after a client presents an application form. Before deciding about providing the loan, financial institutions consider above all the client’s financial position, feasibility of their business plans, and they require securing the loan with real estate (pledge), backing it by a third person (surety for a person), by a bank guarantee etc. Then the bank identifies credit risk – they make a financial analysis of the economical situation of the company, find out the quality of guarantee and assessment of creditworthiness of the client, usually with the help of rating. If the result of financial position evaluation is positive, the bank provides the client with a loan under the terms set in a credit contract.
Drawing and Paying off a Loan

By a loan we understand providing a financial amount for a given period at a price – an interest. A loan can be drawn in a single draft or gradually, especially with investments up to about 2 years, then the investment is necessarily less efficient. A loan can be paid off gradually again (exceptionally by a single payment) either regularly (every month or quarter) or irregularly (e.g. seasonal paying off by farmers after a harvest from September to February). An interest can be paid on due interest dates (every month or quarter) from the current loan balance, together with or apart from instalment (see below – interest bearing from the outstanding balance). With mortgage or consumer loans, it can be paid within so called annuity amortization.

6.2 The Loan Interest

Loan Interest Bearing from the Outstanding Balance

If a loan bears interest from its outstanding balance, the interest is calculated from the current balance of a so called loan principal. Beside the loan principal, i.e. the originally borrowed amount, we also distinguish so called loan accessories – interests, fees, penalty interest and penalty.

As a client usually pays off a debt gradually, the debt principal is decreasing, so the basis for interest calculation is changing, because there is a principle that a client pays only from what they currently owe. Another parameter for the interest calculation is a set interest rate that can be fixed or flexible, which of course also changes the amount of the interest. The last parameter is the period of interest bearing. In practice, a bank calculates interest every day, because every day the current principal balance can change (a client may pay off extraordinarily) as well as the interest rate height (influenced by changes on the financial market, changes in the bank’s business policy etc.). This way the interest is being cumulated day after day and usually at the end of a month or quarter (on the ultimate day) it is charged to the client. For the calculation of interest from the outstanding balance we use the formula:

\[
I = \sum_{j=1}^{n} \frac{BP_j \times r_i \times t_j}{360} \times \frac{100}{100}
\]

where:
- \(BP\) = current balance of the loan principal
- \(r_i\) = interest rate in % p.a.
- \(t\) = length of interest period, it is time in days when the balance of the principal or the interest rate does not change
- \(n\) = number of interest periods

Annual interest bearing period (method of bearing interest) is set by the bank either as a current year of 365 days or as the economic year of 360 days (more often). This type of interest running (bearing) is used for all forms of business and municipal loans (including revolving or overdraft).

Annuity Interest Bearing of a Loan

In case of annuity amortization the repayment of a loan is done by constant amounts (annuities), identical for the whole period of repayment. Part of the annuity payment goes
to paying off the original debt (redemption), the other part pays for the interest. Every instalment thus consists of two parts:

- redemption of the loan principal (this part decreases the due amount gradually, it increases itself).
- interest from the debt (this part always pays off interest from the outstanding balance, so it decreases gradually). The bank makes up a payment schedule for the client to show an overview of the amounts of instalments including interest and their due dates.

6.3 Practical Example

Convenience of a loan is given by total expenditures of a debt settlement. That is a sum of payments of the principal, interest, fees, and eventually also penalty interest and penalty for not complying with the conditions of the loan. In the following example we will construct the schedule only with considering calculation of instalments, fees and interest from the loan. After such a calculation of debt expenditures, an entrepreneur makes a comparison with another loan (another alternative from the same bank, a loan from a different bank).

Problem

On 1 January 2003, the company DELTA Ltd. got a medium-term loan for operational and investment needs in the amount of 1,200,000 CZK from a bank. The payback period of the loan is 3 years; the payment schedule is set for quarterly instalments from March 2003 in the amount of 100,000 CZK. It is the classical form of a loan and interest bearing from the balance. The method of interest bearing is set for the period of 360 days out of a calendar year (360/360).

The instalments will be made on the last day of a quarter (ultimate day), the final instalment on 31 December 2005.

The interest rate is 12% p.a., interest will also be paid every quarter on the last day of the quarter.

The client pays a fee for the loan negotiation in the amount of 1.0% from the principal; fees for keeping a credit account are 300 CZK a month.

Task

Calculate the total costs (debt expenditures) of this medium-term bank loan for the client.

Procedure

1. We make a payment schedule of the loan
2. Gradually we calculate interest for single periods of interest bearing of the balance according to the formula. Based on the set annual interest bearing period, we take every month as 30 days.
3. We calculate the amount of the commission for the loan negotiation as a percentage from the loan principle.
4. We calculate the sum of fees for keeping a credit account when the monthly fee is 300 CZK and the period of the loan repayment is 12*3 = 36 months.
5. We calculate the debt expenditures, i.e. costs of financing, as a sum of its single items – instalments, interest, commission and fees for keeping the credit account.
The real amount of the debt expenditures can then differ by penalty interest for delayed repayment of the principal and interest or a penalty for not meeting other conditions of the contract (e.g. submitting economical statements, documenting a record of a real estate lien etc.).

**Solution**

1) Making an instalment plan and 2) calculating interest for all interest bearing periods (in thousands CZK).

\[
I = \sum_{j=1}^{n} BP_j \ast \frac{r_j}{100} \ast \frac{t_j}{360}
\]

where \( j = 1 \ldots n \), (the sequence of periods of interest bearing of single loan balances from January 2003 to December 2005)

**PAYMENT SCHEDULE**

<table>
<thead>
<tr>
<th>Period of interest bearing</th>
<th>Interest bearing period ((t_j)) (in days)</th>
<th>Instalment* (thousands CZK)</th>
<th>Balance of principal in period (BP(_j)) (thousands CZK)</th>
<th>Interest rate ((r_j))</th>
<th>Interest (I) (thousands CZK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3/2002</td>
<td>90</td>
<td>100</td>
<td>1,200</td>
<td>12%</td>
<td>36</td>
</tr>
<tr>
<td>4-6/2002</td>
<td>90</td>
<td>100</td>
<td>1,100</td>
<td>12%</td>
<td>33</td>
</tr>
<tr>
<td>7-9/2002</td>
<td>90</td>
<td>100</td>
<td>1,000</td>
<td>12%</td>
<td>30</td>
</tr>
<tr>
<td>10-12/2002</td>
<td>90</td>
<td>100</td>
<td>900</td>
<td>12%</td>
<td>27</td>
</tr>
<tr>
<td>1-3/2003</td>
<td>90</td>
<td>100</td>
<td>800</td>
<td>12%</td>
<td>24</td>
</tr>
<tr>
<td>4-6/2003</td>
<td>90</td>
<td>100</td>
<td>700</td>
<td>12%</td>
<td>21</td>
</tr>
<tr>
<td>7-9/2003</td>
<td>90</td>
<td>100</td>
<td>600</td>
<td>12%</td>
<td>18</td>
</tr>
<tr>
<td>10-12/2003</td>
<td>90</td>
<td>100</td>
<td>500</td>
<td>12%</td>
<td>15</td>
</tr>
<tr>
<td>1-3/2004</td>
<td>90</td>
<td>100</td>
<td>400</td>
<td>12%</td>
<td>12</td>
</tr>
<tr>
<td>4-6/2004</td>
<td>90</td>
<td>100</td>
<td>300</td>
<td>12%</td>
<td>9</td>
</tr>
<tr>
<td>7-9/2004</td>
<td>90</td>
<td>100</td>
<td>200</td>
<td>12%</td>
<td>6</td>
</tr>
<tr>
<td>10-12/2004</td>
<td>90</td>
<td>100</td>
<td>100</td>
<td>12%</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>1,200</td>
<td>234</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* paying off the ultimate date of the quarter

3) Commission (charges) calculation

Commission = 1,200 * 1.0 (%) / 100 = 1,200 * 0.01 = 12 (thous. CZK)

4) Calculation of fees for loan keeping

Fees for keeping a credit account = 300 CZK/month * 36 months = 10.8 (thous. CZK)

5) Debt expenditures

Debt expenditures = sum of instalments + interest + commission + fees for loan keeping =

\[
= 1,200 + 234 + 12 + 10.8 = 1,456.8 \text{ (thous. CZK)}
\]
### 6.4 Key Terms of the Theme

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>to borrow</strong> money from bank</td>
<td>debt principal</td>
</tr>
<tr>
<td><strong>to lend</strong> money to somebody</td>
<td>annual interest rate (p.a.)</td>
</tr>
<tr>
<td><strong>to repay</strong> within a year</td>
<td>annuity amortization</td>
</tr>
<tr>
<td><strong>to present</strong> an application form</td>
<td>interest period</td>
</tr>
<tr>
<td><strong>to be in</strong> debt</td>
<td>redemption of principal</td>
</tr>
<tr>
<td><strong>to raise</strong> a money</td>
<td>interest period</td>
</tr>
<tr>
<td><strong>to provide</strong> / <strong>to grant</strong> a loan</td>
<td>paid interest</td>
</tr>
<tr>
<td><strong>business plan/prospect</strong></td>
<td>fixed or flexible interest rate</td>
</tr>
<tr>
<td><strong>short-term, medium-term and long-term loan</strong></td>
<td>interest from the outstanding balance</td>
</tr>
<tr>
<td><strong>quality of guarantee</strong></td>
<td>repayment of a loan</td>
</tr>
<tr>
<td><strong>assessment of creditworthiness</strong></td>
<td>loan contract</td>
</tr>
<tr>
<td><strong>to borrow</strong> money from bank</td>
<td>financial position</td>
</tr>
<tr>
<td><strong>to lend</strong> money to somebody</td>
<td>current account</td>
</tr>
<tr>
<td><strong>to conclude</strong> a contract</td>
<td>lien</td>
</tr>
<tr>
<td><strong>operational-investment loan</strong></td>
<td>bank guarantee</td>
</tr>
<tr>
<td><strong>bank overdraft</strong></td>
<td>securing the loan</td>
</tr>
<tr>
<td><strong>revolving loan</strong></td>
<td>pledge</td>
</tr>
<tr>
<td><strong>mortgage loan</strong></td>
<td>guarantor</td>
</tr>
<tr>
<td><strong>municipal loan</strong></td>
<td>loan fees and commission (charges)</td>
</tr>
</tbody>
</table>
7 Leasing, Factoring, Forfeiting

7.1 Leasing and its Comparison with Credit

Leasing (lease) is a special form of financial business that makes it possible to get tangible assets without investing sources of finance at once. The matter of leasing is a lease of the means of production or product from the lessor for a certain period for a gradual remittance in the form of regular lease payments. Leasing is carried out either by producers themselves or by specialized private companies or commercial banks through their subsidiary leasing companies. In principle, we distinguish operational and financial leasing. The contract is called a leasing agreement and it contains a payment schedule and general terms of the agreement.

Operational leasing represents a lease of a thing for a period shorter than its lifetime and its period of depreciation. After the expiration of the lease the thing remains in the ownership of the leasing company. At present leasing companies offer catalogued lists to provide this service.

Financial leasing represents a long-term lease of a thing with a consequent sale for a bargain price – the used thing thus becomes a property of the lessee. If the lessee is a legal person (e.g. company), they may use tax allowance (tax shield) as amended by legislative on corporate tax. The lessee can purchase the asset for a bargain price when the leases expire. On the other hand we have to know that payments for the lease of tangible assets exceed the purchase price, increase costs and reduce the profits of a company. For this reason we have to evaluate the convenience of a leasing e.g. in comparison with a loan that would enable the company to buy the property directly.

A loan indeed enables a company to obtain a thing and become its owner at once, which is advantageous e.g. from the point of view of depreciation, but is also brings costs as interest (see the previous example). Time value of money also plays a role when comparing both the forms of financing tangible assets.

