

MEASURING AND MANAGING THE VALUE OF A COMPANY

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MEASURING AND MANAGING THE VALUE OF A COMPANY

Student's workbook

The list of modules:

1. Valuation: the basis
2. Process of measuring the value of a company
3. *Market-based* valuation methods
4. *Cost-based* valuation methods
5. *Income-based* valuation methods

Each module consists of the following:

1. Sources and useful links
2. Lecture materials
3. Formulas
4. Example of valuation and business-cases
5. Key words (Wiki)
6. Quizzes and exercises (student book)

Writing exams

The exam consists of

- 1) Task of implementing a valuation method (one of the income, cost or market approach)
- 2) Task of value-based decision-making (business case)
- 3) Key words test

M1. Valuation: the basis

→ SOURCES AND USEFUL LINKS

- 1) Uniform Standards of Professional Appraisal Practice (the Definitions, U1).- USPAP
- 2) International Accounting Standards- IAS (the 36th article)
- 3) Business dictionaries, see for example *Investopedia*, available at: <http://www.investopedia.com>, *Business dictionary*, available at: <http://www.businessdictionary.com>

→ LECTURE MATERIALS

- 1.1. There are two types of a value in the theory of economy. They are the **value in exchange** (or exchange value) and the **value-in-use** (or use value).

Exchange value is the quantitative aspect of value, as opposed to “use-value” which is the qualitative aspect of value, and constitutes the substratum of the price of a commodity.

The use value and exchange value of a business can differ from the cost of its assets. For example the **market capitalization** of a company is one of the money forms of a value on exchange. The capitalization of any company changes every day because of the market fluctuation.

How to find out the market capitalization of a company?

There are a lot of stock information databases (free in use) and services in the Internet. See for example the Yahoo Finance (<http://finance.yahoo.com>), or the CNBC (<http://www.cnbc.com/>). To find the quotes you need to fill the symbol/company name.

Usually the value-in-use of a business is much more than the cost of its assets because the use value includes not only the present value of a company, but also the future money benefits (incl. profit, dividends) for its owners.

The exchange value can be less or more than the cost of the assets of a business: it depends on the stock market situation (see the business case 1).

Business case №1. The Dot-com bubble.

Dot-com bubble (also referred to as *the Internet bubble* and *the Information Technology Bubble*) is a rapid rise in equity markets fueled by investments in internet-based companies. During the dotcom bubble of the late 1990s, the value of equity markets grew exponentially, with the technology-dominated Nasdaq index rising from under 1,000 to 5,000 between 1995 and 2000. Investors poured money into internet startups during the 1990s in the hope that

those companies would one day become profitable. The collapse of the bubble took place during 2000-2001. Some companies, such as Pets.com, failed completely. Others lost a large portion of their market capitalization but remained stable and profitable, e.g., Cisco, whose stock declined by 86%. Some later recovered and surpassed their dot-com-bubble peaks, e.g., Amazon.com, whose stock went from 107 to 7 dollars per share.

- 1.2. There are several types of properties, which are usually evaluated. They are real estate (an identified parcel or tract of land), real property, intellectual property (intellectual property portfolio, which is called an ip-portfolio) and a business itself (incl. the parts of it, for example a stake at it).

It is important to notice that an appraiser values the interests, benefits, and rights inherent in the ownership of a business (real estate, real property or intellectual property). That's why in the valuation process the legal aspects should be taken into account.

- 1.3. One can be interested in a valuation for the purposes of selling it, making the investment decisions, giving a loan (bank) or managing the company. The valuation underpins a major proportion of financial decisions in mature economies, especially where it serves as collateral for loans or as an important element in the published company accounts.

It is important to know the value of a property (business) for

- Banks that use property as collateral for loans;
- Shareholders that have invested in quoted companies and the companies themselves that become vulnerable to take-overs and asset stripping if the properties they own are not regularly and correctly valued in the balance sheet;
- Managers, who make the important decisions in managing the company, which should increase the welfare of its owners;
- House-buyers;
- Future pensioners whose savings are invested by funds;
- Whole economies that depend on stable banking systems.

Requests for valuation will include the following: sale and purchase, mortgage and insurance, lease/rental, financial reporting and decision making process (see the [value-based management](#)).

→FORMULAS

The balance equation helps to understand the basic principles of business valuation scheme (see the next table, formulas 1 and 2). Assets of a company include its property (goodwill, intellectual property portfolio, real estate and real property). They are listed in the balance sheet. Liabilities of a company demonstrate sources of financing. They include equity and debts.

So the value of the firm can be defined as follows

$$V = E + D \quad (1)$$

V – value of a business
 E – equity of a business
 D – debts of a business.

Table 1

Assets ↓	Liabilities ↓
Goodwill IP-portfolio Real Estate Real Property	Equity
	Debt
↑ Cost of assets	↑ Value of business

Using the core balance equation (Assets = Liabilities) we have the next basic formula

Cost of Assets – Debts =	Equity (2)
↑ Book value	↑ Investment value or
	↑ Market value

→WIKI

VALUATION is the process of determining the current worth of an asset or company. There are many techniques that can be used to determine value, some are subjective and others are objective.

EXCHANGE VALUE is the value of something in terms of the goods or services for which it can be exchanged. The money price often is one measure of value in an exchange.

VALUE-IN-USE is a subjective assessment of the benefits available to a particular user (its owner).

MARKET CAPITALIZATION is on-going market valuation of a public firm (whose shares are publicly traded) computed by multiplying the number of outstanding shares (held by the shareholders) with the current per share market price.

VALUE-BASED MANAGEMENT is the management approach that ensures corporations are run consistently on value (normally: maximizing shareholder value).

→ QUIZZES AND EXERCISES

Ex.1.1. See the Chapter 1 (p.2-3) Pablo Fernandez. Company valuation methods. IESE Business School – University of Navarra, 2004 (available at <http://www.iese.edu/research/pdfs/DI-0449-E.pdf>) and try to explain what the difference between a value and a price is?

Ex.1.2. Look through the IAS 36 «Impairment of Assets» (International Accounting Standards) and fill two gaps in the following statement.

Value in use is _____ of the _____ expected to be derived from an asset or cash-generating unit.

Ex.1.3. Using a business dictionary (surf the Internet) or the «Definition» part of Uniform Standards of Professional Appraisal Practice give definitions of «Value», «Appraiser», «Appraisal».

Value is _____

Appraiser is _____

Appraisal is _____

Ex.1.4. Using a business dictionary (surf the Internet) or the «Definition» part of Uniform Standards of Professional Appraisal Practice give the practice equivalents of the following types of a value of business.