The evaluation of the convenience of leasing in comparison with a loan can be done with a view to three aspects:

1. so called debt expenditures of both options is the criterion of decision-making (lease payments versus instalments of the principal of a loan, interest, and fees)
2. focus on tax economies is the criterion (interest as a cost of a loan versus possibility to apply lease payments as tax deductible cost, “tax shield”)
3. focus on influence of time value (discounting cash-flows) of money in a long term is the criterion (influence of regular or irregular instalments of a loan versus the influence of advance payment and usual monthly instalments of leasing).

Other influences are difficult to express in number in advance but a company deciding about one of these forms of financing assets has to consider them.

With leasing, there are especially possibilities of taking the thing away in case of not paying instalments, the necessity to pay expensive guarantee inspections, impossibility to dispose of the thing and modify it without the lessor’s approval, loss of the benefit of tax depreciations after the period of lease (the thing is totally or almost totally depreciated by the lessor) and a transfer of part of the owner’s risks to the lessee - in case of a theft or damage of the thing the necessity to charge lease payments; if an insurance company does
not grant a full compensation, it burdens the lessee who in addition needs an equivalent replacement.

With a loan, we have to consider increased costs and risks issuing from the loan guarantee, the possibility of a change of interest amount and penalty interest and penalty height in case of problems with repayment and meeting the loan conditions and more difficulties during obtaining the loan.

7.2 Factoring and Forfeiting

Collecting payments from customers is the final step in financial management of the company. When a customer falls behind with settlements the usual procedure is to watch our company’s statement of account and send at intervals demands for payment or repeat telephone calls. If it does not help, most companies pass the debt to a collection company or a lawyer. Many firms may be able to obtain part of the money back by selling the receivable (usually with due date up to 90 days) to a specialist, factoring company (factor). Factoring typically works as follows: the factor and the client agree on credit limits for each customer and on the average collection period. The client (our firm) lets each customer know that the factor has bought the receivable. Then, for any sale, the client sends a copy of the invoice to the factoring company, and the factoring company pays the client on the basis of the agreed average collection period regardless of whether the customer has paid. The customer must pay directly to the factor. There are costs to such an operation, and the factoring company usually charges a commission of 1 to 2 percent of the value of the invoice. We distinguish factoring without regress and regressive factoring, confidential factoring, hidden factoring, and revolving factoring.

Forfeiting is purchase of long-term receivables (up to 10 years maximally) before their due date without any regress. Its subject is contracts or invoices for long-term supplies of goods, equipment and investment units. Forfeiting company claims securing for this business like long-term bills with bank bail or state guarantee.

7.3 Practical Example

Problem

The company ZETA Ltd. needs a delivery van with special equipment with a purchase price 1,200,000 CZK and a lifetime of 3 years. It needs the car on 1 January 2002. It has two options:

- to get a loan with quarterly instalments on the last day of a quarter
- to get a leasing with monthly lease payments on the last day of a month, when:
  - the period of the lease is 3 years
  - the first payment of the initial price in advance (advance payment) is 30% from the price of the car, the rest is paid off in even monthly payments
  - annual insurance of the car in the amount of 18,000 CZK is paid separately in lease payment from January 2002
  - monthly amount of the financial increase is 2,000 CZK, paid from January 2002.
**Task**
Find out the amount of monthly lease payment and leasing rate (do not consider VAT). Compare this leasing form of financing assets in single years with the case when the car is bought on a loan under the conditions of the example of a loan solved in chapter 6. Find out which option is more advantageous.

**Procedure**
1) From the set data we make a leasing payment schedule and from its sum items we calculate the monthly amounts of leasing instalment.

\[
\text{Lease payment (monthly) = repayment of the initial price of the car + financial leasing increase + costs of additional services (insurance, maintenance)}
\]

If we add up monthly lease payments (in the first year including the advanced payment) we will get the annual debt expenditures for the case of leasing.

\[
\text{Leasing rate = sum of leasing payments / the initial price of property}
\]

2) We make a sheet for comparing the debt expenditures in cases of leasing and a loan in single years of financing and in the sum we can see cash differences at financing the car in single years.

**Solution**
1) Comparison an annual leasing payment schedule (in thousands CZK)

**YEAR 2002**

<table>
<thead>
<tr>
<th>Month</th>
<th>Initial price payment</th>
<th>Financial increase</th>
<th>Insurance</th>
<th>Lease payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2002</td>
<td>360 360 (30% initial payment)</td>
<td>2</td>
<td>1.5</td>
<td>360</td>
</tr>
<tr>
<td>2/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>3/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>4/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>5/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>6/002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>7/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>8/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>9/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>10/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>11/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>12/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>624</td>
<td>22</td>
<td>18</td>
<td>662.5</td>
</tr>
</tbody>
</table>
### YEAR 2003 (and the same for 2004)

<table>
<thead>
<tr>
<th>Month</th>
<th>Initial price payment</th>
<th>Financial increase</th>
<th>Insurance</th>
<th>Lease payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>2/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>3/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>4/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>5/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>6/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>7/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>8/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>9/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>10/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>11/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>12/2002</td>
<td>24</td>
<td>2</td>
<td>1.5</td>
<td>27.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>288</td>
<td>24</td>
<td>18</td>
<td>330</td>
</tr>
<tr>
<td>TOTAL LEASING</td>
<td>1,200</td>
<td>72</td>
<td>54</td>
<td>1,326</td>
</tr>
</tbody>
</table>

#### lease rate

1,105

2) Debt expenditures loan/leasing (in thousands CZK)

<table>
<thead>
<tr>
<th>Year</th>
<th>Loan instalment</th>
<th>Loan interest</th>
<th>Loan fees</th>
<th>Loan debt expendit.</th>
<th>Leasing debt expendit.</th>
<th>Loan-Leasing difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>400</td>
<td>126</td>
<td>15.6</td>
<td>541.6</td>
<td>666.0</td>
<td>-124.4</td>
</tr>
<tr>
<td>2003</td>
<td>400</td>
<td>78</td>
<td>3.6</td>
<td>481.6</td>
<td>330.0</td>
<td>+151.6</td>
</tr>
<tr>
<td>2004</td>
<td>400</td>
<td>30</td>
<td>3.6</td>
<td>433.6</td>
<td>330.0</td>
<td>+103.6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,200</td>
<td>234</td>
<td>22.8</td>
<td>1,456.8</td>
<td>1,326</td>
<td>+130.8</td>
</tr>
</tbody>
</table>

### 7.4 Key Terms of the Theme

- **lessor**
- **the lessee (leaseholder)**
- **initial price**
- **financial increase**
- **operating/financial lease**
- **costs of additional services**
- **bargain price**
- **lease coefficient**
- **lease period**
- **advance payment**

- **lease contract**
- **lease payment schedule**
- **factor**
- **factoring without regress**
- **regressive factoring**
- **revolving factoring**
- **forfeiting**
- **state guarantee**
- **forfeiter**
- **bank bail/aval**
8 Long-term Financing

8.1 Stock Capital

Long-term financing serves for acquiring capital goods of a company – both tangible and intangible assets. An important source of long-term finance is company’s own capital. The original part of the company’s own capital (equity) is its basic capital, which can be created by both monetary and non-monetary deposits of partners of a company, by share subscription done by a joint-stock company or by paying down deposits of cooperative members. The equity of a corporation is referred to as stock and ownership of stock is represented by shares. Shares are widely used means of acquiring long-term capital and they claim a right of the share owner to manage the company through the annual general meeting or, as the case may be, through a participation in the board of directors of joint-stock company (am. incorporated company), and a right to obtain part of profit in the form of a dividends. Investors who own stock are referred to as shareholders.

Every corporation has common stock, and some corporation have another type of stock, preferred stock, as well.

Common stock is the most usual type of stock in a corporation; it represents the ownership of a stake in the company. Common shareholders may receive cash payments (dividends) from corporation. They may also receive a return on their investment in the form of increased value of their stock as the corporation prospers. Common stock is a perpetual security, it has no maturity. If the business is liquidated, the common shareholders can claim the rest of the business’ assets after all other claimants have been satisfied.

Preferred stock also represents ownership interest in a corporation and, like common stock, is a perpetual security. Nevertheless, preferred stock differs from common stock. Preferred shareholders are usually promised a fixed annual dividend, whereas common shareholders receive what the board of directors decide to allocate. To preferred shareholders, their dividends must be paid before any common dividends are paid. Also their claim on a liquidated corporation comes before that of common shareholders. However, preferred shareholders generally cannot influence corporate matters, whereas common shareholders have the right to vote for members of the board of directors and on major issues.

8.2 Dividend Valuation Model

When a corporation issues a share, the security has the stated (nominal, par) value presented on the share. If the price of an issued share is bigger than stated value we talk about issue value of share; the difference between issue value and stated value is additional paid capital called share premium account (agio).

When we buy a share of common stock on a capital market, it is reasonable to assume that the market price (different from nominal price or issue price) you pay reflects what you expect to receive from it in the form of a return on your investment. What you receive are cash dividends in the future. We suppose that market value of a share should be equal to the present value of all the future cash-flows you expect to receive from that share. If dividends are constant forever, the value of a share of stock is the present value of the dividends per period, in perpetuity.
A) The current (market) price of a share of common stock if we assume keeping the share for infinity equals the present value of the common stock which is also the present value of all future dividends:

\[
P_0 = \frac{D}{(1 + r_E)^1} + \frac{D}{(1 + r_E)^2} + \frac{D}{(1 + r_E)^3} + \ldots + \frac{D}{(1 + r_E)^\infty}
\]

where:
- \( D \) = constant amount of dividend per share of common stock
- \( r_E \) = required rate of return

The required rate of return is the return shareholders demand to compensate them for the time value of money tied up in their investment and the uncertainty of the future cash-flows from these investments. We can write it using summation notation:

\[
P_0 = \sum_{n=0}^{\infty} \frac{D}{(1 + r_E)^n} = \frac{D}{r_E}
\]

B) If dividends grow at a constant rate, the value of a share is the present value of a growing cash-flow. This equation is called the Dividend Valuation Model (DVM):

\[
P_0 = D_0 \times \frac{(1+g)^1}{(1+r_E)^1} + D_1 \times \frac{(1+g)^2}{(1+r_E)^2} + \ldots + D_0 \times \frac{(1+g)^n}{(1+r_E)^n} + \ldots + D_0 \times \frac{(1+g)^\infty}{(1+r_E)^\infty}
\]

using summation notation:

\[
P_0 = \sum_{n=1}^{\infty} D_0 \times \frac{(1+g)^n}{(1+r_E)^n} = D_0 \times \frac{1+g}{r_E-g} = \frac{D_1}{r_E-g}
\]

where:
- \( D_0 \) = this period’s dividend
- \( D_1 \) = next period’s dividend = \( D_0 \times (1 + g) \)
- \( g \) = constant growth in dividends

C) If we assume selling the share and so not keeping the share in infinity period and growth rate of market price of the share corresponds to growth rate of dividends, the current (market) price of a share of common stock for limited keeping is in shape:

\[
P_0 = D_0 \times \frac{(1+g)^1}{(1+r_E)^1} + D_0 \times \frac{(1+g)^2}{(1+r_E)^2} + \ldots + D_0 \times \frac{(1+g)^n}{(1+r_E)^n} + \ldots + \frac{P_n}{(1+r_E)^n}
\]

where:
- \( r_E \) = required rate of return
- \( D_0 \) = this period’s dividend
- \( g \) = constant growth in dividends
- \( P_n \) = expected sale market price of share in year “n”
8.3 Net Income Statement

Other sources of financing company’s assets are funds created from profit (reserves), undivided profit from previous years (retained earnings) and profit of the current period. By profit accumulation during their history, an entrepreneur obtains means of investment. This way they keep their position on the market in the competition of other entrepreneurs.

Net Income Statement (or Profit and Loss Statement) is conceived as a table where revenue items are recorded in rows and related expense items are further assigned to them. Then there is the resulting item expressing in a certain degree defined difference between revenues and expenses. These are trade margin, gross margin (in American English gross profit, in Czech environment added value), or profit in various stages. The resulting item of the whole statement is net profit (net income) or loss for a given accounting period. In single columns of the net income statement are shown topical and historically comparable records of revenues, expenses and resulting profit items in value expression (in thousands of EUR, CZK).