Market value = (Value-in-use, Value-in exchange, Cost of Assets)

Investment value = (Value-in-use, Value-in exchange, Cost of Assets)

Liquidation value = (Value-in-use, Value-in exchange, Cost of Assets)

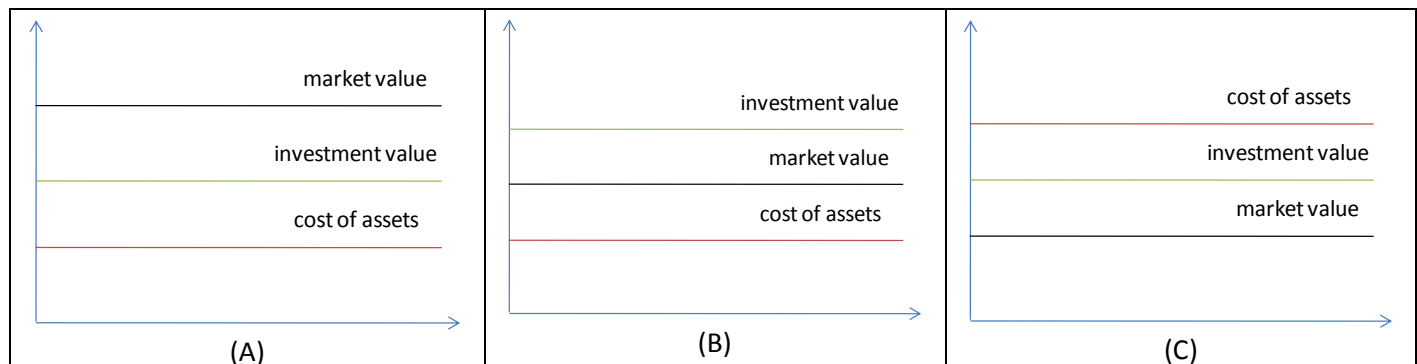
Ex.1.5. Using Yahoo Finance or any other stock information Internet service find out the market capitalization (Market Cap) of the following world famous companies – Microsoft Corporation, Walt Disney Co, McDonald`s Corp.

Market Cap (Microsoft) (_date_) is _____ B US dollars

Market Cap (Disney) (_date_) is _____ B US dollars

Market Cap (McDonalds) (_date_) is _____ B US dollars

*** Ex.1.6. Which of the following pictures (A, B, C) describe the correct position of three types of values of the Internet companies during the dot-com bubble (see the Business case 1).



*****Ex.1.7** Compare the following definitions of a valuation. What do you think is the appropriate definition of valuation for the potential investor of a business, its current shareholder or CFO (chief financial officer)? Mark the correct answer.

- A. Valuation means the provision of a written opinion of an appraiser (the report of valuation). This report can be used as a confirmation of a mortgage value of any property, which reflects its fair market value. It is important to know it, when you are looking for a debt financing.
- B. Valuation is simply a model to try to determine a fair price. It is the quantification of an understanding of the market. It is important to understand if the market price is less or more than the investment value of a company. If the market price is less than the investment value of a business – than it is time to buy it, if otherwise – than to sold or keep it, waiting.
- C. Valuation is the regular process of decision-making. It is important to know the impact of all decisions on the value of a company if you manage it in order to maximize the welfare of its owners.

Investor – A, B, C

Shareholder – A, B, C

CFO – A, B, C

Ex. 1.8. Using the business dictionaries, please find the proper purpose of valuation for the type of the business value in the following table (see the example in the first line):

Type of value	Financial Reporting	Bankruptcy	Restructure of business	Investment in business	Leasing
market value			V	V	
book value					
investment value					
liquidation value					
fair value					

M2. Process of measuring the value of a company

→ SOURCES AND USEFUL LINKS

- 1) Pablo Fernandez. Company valuation methods. IESE Business School – University of Navarra, 2004 (see **Chapter I, II, III**), available at <http://www.iese.edu/research/pdfs/DI-0449-E.pdf>
- 2) Damodaran on valuation, the 2nd edition (see **Chapter II**), available at http://pages.stern.nyu.edu/~adamodar/New_Home_Page/dam2ed.htm
- 3) Print edition. Shannon P. Pratt. Valuing a business, the 5th edition.– 1100 p (see **Chapter III** and **Chapter V**).

→ LECTURE MATERIALS

2.1. Business valuation is a process and a set of procedures used to determine what a business is worth. While this sounds easy enough, getting your business valuation done right takes preparation and thought.

Steps in the valuation process of a business are the following:

- definition of the property and of the purpose of valuation (see §1.2 and §1.3)
- preliminary analysis of the sector of business being valued
- data collection
- financial analysis (defining the current and future business efficiency)
- **highest and best use analysis** and estimate of land value
- application of the three **appraisal approaches**: cost, market, income (see §2.2)
- reconciliation of value estimates, defining the fair value
- **report of value**

Business case №2. What is the table of content of a typical valuation report?

You can see the sample of business valuation report at <http://www.valuadder.com/buy/SampleBusinessValuationReport.pdf>

Table of content

Description of the Appraisal Assignment
Standard and Premise of value
Scope of the Report
Information sources
Business description
Industry overview
Financial Statement Reconstruction and Forecasts
Business valuation approaches and methods
Asset-based business valuation result

Market-based business valuation result
Income based business valuation result
Conclusion of business value
Business value and selling price consideration
Business price Justification
Statement of limiting conditions
Appraisal Credentials and Certification

2.2. There are three basic appraisal approaches to valuation of property or business (see the scheme 1 below).

The market approach focuses mainly on comparables. It measures value of a company, based on what other purchases in the market have paid for assets (businesses) that can be considered reasonably similar to those being valued. The application of the market approach shall result in an estimate of the price reasonably expected to be realized if the asset (business) to be sold.

The cost approach measures the value of an asset (business) based on the cost invested in building the asset (business), or its replacement or reproduction cost. *Note* it is based on the premise that a prudent investor would not pay more for an asset (business), than the cost to replace or reproduce it. The actual cost invested in the asset (business) shall encompass all costs spent on building the asset (business) up to the value date.

The income approach measures the value of the asset (business) by reference to the present value of the economic benefits expected to be received over the remaining useful economic life of the asset (business). It includes forecasting and estimating the after tax **cash flows** and converting it to **present value** through **discounting** function (based on a specific **discount rate**).

2.3. There are a lot of different ways to measure the value of a business (assets) and there are numerous methods of valuation. The three approaches (§2.2) are based on the financial statement data (**income statement**, **balance sheet** and **cash-flow statement**).

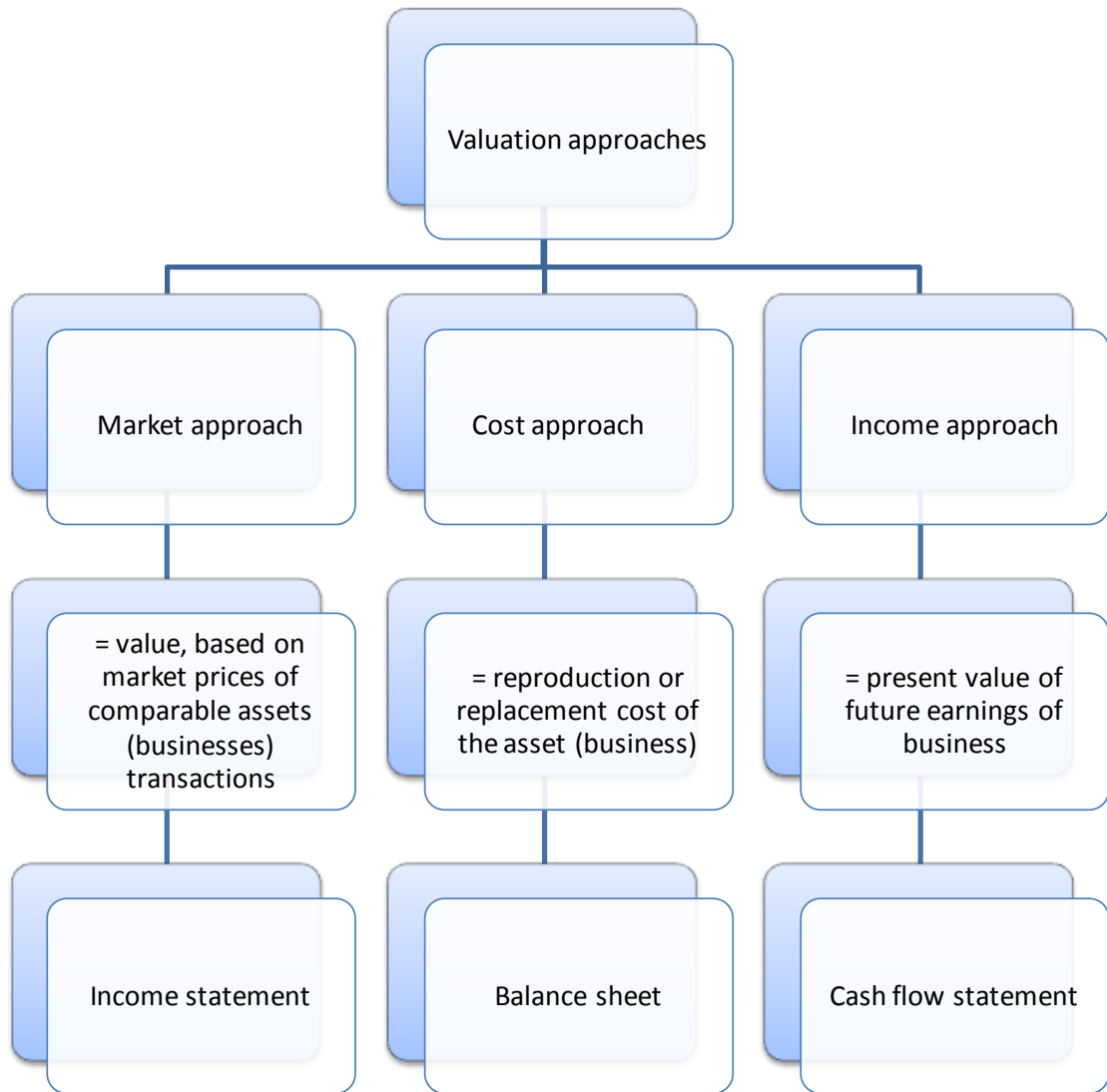
The cost approach seek to determine the company's value by estimating the value of its assets. These are methods that consider that a company's value lies basically in its **balance sheet**. They determine the value from a static viewpoint, which, therefore does not take onto account the company's possible future value. Neither do they take into accounts other factors that also affect the value such as: the current situation in industry, human resources, and contracts etc. that do not appear in the accounting statements.

Methods of income approach seek to determine the company's value by estimating the cash flows it will generate in the future and then discounting them at a discount rate matched to the flow's risk. Cash flow discounting methods are based on the detailed careful forecast, for each period, of each of the financial indicators (drivers). Income approach is based on data of **cash flow statement**.

Unlike the cost approach, the market approach is based on the company's **income statement**. They seek to determine the company's value through the size of its earnings, sales or other

indicators. Thus, for example, it is a common practice to perform quick valuations of business by multiplying their annual production capacity (or sales) by a **ratio** (or multiple) – see the Business case №2.

Scheme 1



Business case №3. How to determine the value of a small business in three minutes.

Market-driven Rules of Thumb afford an easy and fast way to estimate the value of the subject business based upon the empirical evidence of business selling prices in the same industry. When offered for sale, comparable businesses are frequently priced based upon their annual gross revenues.

Usually the Rules of Thumb method is appropriate for measuring small and not diversified business. They are for example a cement company, general business consulting company, a car parking company. It is easy to determine the value of such a company by multiplying its revenue (or a special production capacity metric, for example a quantity of parking spaces for a car parking business) by a **ratio (multiple)**.

Valuation Formula	
	Revenue or SDE
x	<u>Valuation multiple</u>
	Intangible assets and furniture, fixtures, and equipment
+	Cash
+	Accounts receivable
+	Inventory
+	Real estate
+	Other tangible assets
-	<u>Liabilities</u>
	<u><u>Indicated equity value</u></u>

See for example the table below, where actual multiples are listed

Table 2

Industry Description	Price/Revenue Multiple Range*		Price/Earnings Multiple Range*	
	Landscape and Plant Nurseries	0.21	0.20	1.40
Veterinary Services	0.68	0.80	1.69	3.84
Boarding Kennels and Pet Grooming Services	0.43	0.65	1.31	1.95

* Based on actual market transactions, with the primary focus on small businesses priced at less than \$1 million.

** See <http://valuationresources.com/vms.pdf>

→WIKI

HIGHEST AND BEST USE ANALYSIS (aka HBU) is a concept in real estate appraisal that shows how the highest value for a property is arrived. In any case where the market value of real property is sought, that value must be based on its highest and best use. Highest and best use is always that use that would produce the highest value for a property, regardless of its actual current use.