From the net income statement we can also estimate the nature of a company economy, what it deals with in business. In the first part of the statement there are the items related to business activity. In the second part of the statement there are revenue and expense items related to the production activities of the company. In the third part there is information related to the financial aspects of the company’s activities. The location of fundamental revenue and expense items in single parts of the statement is typical for a type of a company (trade company, agricultural company, a industrial company or service company or a company doing its business in financial sector).

The operating decisions of the company generate revenues (or sales) and include the cost of good sold. The difference between sales and cost of goods sold (or cost of products sold) is then gross profit. Operating decisions also result in administrative and general expenses, such as advertising fees and consumption of material and energy and wages & salaries. Deducting these expenses from gross profit leaves operating profit, which is also referred to as operating income or earnings before interest and tax (EBIT). The results of financing decisions are reflected in the rest of the net income statement. When interest (as cost of borrowed capital) and taxes, which are both influenced by financing decisions, are subtracted from EBIT, the result is net income. Net income is the amount available to the owners of the firm.

Next, for other purposes we distinguish other income items referred to as:
  o EBDIT (earnings before depreciation, interest and tax)
  o EBITDA (earnings before depreciation, amortisation, interest and tax)
  o EBT (earnings before tax)
  o EAT (earnings after tax)
  o NOPAT (net operational profit after tax)

8.4 Depreciation and Provisions

The next important form of financing fixed assets is tax depreciation. Depreciation is a product of fiscal policy of the state, which encourages business investments as a source of economical growth and consequently of further future tax incomes. Depreciation represents financial means that a company acquires by applying depreciation as a tax deductible cost that the company does not pay. By cumulating of these funds a company creates sources for funding assets or for repayment of bank investment loans.
Tax depreciation is a source of financing of the least simple reproduction of fixed assets. This is unpaid cost and the amount of depreciation is determined by state fiscal policy including determining of depreciation group, depreciation period and choice of depreciation types. Everything is defined in *Law of Corporate Tax*, where there is also a definition of depreciation base and rate (coefficient of depreciation). We distinguish time, linear and non-linear depreciations (digressive or progressive) and in the Czech Republic we use time, linear and digressive (accelerated) depreciation. We may depreciate up to 100%, so it holds: depreciations sum = market entry price of property. For depreciation calculation are defined formulas for both time depreciation and linear and accelerated depreciation or for depreciation by technical appreciation. Depreciation can be done by the owner or by a tenant for the period of rent of property.

Another form of long-term financing is *long-term provisions*. Their creation should compensate for repairs of fixed assets or financing hidden inner debts. Part of these provisions (e.g. provisions for repairs, silvicultural activities etc.) is also tax supported through the state fiscal policy.
8.5 Practical Example

Problem
In the capital market, apart from other stocks and shares, common stocks of the company LAMBDA Plc. are offered. We are investors who intend to put their capital to shares and we expect the capital gain from our investment in the amount of 20% at an acceptable investment risk. In the first year of the share holding, a dividend in the amount of 5 Euro is expected just like last year.

Task
Calculate how much you would be willing to pay for this share (purchase price of share):
1/ in case of infinity keeping of the share if we assume constant amount of dividend just like in the previous year 0.
2/ in case of infinity keeping of the share in our portfolio we already expect a constant growth of dividends by 15% a year.
3/ in case of limited keeping of the share and consequent speculative sale after 2 years. We assume that the expected appreciation of the market value of the share will reach 115 Euro and for the following years constant increase of the dividend will cause the same increase of the sale price of share.

Procedure
The considered purchase price of the share for infinity keeping equals the present value of share which is derived from the discount future yields from this investment - dividends.

For the calculation of task 1/ we will use the formula for infinity keeping of share and a stable height of dividend.

For the calculation of task 2/ we will use the formula for infinity keeping of share and a given constant growth of dividend.

For the calculation of task 3/ we will count the present value of the investment by discounting the future yields from share keeping after two years. The present value (purchase price of share) will thus be determined as the sum of discounted yields from the first year of share keeping, which is the dividend, and the discounted yields from the second year of share keeping, which is the increased dividend in the second year and the increased market price of the share in the second year. This sale price of share is influenced by the constant growth of dividends in a linear way. For the calculation we will use a formula for limited share keeping in the form:

\[
P_0 = \frac{D_0}{(1 + r_E)^1} + D_0 \cdot \frac{(1+g)^2}{(1 + r_E)^2} + D_1 \cdot \frac{(1+g)^n}{(1 + r_E)^n}
\]

- where \(P_1\) = the expected value of market price of the share in the 1st year

After substituting \(D_1 = D_0 \cdot g/(1 + r_E)^1\) it holds :

\[
P_0 = \frac{D_0}{(1 + r_E)^1} + D_0 \cdot \frac{(1+g)^2}{(1 + r_E)^2} + \frac{(1+g)^n}{(1 + r_E)^n}
\]

- where \(D_1\) = considered dividend in the first year of holding the share (derived from the dividend last year)
For the considered second year it holds again for the dividend yield and the growth of the market price of share:

\[ D_2 = D_1 \times (1 + g)^l \]
\[ P_2 = P_1 \times (1 + g)^l \]

which simplifies to basic formula:

\[ P_0 = \frac{D_1}{(1 + r_E)^1} + \frac{D_2}{(1 + r_E)^2} + \frac{P_2}{(1 + r_E)^l} \]

where the first term refers to the cash-flow from share holding in the first year and the second term of the formula refers to the cash-flow from share holding in the second year of the investment.

**Solution**

1/ infinity keeping of the share
\[ P_0 = 5 \times 0.20 = 25 \text{ EUR} \]

2/ infinity keeping of the share, dividends grow at constant rate
\[ P_0 = 5 \times (0.20 - 0.15) = 100 \text{ EUR} \]

3/ limited keeping of the share for 2 years
\[ P_0 = 5 \times (1.20)^1 + [5 \times (1+0.15)^1 + 115 \times (1+0.15)^1] / (1.20)^2 = 100 \text{ EUR} \]

### 8.6 Key Terms of the Theme

- stock capital
- share
- annual general meeting
- board of directors
- shareholders
- common stock
- preferred stock
- capital funds
- share premium account (agio)
- revenues
- costs of goods sold
- expenses
- depreciation
- provisions
- gross margin
- retained earnings
- profit
- loss
- net income
- EBT (earnings before tax)
- EAT (earnings after tax)
- EBIT (earnings before interest and tax)
- EBDIT (earnings before depreciation, interest and tax)
- required rate of return
- dividend yield
- capital yield
- price to earnings (P/E) ratio
- earnings per share (EPS)
- the current (market) price of share
- stated (par, nominal) value of share
9 Debt Financing

9.1 Long-term Debt Securities

Beside the forms of debt funding of fixed assets mentioned in previous chapters (bank loans, leasing, forfeiting, stock capital, depreciation), bond emissions are an important way of acquiring long-term financial sources. Unlike shares, bonds do not create a right to company assets and decision-making, but only claim to yields and repayment of the amount spent for the purchase of the nominal value of this security in maturity date – maturity value. Some bonds also can be emitted so that their owner has the right to exchange them for equity shares of the company.

Long-term debt securities, such as notes, debentures or bonds, are promises by the borrower to repay the principal amount. Bonds typically require the borrower to pay interest periodically, annually in Europe and mostly semi-annually in the United States, and are generally stated as a percentage of the face value of the bond. We refer to interest payment as coupon payments or coupons and the percentage rate as the coupon rate. If these coupons are a constant amount, paid at regular intervals, we refer to the security paying them as having a straight coupon. These long-term debt securities are called as straight bonds.

The value of a debt security today is the present value of the promised future cash-flow consisting of the coupon interest and the maturity face value – i.e. discounted value of all future interests and principal of the debt. Therefore, the present value of a debt is the sum of the present value of future interest payments and the present value of the maturity (nominal, face) value. It is also its current market price:

\[ P_{\text{BOND}} = \sum_{t=1}^{n} \left( \frac{C_t}{(1+i)^t} \right) + \frac{N}{(1+i)^n} \]

where:

- \( P_{\text{bond}} \) = current market price of the bond (present value of a debt)
- \( C_t \) = coupon payment
- \( N \) = nominal value returned at the end of year \( n \)
- \( n \) = number of years till the end of maturity of the bond
- \( i \) = interest (coupon) rate of the bond

We have to discount the future cash-flow - the interest and nominal (maturity, face) value - at some rate that reflects both the time value of money and the uncertainty of receiving these future cash-flows. We refer to this “discount rate” as yield from debt. It holds that the more uncertain the future cash-flows, the greater the yield. It follows that the greater the yield, the lower the present value of the future cash-flow and then the lower the market value of the debt security (bond).
9.2 Types of Bonds

Corporate bonds represent a part of the debt of many companies. A corporate bond certifies that the company issuing this bond owes money to the bondholder.

Government bonds. Government and their various departments and regions borrow by issuing a variety of fixed and variable interest rate bonds to finance public expenditure and to supply credit in the economy. They are usually considered free risky bonds.

Municipal bonds represent a part of the debt of cities and towns.

Mortgage bonds are a special type of a bond, secured by a pledge on real estate; mortgage banks can use the funds raised from issuances only for granting mortgage loans.

Indexed bonds are debt securities which bear real interest rate that depends on the inflation rate. These real cash-flows on Treasury Inflation-Protected Securities (TIPs) are fixed, but the nominal cash-flows (interest and principal) are increased as the Consumer-Price Index increases.

Convertible bonds are an equivalent to a straight bond plus an option to acquire common stock. When convertible bondholders exercise this option, they do not pay cash; instead they exchange their bonds for shares.

Floating rate notes (FRN) are bonds with flexible interest coupon rate. Bondholders except it to decrease risk involved in volatile interest rate on the capital market and inflation influences.

Warrants. Instead of issuing convertible bonds, companies sometimes sell a package of straight bonds and warrants. Warrants are simply long-term call options that give the investor the right to buy the firm’s common stock. The warrant holder can buy additional shares from the company at prices and at times that are specified when the warrants are issued.

Debentures. In the United Kingdom, debentures are bonds usually secured against specific assets of the firm. In the United States, debentures are unsecured bonds.

Consols. They are the United Kingdom government bonds (war debt securities) with the infinity maturity. The bondholders are paid only coupon payments.

Treasury bills. Short-term security sold by a central bank to meet a government’s short-term financial requirements. Also used as an instrument of monetary policy, influencing credit and the money supply.

Zero bonds. A debt security that does not have a promise to pay interest periodically but only at the maturity date. Instead, investors pay some amount less than the maturity value, with its yield based on the difference between its maturity value and what they pay for it at present - they assume to hold it to maturity.

9.3 Practical Example

Problem

You want to invest spare financial sources into securities. You are considering issuing corporate bonds of the OMEGA joint-stock company. You have found out that:

- these bonds have nominal value (face value) of 1,000 CZK,
- current market value of the bond is 1,200 CZK,
- coupon payment is 120 CZK a year,
 Task
Find out the yield that the bond provides. Calculate the rate of profit in various ways:
   a) coupon yield,
   b) current yield,
   c) yield until the end of maturity – exactly or approximately.

 Procedure
a) Coupon yield
This is the easiest way of expressing the rate of yield of bonds.

   Coupon yield = \frac{\text{Coupon payment}}{\text{Nominal value of the bond}}

b) Current yield
It expresses the situation of the investor a bit more exactly as it works with market price.

   Current yield = \frac{\text{Coupon payment}}{\text{Market value of the bond}}

c) Yield until the end of maturity
This is the most exact expression of the profit rate of bonds as it considers both real revenues and expenses related to the bond and their time spreading. Revenues and expenses related to the bond will be spread to a range of annual cash-flows:

year 0: an expense in the amount of present market price of the bond,
year 1 to n-1 (in year n from now the bond is repaid): coupon payments
year n: last coupon payment + returned nominal value (as maturity value)

From an investment into bonds expressed this way we calculate internal interest rate. This internal interest rate expresses exact performance and with bonds, it is called yield until the end of validity.

\[
P_{\text{BOND}} = \left[ \sum_{t=1}^{n} \frac{C_t}{(1+i)^t} \right] + \frac{N}{(1+i)^n}
\]

where:
  * \( P_{\text{bond}} \) = current market price of the bond
  * \( C_t \) = coupon payment
  * \( N \) = nominal value
  * \( n \) = number of years till the end of maturity of the bond
  * \( i \) = discount rate until the end of maturity of the bond
We search for such \( i \), for which this equation is valid (for the exact calculation by means of Method of Internal Rate of Return - see chapter 13).