APPRAISAL APPROACHE is the based on a number of factors, such as its cost, the income it generates or its fair market value as compared to similar assets. A different dollar value will be assigned to an asset depending on which of these factors the appraiser primarily bases his or her estimate on. No matter which appraisal approach is used, an appraisal is only an educated guess as to what price the asset would fetch in a free market.

REPORT OF VALUE is the formal presentation of the appraiser’s opinion in written form. It must contain: a sufficient description to identify the property without doubt; a definition of value (purpose of valuation); a statement as to the interest being valued and any legal encumbrances present; the effective date of the valuation; any special features of the property; the name of the appraiser.

CASH FLOW – a revenue or expense stream that changes a cash account over a given period. Cash inflows usually arise from one of three activities - financing, operations or investing - although this also occurs as a result of donations or gifts in the case of personal finance. Cash outflows result from expenses or investments.

PRESENT VALUE – the current worth of a future sum of money or stream of **cash flows** given a specified rate of return.

DISCOUNTING – The process of determining the present value of a payment or a stream of payments that is to be received in the future. Discounting is the method used to figure out how much these future payments are worth today.

DISCOUNT RATE – The interest rate used in **discounted** cash flow analysis to determine the present value of future cash flows. The discount rate takes into account the time value of money and the risk or uncertainty of the anticipated future **cash flows**.

RATIO (MULTIPLE) – An expression of market value relative to a key statistic that is assumed to relate to that value. To be useful, that statistic – whether earnings, cash flow or some other measure – must bear a logical relationship to the market value observed; to be seen, in fact, as the driver of that market value.

→ **QUIZZES AND EXERCISES**

Ex.2.1 Please find the pair for the next types of value and approaches to valuation of business

<ul style="list-style-type: none"> • Book value (1) • Present value of future cash flows (2) • Market capitalization (3) • Substantial value (4) • Value of a comparable company, adjusted to the multiple (5) • Liquidation value (6) 	<ul style="list-style-type: none"> • Cost approach (A) • Income approach (B) • Market approach (C)
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------

Cost Approach (A) includes ...

Income Approach (B) includes ...

Market approach (C) includes ...

Ex.2.2. Find the proper definition(A,B or C) for the three valuation approaches below

A: The approach is based on an estimate of net income derived from the operation of an income-producing property and selecting a capitalization rate from market indications of similar properties to convert that income to an estimate of present worth for the property.

B: Method of arriving at the appraisal value of an asset, instrument, or interest on the basis of the prices at which similar items are available or were sold within the last three to six months, and making appropriate adjustments for differences in quality, quantity, or size.

C: It combines an estimate of land value with an estimate of depreciated reproduction or replacement cost of the improvements. The principle of substitution is the basis of the approach. The theory of this principle is that no rational person will pay more for a property than the amount for which they can obtain, by purchase of a site and construction of a building, a property of similar desirability and utility.

Cost Approach is (A, B, C)

Income Approach is (A,B,C)

Market approach is (A,B,C)

Ex.2.3. Find the value of the following companies, using data from Business case 3 and income statements data of companies.

- (1) Veterinary service Inc. Sales (2011) = 50 thousand US dollars, Sales (2010) = 45 thousand US dollars;
- (2) Dog & Cat Grooming & Supplies, Inc. Earnings (2011) = 35 th.US dollars, earnings (2010) = 28 thous. US dollars

Ex.2.4 Try to restore the sequence of the following abstracts (A-F) from the report of valuation (see §2.1, Business case 2).*

A: «We calculate each valuation multiple as a weighted average of the lowest (minimum), median, average and highest (maximum) values as follows: a weight of 50% is assigned to the median valuation multiple, 25% to the average, and 12.5% each to the minimum and maximum values”.

B: «The following sources of information were used in preparing the appraisal ...»

C: «The subject business being valued is Business Services, Inc; a subchapter S corporation, incorporated under the laws of the state of California».

D: «Accurate estimation of business value depends upon the subject business financial performance. The summary of the most recent annual historic Income Statements and the appropriate adjustments are summarized in the following tables».

E: «We relied upon five methods under the Asset, Market and Income Approaches to business valuation: Capitalized Excess Earnings method, Comparative Transaction method, Industry Rules of Thumb, Discounted Cash Flow and Multiple of Discretionary Earnings methods. We use the results obtained from these business valuation methods to provide an estimate of the subject business value».

F: «The industry of a Company continues to provide solid opportunity for growth of small privately held firms. These businesses rely upon the skill and initiative of individual professional practitioners to provide differentiated services to their clients at competitive prices. Industry consolidation is low with the top 20 firms responsible for just 5.3% of the industry total revenues. Through the last 5 years, the industry continued to grow at a robust 11.2% per year on average».

Source: Sample Business valuation report, available at:

<http://www.valuadder.com/buy/SampleBusinessValuationReport.pdf>

M3. Market-based valuation methods

→ SOURCES AND USEFUL LINKS

- 1) Pablo Fernandez. Company valuation methods. IESE Business School – University of Navarra, 2004 (see **Chapter 3**), available at <http://www.iese.edu/research/pdfs/DI-0449-E.pdf>
- 2) Damodaran on valuation, the 2nd edition (see **Chapter 7**), available at http://pages.stern.nyu.edu/~adamodar/New_Home_Page/dam2ed.htm
- 3) Print edition. Shannon P. Pratt. Valuing a business, the 5th edition.– 1100 p (see **Chapter III-11 and 12**, Market approach).

→ LECTURE MATERIALS

3.1. The market-based approach to valuation determines the value of a company by comparing one or more aspects of the subject company to the same aspects of other companies that have an established market value. There are two questions to be asked when market-based approach is applied: which aspects of the companies should be compared (which multiples should be used), and second, which companies to select as comparables.

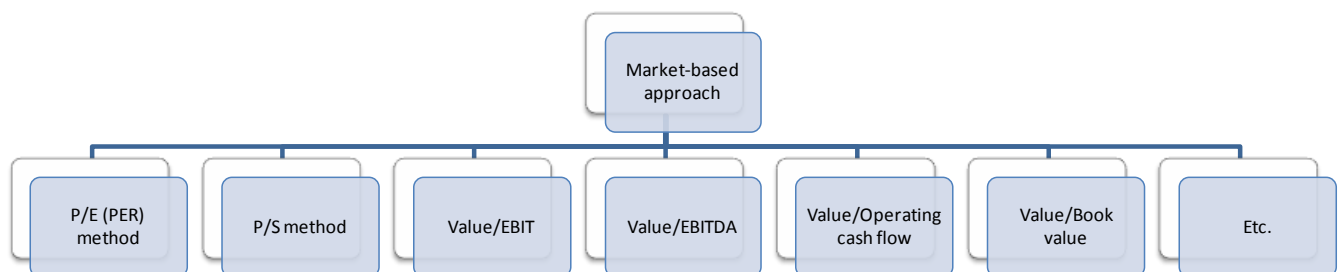
3.2. The market-based valuation uses market information about sales of businesses or its parts and income statement data. See for example the income statement for a company Omega Inc. (Table 3):

Table 3

Income Statement	
Sales (revenue)	500
Cost of sales	(350)
General expenses	(50)
Interest expenses	(4)
Earnings before tax	96
Taxes (30%)	(32)
Net income	64

3.3. Methods of market-based approach applied differ by multiples (see Scheme 2 below) used in valuation and the information source.

Scheme 2

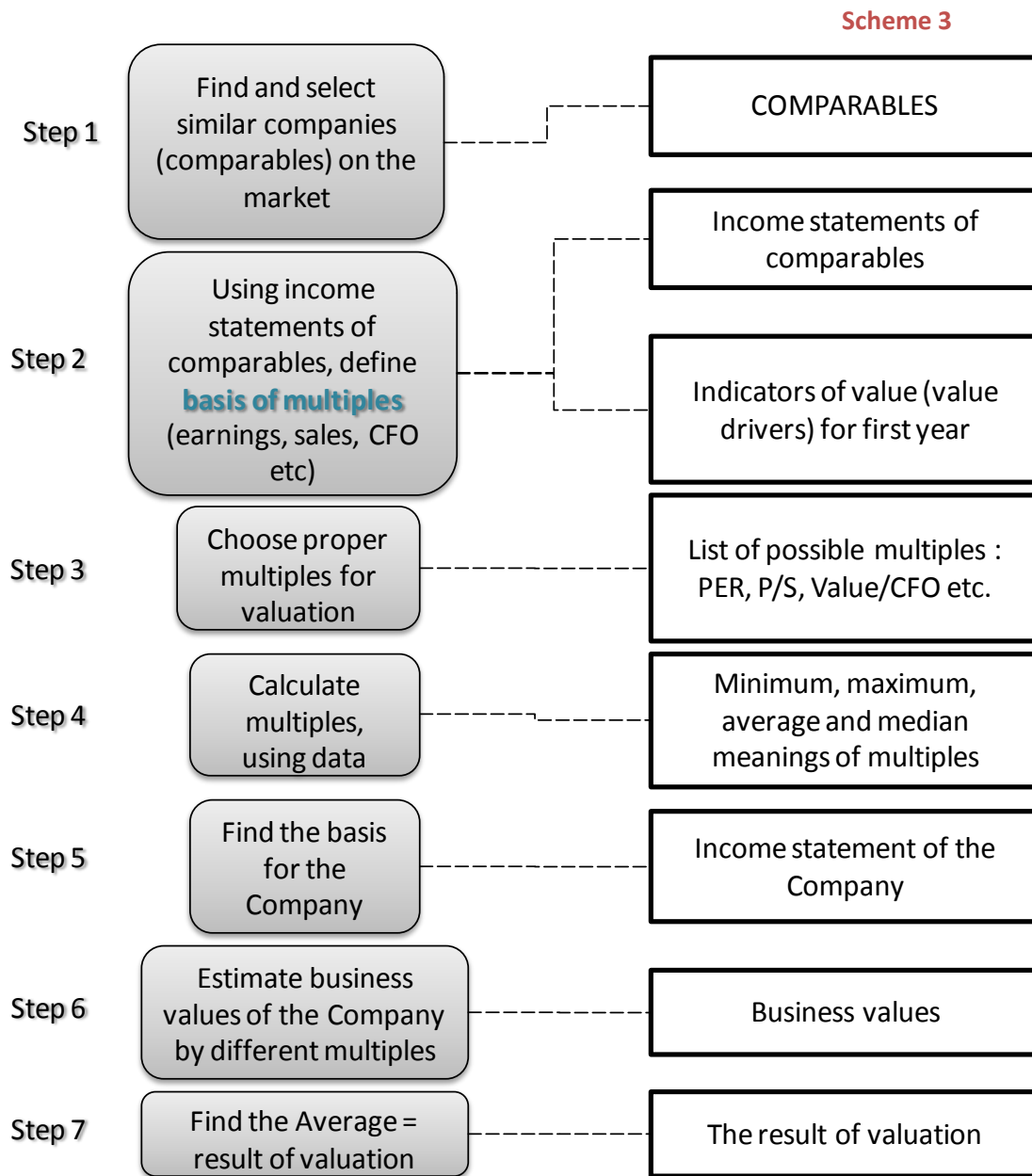


The most common multiples are price-to-earnings (aka PER) ratio and price-to-sales ratio (aka P/S). The price-to-sales ratio differs from PER by **return on sales**, because:

$$\frac{\text{Price}}{\text{Sales}} = \frac{\text{Price}}{\text{Earnings}} \times \frac{\text{Earnings}}{\text{Sales}}$$

In addition to PER and price-to-sales ratio, some of the frequently-used multiples are: Value/**EBITDA**, Value/**EBIT**, Value/**Operating cash flow**, Value/**Book value** and etc.

3.4. The process of market-based valuation approach consists of some steps (see below):



→FORMULAS

To estimate values of the Company based on different multiples (Step 6, Scheme 3), use Formula 1.

Formula 1

$$V_i^{Comp} = Basis_i^{Comp} \times \overline{M}_i$$

- V_i^{Comp} – Market value of the Company, measured by multiple i ;
- $Basis_i^{Comp}$ – Basis for the Company (CFO, EBITDA, EBIT etc.);
- \overline{M}_i – Average or median of multiples of comparables.

To find the average result of valuation use (Step 7, Scheme 3) use Formula 2

Formula 2

$$V_M^{Comp} = \sum_{i=1}^N \lambda_i \times V_i^{Comp}$$

- λ_i – Weight of multiple i (sum of $\lambda_i = 1$);
- V_M^{Comp} – Estimated market value of the Company (on the market-based approach).

→EXAMPLE

To find the market value of Microsoft Corporation on the beginning of September 2012 let's implement all the steps of market-based valuation process (Scheme 3).

Step 1 /Find and select similar companies/

There are three similar companies on the market in industry of application software according to market data. These companies are

- Apple Inc. (AAPL)
- Google Inc. (GOOG)
- Oracle Corporation (ORCL)

Step 2 /Define the basis of multiples/

The basis of different multiples of comparables, indicated in their income statements (according to SEC filings of companies) are in Table below (see Table 4).