Regarding the fact that coupon payments are still the same, we can simplify the calculation by counting current value of annuity and we will subtract the market price of the bond from it.

As this is a relatively frequent index and this exact calculation is elaborate, in practice we use an approximate calculation of the yield to maturity from this formula:

\[
\text{Yield to maturity} = \frac{\text{Coupon payment} + \text{Nominal value – Market value}}{\text{Number of years till the end of validity}}.
\]

\[
= \frac{0.6 \cdot \text{Market value} + 0.4 \cdot \text{Nominal value}}{0.6 \cdot \text{Market value} + 0.4 \cdot \text{Nominal value}}
\]

**Solution**

Task 1 – coupon yield

Coupon yield = \( \frac{120 \text{ CZK}}{1,000 \text{ CZK}} = 0.12 = 12 \% \text{ p.a.} \)

Task 2 – current yield

Current yield = \( \frac{120 \text{ CZK}}{1,200 \text{ CZK}} = 0.1 = 10 \% \text{ p.a.} \)

Task 3 – yield to maturity

- approximate calculation:

\[
\text{yield to maturity} = \frac{120 + \frac{1,000 - 1,200}{10}}{0.6 \cdot 1,200 + 0.4 \cdot 1,000} = \frac{120 - 20}{720 + 400} = \frac{100}{1,120} = 8.93\% \text{ p.a.}
\]

### 9.4 Key Terms of the Theme

- debt security
- corporate/municipal/government bonds
- coupon rate
- coupon payment
- coupon yield
- current yield
- yield to maturity
- coupon interest
- current market value
- nominal value of bond (maturity value)
- zero bond
- convertible bond
- FRN (floating rate notes)
- warrants
- mortgage bonds
- treasury bills
10 Cash-Flow Management

10.1 The Concept of Managing Cash-Flow

The main tasks of financial management are growth of a company’s property and profitability and ensuring yields for owners. Profit is the main source of financing, but it is not cash → from cash money the company covers disbursements resulting from its activities.

At the same time we further have to take into account that:

1. there is a difference between capital flow and its cash expression (tangible assets purchase vs. granted credit)
2. there is time discrepancy between accounting rise of a cost and its settlement (wages payment and wage cost rise)
3. there are various accounting methods influences (depreciation, inventory valuation etc.).

For purposes of cash-flow management we have to determine the difference between reported profit of the company (in net income statement, that represents accrual accounting principle) and money, that is available for ensuring of liquidity (cash-flow principle).

For the concept of cash-flow “accounting” we can define:

- Expenditures (disbursements) = negative cash-flows (outflows) → - CF
- Receipts = positive cash-flows (inflows) → + CF

Cash-flow management is a substantial part of company’s managing system. By analyzing these cash-flows (inflows and outflows), current and potential owners, creditors, and investors can examine such aspects of the business as:

- the source of financing for business operations, whether through internally generated funds or external sources of funds
- the ability of the company to repay bank loan and debt securities (interest and principal/maturity value payment)
- the ability of the company to finance expansion through operating cash-flow
- the ability of the company to pay dividends to shareholders

There is a special statement for checking tasks in the sphere of ensuring the liquidity of the company that depicts truly cash-flows in the company for managers and company owners. This Cash-flow Statement is also intended for external users – banks, leasing, factoring and forfeiting institutions, investors, financial analysts, and auditors or inspectors. The financial analyst can use the cash-flow statement to learn more about a company’s financial health. Cash-flow statement may be compiled as a past, current or future (prediction) annual statement.
10.2 Cash-Flow Statement Structure

Cash-flow statement is a summary over a period of time of a firm’s cash-flow. It has the following structure:

A. Cash at the beginning of an accounting period (year)
B. Cash-flow from operating activities
C. Cash-flow from investment activities
D. Cash-flow from financial activities
E. Net change in cash
F. Cash at the end of an accounting period (year)

The firm’s statement of cash-flows then lists separately its operating cash-flows, investing cash-flows, and financing cash-flows. A firm that generates cash-flows only by selling off its assets (obtaining cash-flows from investments, property) or by issuing more securities or by accepting loans (obtaining cash-flows from financing) cannot keep that up for very long. For future prosperity the firm must be able to generate cash-flows from its operations.

**EXAMPLES CASH INFLOWS (+) AND CASH OUTFLOWS (–)**

<table>
<thead>
<tr>
<th>Operational cash-flow (+/–)</th>
<th>Investment cash-flow(+/–)</th>
<th>Financial cash-flow (+/–)</th>
</tr>
</thead>
<tbody>
<tr>
<td>collection of receivables +</td>
<td>tangible assets sale +</td>
<td>issuing new shares and bonds +</td>
</tr>
<tr>
<td>deposits on current account +</td>
<td>tangible assets purchase -</td>
<td>increasing long-term payables +</td>
</tr>
<tr>
<td>sale of inventory +</td>
<td>intangible assets sale +</td>
<td>decreasing long-term payables –</td>
</tr>
<tr>
<td>sale of short-term securities +</td>
<td>intangible assets purchase -</td>
<td>paying off long-term credits –</td>
</tr>
<tr>
<td>obtaining short-term credit +</td>
<td>gaining shares, bonds –</td>
<td>obtaining long-term credits +</td>
</tr>
<tr>
<td>trade payables payment –</td>
<td>shares, bonds sale +</td>
<td>increasing other equity item +</td>
</tr>
<tr>
<td>payment of interest –</td>
<td>other financial investment item sale +</td>
<td>decreasing other equity item –</td>
</tr>
<tr>
<td>short-term credit repayment –</td>
<td>other financial investment item purchase –</td>
<td>paying off dividends –</td>
</tr>
<tr>
<td>depreciations +</td>
<td></td>
<td></td>
</tr>
<tr>
<td>profit + / loss –</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Cash-Flow Statement by a Direct Method**

In accounting, it is impossible to record real incomes and expenditures, because special accounts for them are not opened. We would have to add these accounts to the accounting system and create analytical evidence for them. All accountancy documents would have to be classified according to their influence on cash-flow. Therefore we rather compile a special cash-flow statement – in the easiest form directly from cash money items and bank account items.

We may quite easily compile the cash-flow statement by a direct method under the conditions of “tax evidence system”, which records actual receipts (incomes) and disbursements (expenditures).

Owners of small firms are able to watch recording of their incomes and expenditures within “tax evidence system”. This easy “cash-management” enables owners to manage their liquidity and successfully control the company.
**Cash-Flow Statement by an Indirect Method**

For compiling a cash-flow statement by an indirect method we use basic financial statements, used in accordance with valid accounting legislative.

The initial and final state of funds can be found out directly from the balance sheet. For a cash-flow calculation, information about cash and non-cash changes is drawn partly from the balance sheet and partly from the net income statement. We proceed in the following way.

*Information from net income statement (profit and loss statement)* – an item which increases the value of funds – is entered with a plus sign, an item decreasing the value of funds with a minus sign. A specific role is played by depreciations as non-cash items, that means expenses in accrual accounting concept, but they are to nobody-paid expenses, so inflows in cash-flow concepts.

*Information from balance sheet* – we find out the change of the state of a particular item during a year.

### 10.3 Creating of the Cash-Flow Statement

#### Cash-Flow from Operating Activities

The creation of cash-flow from operating activities is the most important of the three. Ideally, we could obtain it directly, by summing all cash receipts (inflows) and disbursements (outflows) for the period covered by statement. However, in spite of its usefulness, this sum is, in practise, difficult to prepare. Instead, the cash-flow from operations is generally obtained indirectly. Using the indirect method, we begin with net income as reported in the net income statement and adjust it for each change in current assets and current liabilities (changes in the net working capital) and each noncash operating item (as depreciations). We must adjust net income for changes in current assets and liabilities because those changes represent the difference between accrual accounting and “cash accounting” concept.

#### EXAMPLE OF THE STRUCTURE OF CASH-FLOW STATEMENT

<table>
<thead>
<tr>
<th>Code</th>
<th>Item</th>
<th>Amount (thousands EUR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Cash at the beginning of year</td>
<td>200</td>
</tr>
<tr>
<td>B.1.</td>
<td>Net income</td>
<td>1,200</td>
</tr>
<tr>
<td>B.2.</td>
<td>Depreciation</td>
<td>1,000</td>
</tr>
<tr>
<td>B.3.</td>
<td>Change in account receivables</td>
<td>200</td>
</tr>
<tr>
<td>B.4.</td>
<td>Change in account payable</td>
<td>100</td>
</tr>
<tr>
<td>B.5.</td>
<td>Change in inventories</td>
<td>-800</td>
</tr>
<tr>
<td>B.6.</td>
<td>Change in other short-term assets</td>
<td>-200</td>
</tr>
<tr>
<td>B.7.</td>
<td>Change in short-term loans</td>
<td>0</td>
</tr>
<tr>
<td>B.8.</td>
<td>Change in other current liabilities</td>
<td>300</td>
</tr>
<tr>
<td>B.</td>
<td>Cash-flow from Operating Activities</td>
<td>1,800</td>
</tr>
<tr>
<td>C.1.</td>
<td>Capital expenditures</td>
<td>-1,100</td>
</tr>
<tr>
<td>C.2.</td>
<td>Other investing cash-flow items</td>
<td>100</td>
</tr>
<tr>
<td>C.</td>
<td>Cash-flow from Investing Activities</td>
<td>1,000</td>
</tr>
<tr>
<td>D.1.</td>
<td>Issuance/retirement of stock</td>
<td>700</td>
</tr>
</tbody>
</table>
D.1. Issuance/retirement of debt securities 0
D.1. Drawing/repayment of long term loans -1,000
D.1. Payment of dividends -300
D. Cash-flow from Financing Activities -600
E. Net Change in Cash 200
   Cash Interest Paid, Supplemental (50)
   Cash Taxes Paid, Supplemental (9)
F. Cash at the end of year 400

Cash-Flow from Investing Activities
The cash-flow from investing activities includes cash-flow due to investments in lands, buildings, plant and equipment, the disposal of plant assets, acquisitions of other companies.

Cash-Flow from Financing Activities
The cash-flow from financing activities includes cash-flows due to the sale or purchase of common or preferred stock, the issuing or retirement of long-term debt securities, the drawing or repayment of a long-term bank loan, and the payment of common and preferred dividends.

10.4 Practical Example

Problem
Based on cash-desk documents and items from bank accounts, a KAPPA Ltd. company recorded following accounting items for the year:

<table>
<thead>
<tr>
<th>BANK ACCOUNT - KAPPA LTD., 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
</tr>
<tr>
<td>State of money on 1 January 2006</td>
</tr>
<tr>
<td>Sales of a useless device</td>
</tr>
<tr>
<td>Incomes from sales of goods</td>
</tr>
<tr>
<td>Bought material</td>
</tr>
<tr>
<td>Purchase of new software</td>
</tr>
<tr>
<td>Wages payment</td>
</tr>
<tr>
<td>Payment for electricity</td>
</tr>
<tr>
<td>Instalment of a long-term loan</td>
</tr>
<tr>
<td>Payments to suppliers</td>
</tr>
<tr>
<td>Payment of dividends to partners</td>
</tr>
</tbody>
</table>

Task
Compile a cash-flow statement by the direct method.

Procedure
Based on an analysis of items from a current account and from the cash desk of the company, we identify single receipts (inflows) and expenditure (outflows) items and divide them according to their nature to items related to the company’s operational activities, items related to the company’s investment activities (connected with changes of fixed
assets) and to items related to the company’s financial activities (connected with long-term debt financing and changes of the company’s equity). Summing them up we receive a total cash-flow created in the given year. After adding the beginning state of cash in the company (on accounts and in cash-desk) on 1st January we will receive the ending state of cash on 31st December of the given year.