Table 4

	Apple Inc.	Google Inc.	Oracle Corp.	Microsoft Corp.
Revenue (ttm)	148,81 B	43,16 B	37,12 B	73,72 B
EBITDA (ttm)	55,82 B	15,45 B	16,05 B	30,71 B
Net Income (ttm)	40,13 B	11,11 B	9,98 B	16,98 B
Market Cap on the date	637,85 B	230,93 B	159,17 B	259,47 B
Debt on the date	0	8,12 B	16,47 B	12,8 B
Value (Debt + Equity)	637,85 B	239,05 B	175,64 B	272,27 B

Step 3 /Choose proper multiples for valuation/

There are three multiples that can be measured for comparables using available data

- Value/ Revenue
- Value/EBITDA
- Value/Net Income

Step 4 /Calculate multiples and find the average (median)/

Table 5

	Apple Inc.	Google Inc.	Oracle Corp.	Average	Median
Value/ Revenue	4,29	5,54	4,73	4,85	4,73
Value/EBITDA	11,43	15,47	10,94	12,61	11,43
Value/Net Income	15,89	21,52	17,60	18,34	17,60

Step 5 /Find the basis for the target Company/

The basis for the target company (it's revenue, EBITDA and Net income are in Table 4.

Step 6 /Estimate business values of the Company, using different multiples (see Formula 1)/

Results of multiplying the Basis and the medians of comparable companies are in Table 6.

Table 6

	Median multiple	Basis for the Company	Result of Value	Market Cap of the Company	(+/- %)
Result, based on Value/ Revenue	4,73	73,72	336,02	259,47	30%
Result, based on Value/EBITDA	11,43	30,71	338,12	259,47	30%
Result, based on Value/Net Income	17,60	16,98	286,03	259,47	10%

Step 7 /Find the weighted average of value (see Formula 2) /

Table 7

	Result of Value	Weight of multiple	Estimated Value
Market Cap/ Revenue	336,02	0,30	100,81
Market Cap/EBITDA	338,12	0,20	67,62
Market Cap/Net Income	286,03	0,50	143,02
Sum of estimated values (Market Value of the Company) =			311,45 B

Business value of the Company on the date (market-based approach) = \$ 311,45 B

→WIKI

EBIT – earnings before interest and taxes

EBITDA – earnings before interest, taxes, depreciation and amortization

OPERATING CASH FLOW (aka CFO) - a measure of the amount of cash generated by a company's normal business operations. Operating cash flow is important because it indicates whether a company is able to generate sufficient positive cash flow to maintain and grow its operations, or whether it may require external financing. CFO is calculated by adjusting net income for items such as depreciation, changes to accounts receivable and changes in inventory.

RETURN ON SALES (aka ROS) - ratio widely used to evaluate a company's operational efficiency. ROS is also known as a firm's "operating profit margin". This measure is helpful to management, providing insight into how much profit is being produced per dollar of sales. As with many ratios, it is best to compare a company's ROS over time to look for trends, and compare it to other companies in the industry.

BASIS OF MULTIPLE – The economic indicator of business efficiency, which reflects the company's ability to create its business value, including sales, earnings, CFO, EBIT, EBITDA, fair value of Assets etc.

→ QUIZZES AND EXERCISES

Ex.3.1. What's the advantages and disadvantages of the market-based approach. Please fill the table below, choosing the proper answer from the following list of statements:

Possible advantages (10 statements):

- Includes the financial structure of the company/transaction (and leverage effect)
- Simple valuation method based on limited data
- Clear statement on the fundamental value of company
- Independence from accounting standards
- Takes into consideration actual market data
- Not based on a business plan or outlook or forecasting
- It is useful for measuring the value of loss-making companies, when other approaches are not applicable
- Future oriented approach
- Data are often publicly available
- Limited possibilities for manipulations of results

Possible disadvantages (7 statements):

- No consideration of the development of earnings, of synergies or future opportunities
- Complexity of the calculations involved
- The approach based on market data, which are relevant to speculative fluctuations and crisis
- Individual strengths and unique opportunities of the company to be valued are not taken into account
- Purely history based method
- Sometimes not applicable because of lack of data available to appraiser
- Projection on the basis of subject assessment and expectation of future of business

Advantages	Disadvantages
1)	1)
2)	2)
3)	3)
...	...

Ex. 3.2. Using Yahoo Finance (or any other Market data information service) find the fair market value for Facebook Inc. (see the example). Choose comparables among similar companies of the industry of Internet Information Providers.

M4. Cost-based valuation methods

→ SOURCES AND USEFUL LINKS

- 1) Pablo Fernandez. Company valuation methods. IESE Business School – University of Navarra, 2004 (see **Chapter 2**), available at <http://www.iese.edu/research/pdfs/DI-0449-E.pdf>
- 2) Damodaran on valuation, the 2nd edition (see **Chapter 7**), available at http://pages.stern.nyu.edu/~adamodar/New_Home_Page/dam2ed.htm
- 3) Print edition Shannon P. Pratt. Valuing a business, the 5th edition.– 1100 p (see **Chapter III**, §14, Asset-based approach).

→ LECTURE MATERIALS

4.1. The cost-based approach (aka asset-based approach) to valuation determines the value of a company by the cost of its assets. The methods of the approach are rather simple, but time-consuming, because there are could be a lot of assets in the balance sheet of a company, which need to be adjusted to its fair market value.

4.2. The cost-based approach makes use of balance-sheet data. It is important to note, that the official balance sheet (accounting) is not the same as the balance sheet of appraiser. Any assets or liabilities not on the balance sheet should also be valued and brought onto the balance sheet (for example a brand value).