**Solution**

<table>
<thead>
<tr>
<th>Cash-flow statement items</th>
<th>Amount in EUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash at the beginning of year</td>
<td>+ 28,000</td>
</tr>
<tr>
<td>Receipts from operational activities</td>
<td>707,000</td>
</tr>
<tr>
<td>Expenditures from operational activities</td>
<td>713,000</td>
</tr>
<tr>
<td>Cash-flow from operational activities</td>
<td>- 6,000</td>
</tr>
<tr>
<td>Receipts from investment activities</td>
<td>260,000</td>
</tr>
<tr>
<td>Expenditures from investment activities</td>
<td>103,000</td>
</tr>
<tr>
<td>Cash-flow from investment activities</td>
<td>+ 157,000</td>
</tr>
<tr>
<td>Receipts from financial activities</td>
<td>0</td>
</tr>
<tr>
<td>Expenditures from financial activities</td>
<td>117,000</td>
</tr>
<tr>
<td>Cash-flow from financial activities</td>
<td>- 117,000</td>
</tr>
<tr>
<td>Net change in cash</td>
<td>+ 34,000</td>
</tr>
<tr>
<td>Cash at the end of year</td>
<td>+ 62,000</td>
</tr>
</tbody>
</table>

### 10.5 Key Terms of the Theme

- cash at the beginning of an accounting period
- cash at the end of an accounting period
- accrual accounting
- cash-flow from operating activities
- cash accounting
- cash-flow from investing activities
- managing cash-flows
- cash-flow from financing activities
- disbursements
- net change in cash-flow
- expenditures
- cash-flow statement
- receipts
- cash/non-cash items
- inflows
- direct method
- outflows
- creating of a statement
11 Long-term Investment Decisions

11.1 Capital Investments
Investment is generally enabled by postponed consumption. Investment decision includes:

- time factor (long-term effect)
- risk factor (uncertainty of the yield)
- return factor (to invest or to consume)

Investments are assets, serving not for consumption but for production of consumer or capital goods. Investments are sources of long-term economic growth and also are influenced by governmental economic policy (fiscal/monetary). Firms continually invest funds in assets and these assets produce net profit and cash-flow that the firm can then either reinvest or pay off to the owners. These assets include all tangible and intangible assets - we consider them capital investments. The investment decisions of the firm are decisions regarding a firm’s capital investment. The term capital means the long-term funds used to finance the firm’s assets. In this sense, capital consists of equity (mainly stock capital), debt securities and bank loans. We use the term capital structure to refer to the mix of these different sources of capital used to finance a firm’s assets.

The firm’s capital investment decisions may consist of a number of particular decisions in an investment project. This investment project would require the firm to acquire land, build facilities, and purchase production equipment. This investment project may also require the firm to increase its working capital – inventory, receivables and cash. Working capital is the collection of assets needed for supporting firm’s long-term investments.

11.2 Investment projects

Phases of Investment
We distinguish several investment phases that bring receipts or expenditures to the investor and there is also appropriate documentation related to these phases. The first phase is a pre-investment phase, where we create an opportunity study (with market analysis) and a feasibility study (with technical and economic part), SWOT analysis, and for public sector investment a cost-benefit analysis finding out benefits and costs/losses of a project. Expenditures related to this phase are usually not included in investment efficiency evaluation (capital budgeting) and are called sunk costs.

The second phase is an implementation phase, where we create an investment project (including getting funds), an EIA study of the investment influence on the environment (Environmental Impact Assessment); we arrange a building permission and other permissions (power grids, hygiene, etc.). We must prepare project documentation (technical and economical part, net chart). Then the very implementation of the investment follows, i.e. the construction (reconstruction, purchase) of the property including construction documentation. This phase is connected with capital expenditures including both investment costs and costs concerning working capital increase resulting from the investment and its tax impacts.

The third phase is an operational phase, where we carry out testing of the operation and after that the main operation itself follows. Net profit (or cash-flow) from this phase should
cover capital expenditures and should maximize owners’ wealth.

The fourth phase is a *liquidation phase* that usually brings to the investor equipment liquidation expenditures and environmental measures and partly investment liquidation receipt (assets selling out).

**Capital Budgeting Techniques**

To evaluate investment projects and select the one that maximizes wealth of the firm, we must determine yield from investment. We may use two types of capital budgeting techniques (or investment efficiency methods).

A) Static methods (simple) – they do not consider time value of money, we distinguish:
   - Return on Investment method (Average rate of return)
   - Payback Period method
   - Method of Average Comparative Costs

B) Dynamic methods (more suitable) – they use discounting of cash-flows (operate with time value of money) and uncertainty associated with future cash-flows like:
   - Net Present Value
   - Internal Rate of Return
   - Profitability Index
   - Discounted Payback Period

**11.3 Static Methods of Investment Efficiency Evaluation**

They work on the net profit basis (difference between revenues and expenses), or on cash-flow basis where we must calculate inflows and outflows from investment – all without considering time value of money (*principle of discounting*).

**a) Return on Investment Method (Average Rate of Return)**

Return on investment is index which shows how much net profit (or cash-flow) is necessary so that investment costs are returned from investment operation.

The index is defined as:

\[ ROI = \frac{\phi ANP}{IC} \]

where:
- \( \phi \) ANP = average annual net profit
- IC = investment costs (or capital expenditures)

or better:

\[ ROI = \frac{\phi ACF}{IC} \]

where: \( \phi \) ACF = average annual cash-flow from investment
Criterion: we are looking for maximum ROI of screened investments. Advantage: projects with different life time and different costs of investment can be compared. The project will be accepted if the actual average rate of return is more than predetermined required rate of return.

b) Payback Period Method
The payback period \((T_{pp})\) for a project is the length of time it takes to get your money back. It is such \(T_{pp}\) for which it holds that:

\[
\sum_{j=1}^{n} ANP_j = IC
\]

or:

\[
T_{pp} = \frac{IC}{\bar{ANP}}
\]

or better in using of cash-flow we look such \(T_{pp}\) for which it holds that:

\[
\sum_{j=1}^{n} ACF = IC
\]

or:

\[
T_{pp} = \frac{IC}{\bar{ACF}}
\]

where:
- \(\Sigma ANP_j (\Sigma ACF_j)\) = sum of annual net profits (cash-flows) from investment, calculated up to the amount of cost of investments reached
- \(\bar{ANP}\) = average annual net profit from investment
- \(\bar{ACF}\) = average annual cash-flow from investment

Criterion: we are looking for minimum payback period of screened investments.

c) Method of Average Annual Comparative Costs
We look for:

\[
min ACC(k) = min \ [ACC(1), ACC(2), \ldots ACC(m)]
\]

when:

\[
ACC = \frac{IC + \sum_{j=1}^{T} OC_j}{T}
\]

where:
- \(k = 1\) to \(m\), \(m = \) investment variants number
comparative costs = include all costs connected with the investment in all inv. phases, i.e.
costs from implementation phases, operational and liquidation costs
• OC\_j = operating costs of investment in year “j” (include depreciation).
• T = lifetime of investment

Criterion: we are looking for minimum costs of screened investments. It is used in cases
when we are limited by the cost amount of project or have secure profits (monopoly).

11.4 Practical Example

**Problem**

The KAPPA Ltd. Company needs to build a traffic route to its plant. There are following
project options:

A) Construction of a road with investment costs of 10 million CZK.

B) Construction of a railway with investment costs of 8 million CZK.

Construction and operation of the traffic route will be ensured by an investment company
that will receive incomes from transport rates paid by the KAPPA Company. Which
investment option will be the most efficient if following revenues and costs are estimated?
For deciding about the choice of an option we will use the criterion of average annual
comparative costs, average return rate and payback period. The lifetime of the investment
is 10 years.

<table>
<thead>
<tr>
<th>Year of operation</th>
<th>Revenues (thousands CZK)</th>
<th>Costs (thousands CZK)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>1</td>
<td>1,500</td>
<td>2,800</td>
</tr>
<tr>
<td>2</td>
<td>2,400</td>
<td>2,500</td>
</tr>
<tr>
<td>3</td>
<td>2,600</td>
<td>2,000</td>
</tr>
<tr>
<td>4</td>
<td>3,000</td>
<td>2,000</td>
</tr>
<tr>
<td>5 - 10</td>
<td>3,200</td>
<td>1,900</td>
</tr>
</tbody>
</table>

**Procedure**

1. We find out total revenues, total expenses and total net profit for both investment
options.

2. From calculated values we find out annual net profit reached in both options.

3. We calculate single values according to chosen methods for both investment options, we
use the formula for:

a) method of average annual comparative costs

\[ ACC = \frac{IC + \sum OC\_j}{T} \]

where: IC = investment costs, OC\_j = operating costs in single years of the operation of the
investment (including depreciation)

b) method of average rate of return (or ROI)

\[ ROI = \frac{Average \ annual \ net \ profit (\bar{ANP})}{investment \ costs (IC)} \]
c) method of payback period

- \( T_{pp} = \frac{IC}{\bar{\text{ANP}}} \)

Where : \( \bar{\text{ANP}} = \text{average annual net profit from investment.} \)

4. We insert calculated values into a control table. For calculating the efficiency of an investment option we use minimization of the criterion of comparative costs, maximization of the criterion of net profit, and minimization of the criterion of payback period.

Solution

<table>
<thead>
<tr>
<th>Year of operation</th>
<th>Revenues (thous. CZK)</th>
<th>Costs (thous. CZK)</th>
<th>Net profits (thous. CZK)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OPTION A</td>
<td>OPTION B</td>
<td>OPTION A</td>
</tr>
<tr>
<td>1</td>
<td>1,500</td>
<td>2,800</td>
<td>1,300</td>
</tr>
<tr>
<td>2</td>
<td>2,400</td>
<td>2,500</td>
<td>2,100</td>
</tr>
<tr>
<td>3</td>
<td>2,600</td>
<td>2,000</td>
<td>1,600</td>
</tr>
<tr>
<td>4</td>
<td>3,000</td>
<td>2,000</td>
<td>1,700</td>
</tr>
<tr>
<td>5 - 10</td>
<td>3,200</td>
<td>1,900</td>
<td>1,800</td>
</tr>
<tr>
<td>( \Sigma )</td>
<td>28,700</td>
<td>20,700</td>
<td>17,500</td>
</tr>
<tr>
<td>Net profits</td>
<td>11,200</td>
<td>4,900</td>
<td></td>
</tr>
</tbody>
</table>

CRITERION SHEET

<table>
<thead>
<tr>
<th>Method</th>
<th>Criterion</th>
<th>Option A</th>
<th>Option B</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC</td>
<td>MIN</td>
<td>275</td>
<td>238*</td>
</tr>
<tr>
<td>ARR(ROI)</td>
<td>MAX</td>
<td>0.112*</td>
<td>0.061</td>
</tr>
<tr>
<td>( T_{pp} )</td>
<td>MIN</td>
<td>8.93*</td>
<td>16.33!!</td>
</tr>
</tbody>
</table>

* optimum variant, !! unsuitable

From the viewpoint of the minimum average annual comparative costs the option of a railway is more efficient. From the viewpoint of annual rate of return we should choose the option of construction of a road as well as in case of the method of payback period. Besides, the option B (railway) has a longer payback period of capital expenditures of investment here than the supposed construction lifetime (unacceptable).