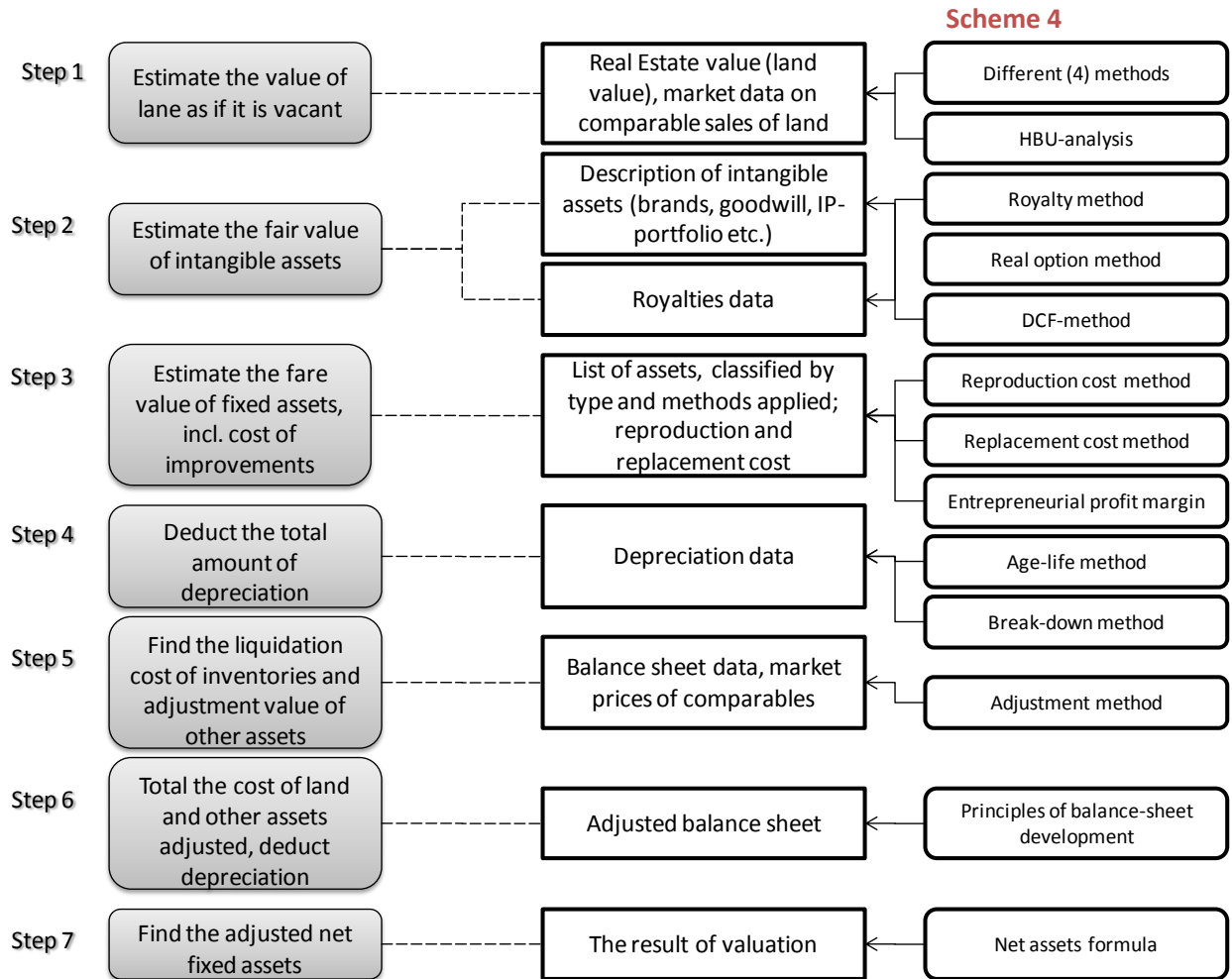
See for example a balance sheet of Omega Inc. in the table below.

Table 8

Assets		Liabilities	
Cash	20	Accounts payable	70
Accounts receivable	50	Bank debt	50
Inventories	100	Long-term debt	150
Assets	600	Shareholder`s equity	500
Total Assets	770	Total liabilities	770

Assets include fixed assets (Real estate (land) and Real property), intangible assets (such as goodwill, brands) and intellectual property.

4.3. The procedure (see Scheme 4) is to adjust each asset and liability item on the balance sheet to its fair market value.



4.4. There are several methods for measuring different types of business assets in the cost-based approach. It depends on the step of valuation procedure (Scheme 4), which of methods needed to be applied.

1) *Methods of estimating the value of Land (Step 1, Scheme 4), include the following*

- Sales comparison method
- Capitalization of **Ground rate**
- Abstraction method
- Land build-up method

Sales comparison method is, by far, the most accurate approach to land values and should be used as when sufficient sales are available. First, the appraiser must gather all land sales and study each one to determine if they are **arms length sales**. All unusual and questionable sales should be removed from the study. Next, we must reduce the remaining “good” sales to a common unit for study purposes. No two parcels of land are exactly alike. Therefore it is necessary to adjust for these differences. Typical adjustments include time of sale, location, shape, size, and topography.

The most usual units of comparison are square foot (is best used to value outlying residential properties, commercial and small industrial sites), acres (is used in valuing large parcels), front foot (downtown commercial properties and residential properties with uniform lot sizes).

*The capitalization of **ground rent** method* is used when the income from the property is completely independent of any improvements. The ground rents can be capitalized at an appropriate rate to indicate a market value of the site.

Abstraction is a method in which land value is extracted from the sale price of an **improved property**. This method involves subtracting the depreciated **replacement cost** of improvements from the actual sale price for that property. The remainder would be an indicated value for the land portion of the property.

The land build-up method may be considered when there is insufficient sales data. This method is seldom used under normal conditions and should be considered only as a last resort in establishing unit land values.

2) *Methods of estimating intangible Assets (brands, goodwill) or intellectual property – (Step 2, Scheme 4) include the following*

- Discounted Cash Flow analysis (income based approach);
- **Royalty rates** method (market based approach);
- Real-options method

Under *the Discounted Cash Flow* method the value of an intangible asset is estimated on the expected income attributable to the intangible asset during its remaining **economic life**. The fair value of asset can be expressed as the present value of the future stream of the economic benefits that are derived from the ownership of the property. The future stream of economic benefits is often measured by the amount of net cash flow to be derived from employment of the property.

The present value is calculated with the formula:

Formula 3

$$PV = \sum_{i=1}^N \frac{CF}{(1+r)^i}$$

Defining **royalty rate** for licensing agreements is another intellectual property valuation – *Royalty rates method*. Relief from royalty is based on deprival value theory and looks at the amount of income that a company would be “deprived” of, if it did not own the intellectual property in question but was required to rent it from a third-party instead. Obtaining a royalty rate is only a first step however and a reliable sales forecast is also required in order to estimate the income that flows directly from the intellectual property. As with other income approaches, an appropriate cost of capital has to be determined.

The *Real Options Method (ROM)* recognizes that a patent has intrinsic value based on its projected cash flows discounted at the opportunity cost of capital for the owner of the intellectual property. Additionally, the ROM incorporates the value associated with the

uncertainty inherent in a business and the active decision making required for a patent-based business strategy to succeed. The ROM values these items using the **Black-Scholes option-pricing model**.

3) *Methods of estimating the fair market value of fixed assets (Step 3, Scheme 4) include two groups*

- Methods for measuring the **reproduction cost** of an asset;
- Methods for measuring the **replacement cost** of an asset.

Reproduction cost is sometimes difficult to measure because the same building materials or methods are not available. The **Replacement cost** rather than Reproduction cost is used as the basis for the cost approach in most appraisal situations where cost is considered an appropriate measurement of value.