11.5 Key Terms of the Theme

- investment efficiency methods
- feasibility study
- SWOT analysis
- Environmental Impact Assessment
- investment costs
- capital budgeting techniques
- capital expenditures
- cost-benefit analysis (CBA)
- opportunity study
- static methods
- pre-investment phase
- return on investment
- implementation phase
- average annual comparison costs
- operational phase
- average rate of return
- liquidation phase
- payback period
12 Capital Budgeting - Net Present Value Method

12.1 Investment Efficiency Evaluation
Investor gives up present income for future profit. Investment efficiency evaluation includes viewpoints of:

I. return rate – relation between revenues (or receipts) and costs (expenditures) of investment implementation, investment operation and of investment liquidation

II. risk rate – degree of probability of obtaining expected yield

III. payback period – period of paying off the investment from future cash-flows within its economic lifetime

Procedure of Investment Efficiency Evaluation
1) determination of capital expenditures (costs of investments + working capital increasing) on investment project
2) determination of future cash-flows (receipts and expenditures from a given investment) and calculation of the present value of expected cash-flows by means of discounting
3) estimation of the risk of obtaining the cash-flows
4) determination of costs of sources of financing – both own and external capital costs
5) elimination of sunk costs (in a project preparation - they are usually not calculated)
6) calculation of tax influences impacts
7) using criterion for investment efficiency evaluation - NPV, IRR, B/C ratio etc.

12.2 Present Value of Future Cash-flows
In order to estimate future cash-flow from the investment we have to concern with a project’s operating cash-flows (change in revenues, expenses, and taxes). What we cannot know for certain what these cash-flows will be in the future, but we must estimate them. We base them on marketing research, engineering analyses, operation research, analysis of our competitors, and also our managerial experience.

To determine the present value of a series of future cash-flow from the investment, each cash-flow must be discounted to the present, where the beginning is the period designated as year 0 – start of investment implementation (construction, purchase, lease...)

The present value of the series of cash-flows can be represented in notation form as:

\[
P V = \frac{CF(1)}{(I+k)^1} + \frac{CF(2)}{(I+k)^2} + \frac{CF(3)}{(I+k)^3} + ... + \frac{CF(n)}{(I+k)^n}
\]

where:

- \( CF(t) \) = cash-flow from future operating phase of the investment \( \rightarrow CF(t) \) is difference between receipts \( R(t) \) and expenditures \( E(t) \)
- \( k \) : discount rate respecting different time value of money in single years of the investment
Financial Management

- \( t = 1 \) to \( n \), single years of operation of the investment.

This equation tells us that the present value of series of cash-flows from investment is the sum of the products of each cash-flow from operating phase and its corresponding discount factor:

\[
PV = \sum_{t=1}^{n} \frac{CF(t)}{(1+k)^t}
\]

The present value of investment project’s operating cash-flows is typically positive – we indicate predominantly cash inflows.

12.3 Cost of Capital

Cost of capital is an integral part of investment decisions. It is used as a discount rate (\( k \)) in determining the present value of future cash-flows associated with investment projects. When the company uses different sources of finance, the financial manager must make serious decision with regard to the cost of capital – it is closely bound both with the value and the earning capacity of the firm.

Cost of capital is the required rate of return on its investment which belongs to equity and debt (as the minimum rate of return). If a company does not earn yield at the expected rate, the market value of the shares will fall and it will result in the reduction of overall wealth of the shareholders. The rate of return the firm required from investment has to be higher than the cost of capital in order to increase the value of the firm in the market place.

The cost of sources of long-term capital includes combination of all sources of capital such as equity (common stock capital, preferred stock capital, retained earnings) and debt (debt securities, bank loans). Average cost of the capital is the weighted average cost of each components of capital employed by the company.

If the funds are borrowed, the cost of capital of debt is related to the interest (from bank loan, from debt securities) that must be paid to the creditors. If the funds are equity, the cost of capital is the return that investors expect, both from the stock’s price appreciation and dividends. From the investor’s point of view, the cost of capital is then the same as the required rate of return.

The cost of capital as the average of the cost of each source, weighted by its proportion of the total capital, is referred to as WACC:

\[
WACC = r_D \times (1-\tau) \times \frac{D}{V} + r_p \times \frac{P}{V} + r_E \times \frac{E}{V}
\]

where:
- \( D \) = value of debt (loans, debt securities)
- \( \tau \) = corporate tax rate coefficient
- \( r_D \) = cost of debt (requested return rate of creditors, i.e. interest rate of a bank loan or debt securities)
- \( P \) = amount of preferred stock outstanding
- \( r_P \) = cost of preferred stock (requested rate of return of preferred stockholders, i.e. profitability of dividends from preferred shares)
Financial Management

- \( E \) = amount of common equity capital
- \( r_E \) = cost of common stock (requested rate of return of common stockholders, i.e. profitability of dividends from common shares)
- \( V \) = total market value of the firm \( (V = D + P + E) \), which equals total capital

### 12.4 Net Present Value Method

Net present value is one of the modern methods for evaluating investment project’s proposals. In this method cash-flows are considered with the time value of money. Net present value is described as the summation of the present value of cash inflow (receipts) and cash outflow (expenditures).

So, *net present value cash-flow* of investment is defined as:

\[
NPV = PV - IC
\]

where:

- \( PV \) (present value of operating cash-flows) = \( \sum CF(t) / (1 + k)^t \), \( t = 1 \) to \( n \)
- \( IC = CF(0) = Receipts(0) - Expenditures(0) = 0 - E(0) = - E(0) = \) investment costs, i.e. cash-flow from investment in year 0 (outflow)

So:

\[
NPV = \sum_{t=0}^{n} \frac{CF(t)}{(1 + k)^t}
\]

where:

- \( t = 0 \) to \( n \); years of economic lifetime of investment

The term “net present value” is used because we want to determine the difference between the change in the operating cash-flows (cash-flows from operational phase of investment) and the investment cash-flows (capital expenditures, investment costs). Mostly, the changes in operating cash-flows are inflows and the investment cash-flows are outflows. Therefore we can refer to the Net Present Value as the difference between the present value of cash inflows and the present value of cash outflows.

**CRITERIA FOR EVALUATION OF INVESTMENT PROJECTS BY MEANS OF NPV**

| NPV > 0 | The investment is expected to increase owner wealth | Accepting the project |
| NPV < 0 | The investment is expected to decrease owner wealth | Rejecting the project |
| NPV = 0 | The investment is expected not to change owner wealth | Indifferent between accepting or rejecting the project |

### 12.5 Practical Example

**Problem**

By the given investment, we would probably obtain following receipts and expenditures in
the next six years. By expenditures we mean both operational expenses and investment expenditures. Minimum required rate of return from investment for the firm value appreciation is 15% p.a.

<table>
<thead>
<tr>
<th>Year</th>
<th>Receipts (thousands of CZK)</th>
<th>Expenditures (thous. CZK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>1.000</td>
</tr>
<tr>
<td>1</td>
<td>700</td>
<td>1.000</td>
</tr>
<tr>
<td>2</td>
<td>900</td>
<td>500</td>
</tr>
<tr>
<td>3</td>
<td>1.100</td>
<td>400</td>
</tr>
<tr>
<td>4</td>
<td>1.600</td>
<td>600</td>
</tr>
<tr>
<td>5</td>
<td>1.700</td>
<td>600</td>
</tr>
<tr>
<td>6</td>
<td>1.600</td>
<td>800</td>
</tr>
</tbody>
</table>

**Task**
Calculate the efficiency of this investment by the method of net present value. In which year is the investment returnable?

**Procedure**
Net present value is the sum of discounted differences between receipts and expenditures related to the investment. So we find out the present value of future expected cash-flows providing that discount rate corresponds with the rate of return (cost of capital) required by the investor. We calculate net present value from the formula:

\[ NPV = \sum_{t=1}^{n} \frac{(R_t - E_t)}{(1 + k)^t} \]

where:
- \( R_t \) = receipts in year \( t \)
- \( E_t \) = expenditures in year \( t \) (including investment expenses)
- \( k \) = requested return rate (another term – discount rate) from investment, in this case we use minimum required rate of capital appreciation that corresponds to weighted average costs of financing capital (WACC).

The investment is advantageous if the net present value of cash-flows from investment is positive.

**Solution**

<table>
<thead>
<tr>
<th>Year</th>
<th>((R_t - E_t))</th>
<th>( (1 + k)^t )</th>
<th>((R_t - E_t) \cdot (1 + k)^t)</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-1.300</td>
<td>1.000</td>
<td>-1.300.0</td>
<td>-1.300.0</td>
</tr>
<tr>
<td>1</td>
<td>-300</td>
<td>0.8696</td>
<td>-260.9</td>
<td>-1.560.9</td>
</tr>
<tr>
<td>2</td>
<td>400</td>
<td>0.7561</td>
<td>+302.4</td>
<td>-1.258.5</td>
</tr>
<tr>
<td>3</td>
<td>700</td>
<td>0.6575</td>
<td>+460.3</td>
<td>-798.2</td>
</tr>
<tr>
<td>4</td>
<td>1.000</td>
<td>0.5720</td>
<td>+571.8</td>
<td>-226.4</td>
</tr>
<tr>
<td>5</td>
<td>1.100</td>
<td>0.4972</td>
<td>+546.9</td>
<td>+320.5</td>
</tr>
<tr>
<td>6</td>
<td>800</td>
<td>0.4323</td>
<td>+345.8</td>
<td>+666.3</td>
</tr>
</tbody>
</table>

Conclusion:
Net present value of the considered investment is 666.3 thousand CZK. As the result is positive the investment is efficient. The investment is returnable as soon as in the fifth year of its economic lifetime.
### 12.6 Key Terms of the Theme

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>discount rate</td>
<td>cash-flow risk</td>
</tr>
<tr>
<td>requested rate of return</td>
<td>business risk</td>
</tr>
<tr>
<td>investment efficiency evaluation</td>
<td>financial risk</td>
</tr>
<tr>
<td>capital expenditures</td>
<td>default risk (credit risk)</td>
</tr>
<tr>
<td>investment costs</td>
<td>market value of the firm</td>
</tr>
<tr>
<td>operating cash-flow</td>
<td>weighted average cost of capital</td>
</tr>
<tr>
<td>investment cash-flow</td>
<td>cost of debt</td>
</tr>
<tr>
<td>set-up expenditures</td>
<td>cost of equity</td>
</tr>
<tr>
<td>shipping</td>
<td>cost of common stock</td>
</tr>
<tr>
<td>installation</td>
<td>cost of preferred stock</td>
</tr>
<tr>
<td>present value</td>
<td>net present value</td>
</tr>
</tbody>
</table>
13 Other Capital Budgeting Techniques

13.1 Financial Leverage Notion

Financial decision within capital budgeting is one of the integral parts of financial management in any kind of business firm. When making financial decisions the board of directors must consider coverage of the financial mix (capital structure), total amount of capital (capitalization) and cost of capital. Capital structure is one of the significant things for the management, since it influences the debt-equity mix of the business firm, which affects the stockholder’s return and risk. Hence, deciding the debt-equity mix plays an important role in increasing the value of the company and market value of the shares. The debt-equity mix of the company can be determined with the help of financial leverage.

How can money be obtained to pay for firm’s investments, when its earnings (retained earnings and net profit) are insufficient? It can be obtained in three ways:

- by issuing debt securities
- by taking bank loans
- by issuing more shares of stock

Debt and equity financing create different types of obligations for the firm. Debt financing obligates the firm to pay creditors interest (from debt securities or bank loans) and principal. If the firm earns more than necessary to meet its debt payments requirements, it can either distribute the surplus to the owners or reinvest.

One index used to judge debt finance of a firm is the debt/equity ratio:

\[
D/E\ ratio = \frac{Debt}{Equity}
\]

Equity financing does not obligate the firm to distribute earnings. The firm may pay dividends or repurchase stock from owners, but there is no obligation to do so.

The financial leverage represents the use of financing by means of debt. The use of debt financings relative to equity financing increases potential earnings for owners: if the costs of debt financing are lower than the costs of equity financing.

Financial leverage can be calculated with the help of the following formula:

\[
Financial\ leverage = \frac{EBIT}{EPS}
\]

where:

- EBIT = earnings before interest and tax
- EPS = earnings per share

So, if we use debts to increase potential earnings for owners, it is called a financial leverage. It means that:

- debt capital is usually cheaper and more accessible than our own (if the floating interest rate of debt does not increase above supposed limits)
- debt capital does not dilute profit (stockholder’s does)
- use of debt capital does not bring direct rights in management and ownership.
13.2 Tax Shield Notion

An interesting element that influences the capital structure decision is the reduction of taxes due to the payment of interest on debt. We refer to the benefit from interest deductibility as the interest tax shield, since the interest expense decreases (shields) income from taxation for government. The tax shield from interest deductibility can be calculated by the following formula:

\[ \text{Tax shield} = r_D \times \tau \times D \]

where:

- \( r_D \) = cost of debt (requested return rate of creditors, i.e. interest rate of a bank loan or coupon rate of debt securities)
- \( \tau \) = corporate tax rate coefficient
- \( D \) = value of debt (loans, debt securities)

So, if we use debts (bank loans, bonds issue) for funding of an investment, the interest as an expense decreases profit – it is a tax effect (tax shield). But there are also disadvantages to debt financing - risks from a flexible interest rate, tax system changes, high tax load, etc.

Depreciation also reduces firm’s tax-related cash outflow. A reduction of taxes in this case is an inflow. We refer to the effect which depreciation has on taxes as the depreciation tax shield.

13.3 Internal Rate of Return Method

Financial managers need to know the rate of return that a capital project earns on its investment. They attempt to estimate a project’s rate of return by calculating its internal rate of return. The internal rate of return (IRR) is the discount rate that forces the NPV of the project to zero.

The following figure illustrates the relationship between the NPV and different discount rates for the capital project. On horizontal axis, we see discount rates running from 0 to 60%. The NPV on the vertical axis corresponds to each of the discount rates on the horizontal axis. The shape of the NPV curve in the figure is typical of a simple project (but can be radically different in some cases in which the cash-flows change over time).

- Point A indicates the NPV of the project is greater than zero.
- Point B indicates the NPV of the project is less than zero.
- The IRR point (point C) is the discount rate at which the NPV equals zero, so the point where the NPV curve crosses the horizontal axis in the figure.
If the project’s NPV is greater than zero, we normally find that its IRR is greater than its (stockholders) required rate of return. Nevertheless, there is no formula for finding the value of the IRR from equation:

\[
NPV = 0 = \sum_{t=0}^{n} \left( \frac{R_t - E_t}{(1 + IRR)^t} \right)
\]

where:
- \( R_t \) = receipts (inflows) in year “t”
- \( E_t \) = expenditures (outflows) in year “t”; including investment costs
- IRR = the searched internal interest rate of investment project

Calculation of the IRR requires an interpolation process of trial and error as follows:

1. guess a slightly high discount rate that makes NPV negative (point B, IRR_B)
2. guess a slightly low discount rate that makes the NPV positive (point A, IRR_A)
3. interpolate by means of interpolation equation

This interpolation is the straight line connecting points A and B in the figure. The straight
line crosses the horizontal axis, because the NPV curve is not straight, the actual value of the IRR is less than the interpolated value (see practical example 13.5.)

The decision rule for the internal rate of return is to invest in a project if it provides a return greater than the cost of capital. The cost of capital, in the context of the IRR, is a hurdle rate – the minimum acceptable rate of return.

**CRITERIA FOR EVALUATION OF INVESTMENT PROJECT’S BY MEANS OF IRR**

<table>
<thead>
<tr>
<th>IRR &gt; cost of capital</th>
<th>IRR &lt; cost of capital</th>
<th>IRR = cost of capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>The investment is expected to return more than required</td>
<td>The investment is expected to return less than required</td>
<td>The investment is expected to return what is required</td>
</tr>
<tr>
<td>Accepting the project</td>
<td>Rejecting the project</td>
<td>Indifferent between accepting or rejecting the project</td>
</tr>
</tbody>
</table>

### 13.4 Other capital budgeting techniques

**Profitability index**

The profitability index is the ratio of the present value of operating cash-flows associated with investment to the present value of investment cash-flow.

\[
PI = \frac{PV}{IC} = \frac{PV}{CF(0)}
\]

where:

- PV = present value of operating cash-flows
- IC = investment costs (present value of investment cash-flows)

Criterion for accepting of an investment project: PI > 1

**Discounted Payback Period**

Discounted payback period is the time needed to pay back the original investment (investment expenditures) in terms of discounted cash-flows. It means that the shorter the discounted payback period the better for our investment project.

### 13.5 Practical Example

**Problem**

In the following case of investment, we would probably consider these receipts and expenditures in the following years. Year 0 is the year of capital construction.

<table>
<thead>
<tr>
<th>Year</th>
<th>Receipts (thous. CZK)</th>
<th>Expenditures (thous. CZK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>1,300</td>
</tr>
<tr>
<td>1</td>
<td>600</td>
<td>700</td>
</tr>
<tr>
<td>2</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>3</td>
<td>800</td>
<td>200</td>
</tr>
<tr>
<td>4</td>
<td>1,400</td>
<td>700</td>
</tr>
<tr>
<td>5</td>
<td>1,600</td>
<td>1,100</td>
</tr>
<tr>
<td>6</td>
<td>1,700</td>
<td>1,200</td>
</tr>
<tr>
<td>7</td>
<td>1,600</td>
<td>1,000</td>
</tr>
<tr>
<td>8</td>
<td>1,500</td>
<td>1,400</td>
</tr>
</tbody>
</table>
Task
Calculate the internal rate of return of the considered investment and compare its efficiency with the yield from bank bonds (as alternative possible way of our capital investment) if the coupon rate of bonds is 10%.

Procedure
Internal rate of return is the interest rate makes cash-flows discounted by this interest rate and expenditures related to the considered investment equal. So it is such an interest rate for which the net present value of the considered investment is zero.

We find out the interest rate from equation:

\[
NPV = 0 = \sum_{t=0}^{n} \frac{(R_t - E_t)}{(1 + IRR)^t}
\]

We use the iteration method for solving this formula:
1. We estimate the initial value of IRR (IRR\(_1\)), it is the first step of an iteration
2. We find out NPV for this value of IRR. Three possibilities can occur:
   a) NPV = 0................. the estimation of IRR is correct (very low probability)
   b) NPV is greater than 0........the estimation of IRR is too low
   c) NPV is less than 0........the estimation of IRR is too high
3. In cases (b) or (c) we increase (decrease) the estimated IRR value (IRR\(_2\) - second step) and find out NPV again.
4. We repeat the procedure with next estimated IRR (IRR\(_3\), IRR\(_4\)) until we get such two interest rate estimations for one of which (IRR\(_A\)) the calculated NPV is positive and for one of the other estimated interest rates (IRR\(_B\)) the calculated NPV is negative.

4. By a linear interpolation after substitution of the calculated values we find out the real value of IRR:

\[
IRR = IRR_A + \frac{A}{A + |B|} \times [IRR_B - IRR_A]
\]

where:
- “IRR\(_A\)“ is interest percentage for which NPV is positive in some step
- “IRR\(_B\)“ is interest percentage for which NPV is negative in some step
- “A” is the positive NPV with IRR\(_A\)
- “B” is the negative NPV with IRR\(_B\) (we substitute it into the formula in the absolute value)

An investment is advantageous if IRR is greater than the required rate of owners (otherwise they should prefer investment into bank securities).
Solution

Step 1. We estimate the initial value of IRR as 18%, so IRR₁ = 0.18, and we find out NPV for this value.

<table>
<thead>
<tr>
<th>Year</th>
<th>(Rᵢ – Eᵢ)</th>
<th>(1 + i)ᵗ</th>
<th>(Rᵢ – Eᵢ) * (1 + i)ᵗ</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-1,300</td>
<td>1.0000</td>
<td>-1,300.0</td>
</tr>
<tr>
<td>1</td>
<td>100</td>
<td>0.8475</td>
<td>84.8</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>0.7182</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>600</td>
<td>0.6086</td>
<td>365.2</td>
</tr>
<tr>
<td>4</td>
<td>700</td>
<td>0.5158</td>
<td>361.1</td>
</tr>
<tr>
<td>5</td>
<td>500</td>
<td>0.4371</td>
<td>218.6</td>
</tr>
<tr>
<td>6</td>
<td>500</td>
<td>0.3704</td>
<td>185.2</td>
</tr>
<tr>
<td>7</td>
<td>600</td>
<td>0.3139</td>
<td>188.3</td>
</tr>
<tr>
<td>8</td>
<td>100</td>
<td>0.2660</td>
<td>26.6</td>
</tr>
</tbody>
</table>

NPV₁ = B = \[-39.8\]

NPV is negative; it means that the estimation is too high. We decrease the estimation and repeat the calculation.

Step 2. We estimate the IRR₂ at 17%, so i₂ = 0.17, and we calculate NPV for this value.

<table>
<thead>
<tr>
<th>Year</th>
<th>(Rᵢ – Vᵢ)</th>
<th>(1 + i)ᵗ</th>
<th>(Rᵢ – Vᵢ) * (1 + i)ᵗ</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1,300</td>
<td>1.0000</td>
<td>1,300.0</td>
</tr>
<tr>
<td>1</td>
<td>100</td>
<td>0.8574</td>
<td>85.5</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>0.7305</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>600</td>
<td>0.6244</td>
<td>374.6</td>
</tr>
<tr>
<td>4</td>
<td>700</td>
<td>0.5337</td>
<td>373.6</td>
</tr>
<tr>
<td>5</td>
<td>500</td>
<td>0.4561</td>
<td>228.1</td>
</tr>
<tr>
<td>6</td>
<td>500</td>
<td>0.3898</td>
<td>194.9</td>
</tr>
<tr>
<td>7</td>
<td>600</td>
<td>0.3332</td>
<td>199.9</td>
</tr>
<tr>
<td>8</td>
<td>100</td>
<td>0.2848</td>
<td>28.5</td>
</tr>
</tbody>
</table>

NPV₂ = A = 14.1

Now NPV is positive, so we have obtained two estimations of IRR, for one NPV is positive, for the other one it is negative. The sought IRR is between these two estimations. IRR value calculation (in %) is done by linear interpolation.

• IRR = 17 + \[14.1 / (14.1 + |-39.8|)\] * \[18–17\] = 17.3 (%)

Conclusion

Internal rate of return of the considered investment is 17.3%. The investment is efficient, because its IRR is greater than the alternative interest rate from bonds

13.6 Key Terms of the Theme

<table>
<thead>
<tr>
<th>financial leverage</th>
<th>iteration method</th>
</tr>
</thead>
<tbody>
<tr>
<td>D/E ratio</td>
<td>profitability index</td>
</tr>
<tr>
<td>interest tax shield</td>
<td>B/C ratio</td>
</tr>
<tr>
<td>depreciation tax shield</td>
<td>discounted payback period</td>
</tr>
<tr>
<td>interest rate of return</td>
<td>interpolation equation</td>
</tr>
</tbody>
</table>
14 Financial Analysis Fundamentals

14.1 Substance and Aim of the Financial Analysis

Financial analysis is closely associated with financial management of a company and with financial accounting from which it issues. This relation can be expressed in the way that accounting provides data and information for financial decision-making by its financial report basic statements: Balance Sheet, Net Income Statement and Cash-flow Statement, eventually supplements of financial statements.

Financial analysis consists in analysis of the past, present, and estimated future of a company’s financial position as it is reflected even in the future development in the form of planning.

The main goal of financial analysis is to gain relevant information from financial statements and further sources, to find out “the condition of the company”, to find its weaknesses, to point out its strengths, and prepare basis for future necessary management decisions.

Based on material used, financial analysis may be classified into two major types:

a) **External financial analysis** – this analysis issues from publicly accessible and published information, especially accounting information; outsiders of the firms do normally external analysis and they are indirectly involved in the company. These are for example investors, bank creditors, government agencies, public and European funds and other creditors – leasing, factoring or forfeiting companies. External analysis mainly depends on the published financial statements of the firms.

b) **Internal financial analysis** – this analysis is another name for an analysis of a company’s financial management when the person carrying out the analysis has access to all data and information from all the information system of the company, namely information from financial accounting, management accounting, calculations systems, statistics, company plans and other company materials.

The procedure how to achieve the goals of financial management of a company with the help of financial analysis can be characterized in the following way:

1) viewing the past development of the company’s financial position and the development of the financial situation in a time line
2) defining the reasons of a company development on the basis of results of this financial analysis
3) choosing the optimal direction of future managing of the company’s financial aims to increase the market value of the company (prediction)

14.2 Techniques of Financial Analysis

Financial analysis is interpreted mainly to determine the financial performance of the company. A number of methods or techniques are used to analyse the financial statements of the company. The following are the common methods or techniques, which are widely used by the company.

Based on the methods of operation, financial analysis may be classified into two major
types such as horizontal analysis and vertical analysis.

**Horizontal analysis** – under the horizontal analysis, financial statements are compared with several years and based on that, a firm may take decisions. Normally, the current year’s figures are compared with base year (as difference, base year is consider as 100) or financial information is changed from one year to another (as ratio).

**Vertical analysis** – under the vertical analysis, financial statements measure the numerical relationship of the various items in the financial statement in a particular period. It is also called structural analysis, because, this analysis helps to determine the relationship with various items in the financial statement.

**Comparative Analysis**

Comparative statement analysis is an analysis of financial statement at different period of time. This statement helps to understand the comparative position of financial performance at different period of time. Comparative financial statements again are classified into two major parts: comparative balance sheet analysis and comparative net income statement analysis.

**Common Size Analysis**

Another important financial statement analysis technique is the common size analysis in which figures reported are converted into percentage to some common base. In the balance sheet the total assets figures is assumed to be 100 and all figures are expressed as a percentage of this total. It is one of the simplest methods of financial statement analysis, which reflects the relationship of each and every item with the base value of 100%.

**Cash-flow Analysis**

Cash-flow Statement is a statement which shows the sources of cash inflow and uses of cash outflow of the company during a particular period in time. It is the statement, which involves only short-term financial position of the company. Cash-flow Statement provides a summary of operating, investment and financial cash-flows and starts with opening cash balance and ends with closing cash balance.

Cash-flow statement indicates the factors contributing to the reduction of cash balance in spite of increase in profit and vice-versa.

**14.3 Ratio analysis**

Ratio analysis is commonly used tool of financial analysis. Ratio is mathematical relationship of one number to another number. Ratio is used as an index for evaluating the financial or operating performance of the company. An accounting ratio shows the mathematical relationship between two figures from balance sheet statement, net income statement, or sometimes cash-flow statement, which have meaningful relation with each other. We can classify ratios according to how they are constructed or according to the financial characteristics that they capture.

Ratios can be classified into various types. The main groups of ratios classification from the point of view of financial management are as follows:

- Liquidity ratios
- Activity ratios
- Solvency ratios
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- Profitability ratios
- Return ratios

Liquidity ratios

It is short-term ratio that helps to understand the potential ability to meet current obligations (see Chapter 3). These ratios express the relationship between current assets and current liabilities of the company during a particular period. The following are the major liquidity ratios:

<table>
<thead>
<tr>
<th>No.</th>
<th>Ratio</th>
<th>Formula</th>
<th>Significant Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Current Ratio</td>
<td>Current Assets/Current Liabilities</td>
<td>2.0 — 2.5</td>
</tr>
<tr>
<td>2.</td>
<td>Quick Ratio (Acid Test)</td>
<td>Financial Accounts + Receivables/Current Liabilities</td>
<td>1.0 — 1.5</td>
</tr>
<tr>
<td>3.</td>
<td>Cash Ratio</td>
<td>Fin. Accounts/Current Liabilities</td>
<td>0.2 — 0.5</td>
</tr>
</tbody>
</table>

Activity Ratios

It is also called turnover ratios. These ratios measure the efficiency of the current (short-term) assets and liabilities in the firm during a particular period. These ratios are helpful to understand the performance of the company (see Chapter 4). Some of the activity ratios are given below:

<table>
<thead>
<tr>
<th>No.</th>
<th>Ratio</th>
<th>Formula</th>
<th>Significant Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Stock Turnover Ratio</td>
<td>Cost of Good Sold/Average Inventory</td>
<td>increasing trend</td>
</tr>
<tr>
<td>2.</td>
<td>Receivables Turnover Ratio</td>
<td>Sales Revenues in Receivables/Average Receivables</td>
<td>increasing trend</td>
</tr>
<tr>
<td>3.</td>
<td>Total Assets Turnover</td>
<td>Sales/Total Assets</td>
<td>increasing trend</td>
</tr>
</tbody>
</table>

Solvency ratios

It is called leverage ratios, which measure the long-term obligation of the company. These ratios help to understand, how the long-term funds are used in the firm (see Chapter 13, financial leverage)

<table>
<thead>
<tr>
<th>No.</th>
<th>Ratio</th>
<th>Formula</th>
<th>Significant Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Debt-Equity Ratio</td>
<td>Long-term Liabilities / Equity</td>
<td>0.5</td>
</tr>
<tr>
<td>2.</td>
<td>Debt-to-Assets Ratio</td>
<td>Long-term Liabilities / Assets</td>
<td>0.25</td>
</tr>
<tr>
<td>3.</td>
<td>Interest Coverage Ratio</td>
<td>EBIT / Interest Expenses</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Profitability Ratios

Profitability ratios help to measure the profitability position of the company. Some of
major profitability ratios are given below (gross profit is defined as difference between sales revenues and cost of goods sales):

<table>
<thead>
<tr>
<th>No.</th>
<th>Ratio</th>
<th>Formula</th>
<th>Significant Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gross Profit Margin</td>
<td>Gross Profit / Sales</td>
<td>min. 25%</td>
</tr>
<tr>
<td>2</td>
<td>Operating Profit Margin</td>
<td>EBIT / Sales</td>
<td>min. 15%</td>
</tr>
<tr>
<td>3</td>
<td>Net Profit Margin</td>
<td>Net Income / Sales</td>
<td>min. 10%</td>
</tr>
</tbody>
</table>

**Return Ratios**

Return on investments ratio compares measures of benefits, such as earnings or net income, with measures of investment (see Chapter 11). If you want to evaluate, how well the firm uses its property in its operations, you could calculate the return on assets ratio. The return on equity is the ratio of the net income that shareholder receive to their equity in the stock.

<table>
<thead>
<tr>
<th>No.</th>
<th>Ratio</th>
<th>Formula</th>
<th>Significant Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Return on Investment</td>
<td>Net Income / Investment Costs</td>
<td>Cost of capital</td>
</tr>
<tr>
<td>2</td>
<td>Return on Assets</td>
<td>Net Income / Total Assets</td>
<td>increasing</td>
</tr>
<tr>
<td>3</td>
<td>Return on Equity</td>
<td>Net Income / Equity</td>
<td>increasing</td>
</tr>
</tbody>
</table>

Ratios can depict truly single partial activities of the company. The use of individual indicators of financial analysis for determination of the total financial position of the company is like putting together individual fragments in order to complete a mirror that will show us the **financial condition** of this company. We must pay attention to find all the necessary fragments and not to paste together a crooked mirror.

**14.4 Complex methods of financial analysis**

**The Du Pont System**

It is a method of breaking down return ratios into their components to determine which areas are responsible for a firm’s performance. It was created by DuPont Chemical Company for needs of financial management.

**EVA method**

EVA (economic value added) is term used by the consulting firm Stern-Stewart Company, which has done much to popularize and implement this notion. Net income after deducting the return required by investors is called as residual income – economic value added.

**Altman Z-score**

For his analysis, Professor E. I. Altman used a direct statistic method (so called discriminant analysis) by means of which he estimated in linear combination the
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significance of single ratio indices, which he included in his model as variable quantities. The criterion of success is simple: the higher the Z-score value, the better the financial condition of the company. Based on a research, this interspaces scale was created for the values of Z:

\[
Z > 2.99 \quad \text{— financially stable companies without financial problems}
\]

\[
Z < 1.81 \quad \text{— financially unstable companies that will go bankrupt soon}
\]

Values between these interspaces describe companies with limited financial problems.

Rating

The most thorough method of complex determining of the financial condition of the company is represented by rating, used by bank houses for evaluating of the credit risk of their clients and by special rating agencies as Moody’s, Standart & Poor’s, Fitch Int., for evaluating financial condition and creditworthiness of firms, funds, banks, cities, regions and states. Rating is a multi-criteria method containing all the underwritten methods and techniques of financial analysis.

14.5 Practical example

Problem

We will use the problem from chapter 1 - the ALFA Ltd. company recorded following results in the balance sheet at the end of an accounting period (in thousands of EUR):

<table>
<thead>
<tr>
<th>Assets</th>
<th>Equity + Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intangible assets</td>
<td>25 Trade payables</td>
</tr>
<tr>
<td>Buildings</td>
<td>150 Payables to the state</td>
</tr>
<tr>
<td>Machinery and equipment</td>
<td>35 Payables to employees</td>
</tr>
<tr>
<td>Inventory</td>
<td>495 Long-term bank loan</td>
</tr>
<tr>
<td>Short-term receivables</td>
<td>322 Basic capital</td>
</tr>
<tr>
<td>Cash and bank accounts</td>
<td>579 Reserve fund</td>
</tr>
<tr>
<td></td>
<td>Retained earnings</td>
</tr>
<tr>
<td></td>
<td>Net income (current year)</td>
</tr>
<tr>
<td>Total</td>
<td>1,606</td>
</tr>
<tr>
<td></td>
<td>1,606</td>
</tr>
</tbody>
</table>

Further it recorded, among others, these figures in the Net Income Statement (in thousands of EUR):

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues from goods sold</td>
<td>200</td>
</tr>
<tr>
<td>Revenues from finished product</td>
<td>1,050</td>
</tr>
<tr>
<td>Interest expense</td>
<td>29</td>
</tr>
<tr>
<td>Corporate income tax</td>
<td>20</td>
</tr>
</tbody>
</table>

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Task
From the given indices, try to estimate the financial situation of the company. Use the complex method of Altman Z-score. We consider that the market value of the company’s capital equals its accounting value.

Procedure
The Z synthetic bankruptcy index is calculated as weighted average of chosen ratio indices which represent the most important spheres of a company’s financial activities.

\[ Altman \text{ Z-score} = 1.2 \times x_1 + 1.4 \times x_2 + 3.3 \times x_3 + 0.6 \times x_4 + 1.0 \times x_5 \]

where:
- \( x_1 \) = net working capital / total assets
- \( x_2 \) = total retained earnings / total assets
- \( x_3 \) = earnings before interest and tax / total assets
- \( x_4 \) = market value of equity / liabilities
- \( x_5 \) = revenues / total assets

Formulas
Earnings before interest and tax = Income from operations for the accounting period + Corporate income tax + Interest expenses
Total retained earnings = Reserves + Retained earnings + Net income current period
Net working capital = Short-term assets – Short-term payables – Short-term bank loans

Solution
Earnings before interest and tax (EBIT) = 115 + 29 + 20 = 164
Total retained earnings = 25 + 53 + 115 = 193
Net working capital = 1396 – 197 – 164 – 114 = 921
\[ Z = \text{value of Altman Z-score} = 1.2 \times 1921 / 1,606 + (1.4 \times 193 / 1,606) + (3.3 \times 164 / 1,606) + (0.6 \times 563 / 1,043) + (1.0 \times 1,250 / 1,606) = 2.29 \]

On the basis of the calculation we can estimate the financial position of the ALFA Ltd. company sufficient with partial financial problems.

14.6 Key terms of the theme

<table>
<thead>
<tr>
<th>horizontal analysis</th>
<th>profitability ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td>vertical analysis</td>
<td>return ratios</td>
</tr>
<tr>
<td>comparative analysis</td>
<td>solvency ratios</td>
</tr>
<tr>
<td>common size analysis</td>
<td>rating agencies</td>
</tr>
<tr>
<td>ratio analysis</td>
<td>Altman Z-score</td>
</tr>
<tr>
<td>liquidity ratios</td>
<td>EVA method</td>
</tr>
<tr>
<td>activity ratios</td>
<td>DuPont system</td>
</tr>
</tbody>
</table>
Literature


Appendix