There are several methods used to arrive at a cost value: the quantity survey method (reproduction cost), the unit-in-place method (replacement cost), and the square foot method (replacement cost).

The quantity survey method requires that the appraiser create a detailed inventory of every item of material, equipment, labor, overhead, and fees involved in the construction of a property. This method is not routinely used by appraisers because it is extremely time consuming.

The unit-in-place method combines direct and indirect costs into a single cost for a building component (the unit-in-place) which is then multiplied by the area of the portion of the building being valued to arrive at a total cost for that component. These allow the appraiser to make adjustments for individual components for various types of structures.

The square foot method combines all the costs for a particular type and quality of structure into one value as a cost per square foot (or cubic foot). This method produces a value based on the floor area of the structure. The cubic foot method is used when the wall height varies within a building class, such as warehouses or factories.

4) *Methods of calculating the **Depreciation** (Step 4, Scheme 4) include:*

- Break down method - estimate the loss in value attributable to each of the three categories of depreciation -physical, functional, and external.
- Age-life - measures the relationship between effective age and total life. (Effective age is related to usefulness, condition, and remaining life expectancy).

5) *Methods of calculating the liquidation cost and making the adjustments (Step 5, Scheme 4)*

The liquidation value of an asset is calculated by deducting the liquidation expenses (tax expenses, extra payments for used inventories) from the book value of an asset.

It is important to note that accounts receivable should be adjusted with the possibility of payment and its duration. For example all bad debts should be deducted from the value of accounts receivable. The adjustment can be done with the Formula 4.

Formula 4

$$AV_{Acc\ Rec} = \frac{BV_{Acc\ Rec}}{(1+r)^n}$$

$AV_{Acc\ Rec}$ – adjustment value of accounts receivable;

$BV_{Acc\ Rec}$ – book value of accounts receivable;

R – discount rate, including the free risk rate and possibility of payment;

N – period of payment of accounts receivable.

Sometimes financial assets (stocks, bonds and other securities) of a company are needed to be adjusted as well. For example if their book value is less than their current value at a stock markets. If there is a lack of stock market data a usual price models of securities can be applied. For example the dividend model can be used to define the fair price of a stock

Formula 5

$$P = \frac{Div}{r - g}$$

P – price of a stock

Div – dividends

r- discount rate, including the free risk rate and risk of stock investments;

g – the growth rate of dividends.

→ FORMULA

The result of valuation of equity in the cost-based approach is

Formula 6

$$AE = LV + IP + AV_{Acc\ Rec} + LC_{Inventories} + FA - Dep - Debts$$

AE – asset-based value of equity;

LV – market value of land;

IP – market value of intangible assets (incl. intellectual property);

$AV_{Acc\ Rec}$ – adjustment value of accounts receivable;

$LC_{Inventories}$ – liquidation cost of inventories;

FA – market value of fixed assets;

Dep – amount of depreciation;

Debts – market value of company's debts.

Asset-based value of a business is

Formula 7

$$AV = AE + Debts$$

→ EXAMPLE

Example 1 /Developing the adjusted balance-sheet/

Find the cost-based value of equity of a company Omega Inc., using the following detailed balance sheet and information about its assets.

Assets		Liabilities	
Cash	20	Accounts payable	70
Accounts receivable	50	Bank debt	50
Inventories	100	Long-term debt	150
Patent (IP-portfolio)	60	Shareholder`s equity	500
Buildings (Fixed assets)	140		
Machinery (Fixed assets)	250		
Stocks (Financial assets)	50		
Real Estate (land)	100		
Total Assets	770	Total liabilities	770

- Accounts receivable includes 10 millions of bad debt. According to accountant of a company 20 millions of accounts are to be paid in the end of the year, the rest – in 2 years later;
- To have a market value of inventories a discount of 20% is applied;
- Fixed assets (machinery and buildings) has a total market value of 425 according to an expert;
- Stocks are not public traded now and their book value should be adjusted subject to dividends are expected at \$12 per year at discount rate of 15% and growth rate of 2%;
- Patent`s economic life is 5 years, with expected operating cash flows of \$40, \$40, \$55, \$55 and \$75 and discount rate of 35%. Present value of development cost – \$20;
- Real Estate has a fair market value of 110 according to an expert;
- The calculated depreciation cost of fixed assets is \$20 and it matches the book value of depreciation.

The balance sheet of Omega Inc., including all the adjustments, is in table below.

Book value of assets		Adjustments	Adjusted value
Cash	20	-	20.00
Accounts receivable	50	- 14.88	35.12
Inventories	100	- 20.00	80.00
Patent (IP-portfolio)	60	27.22	87.22
Buildings & Machinery(Fixed assets)	390	35.00	425.00
Stocks (Financial assets)	50	42.31	92.31
Real Estate (land)	100	10.00	110.00
Total	770	79.6	849.65

The cost of equity of Omega Inc. according to Formula 6 is as follows

$$AE = 110 + 87.22 + 35.12 + 80 + 425 + 92.31 - 150 = 699.65$$

→ **WIKI**

ARM'S LENGTH SALES – A transaction, in which the buyers and sellers of a product act independently and have no relationship to each other.

BLACK SCHOLES PRICING MODEL – is a mathematical model of a financial market containing certain derivative investment instruments.

DEPRECIATION – The loss in value in property from any cause (there are three types of depreciation – physical, functional and external).

ECONOMIC LIFE – The expected period of time during which an asset is useful to the average owner. The economic life of an asset could be different than the actual physical life of the asset.

GROUND RENT is the amount paid for the right to use a parcel of land according to the terms of a ground lease.

IMPROVED PROPERTY (LAND) Land that is undeveloped, or in agricultural use, is considered unimproved. Land that has been developed to the extent that it is ready to be built upon is considered a site. The off-site improvements which make undeveloped land a site include streets and utilities.

REPRODUCTION COST – the cost of construction at current prices of an exact duplicate or replica using the same materials, construction standards, design, layout, and quality of workmanship.

REPLACEMENT COST – the cost of construction at current prices of an improvement having equivalent utility to the improvement being appraised, but constructed with modern materials and according to current standards, design, and layout.

ROYALTY RATE – represents the rental charge, which would be paid to the licensor if this hypothetical arrangement were in place.

→ **QUIZZES AND EXERCISES**

Ex.4.1. What's the advantages and disadvantages of the asset-based approach. Please fill the table below, choosing the proper answer from the following list of statements:

Possible advantages (10 statements):

- Includes the financial structure of the company/transaction (and leverage effect)
- Simple valuation method based on limited data
- Clear statement on the fundamental value of company
- Independence from accounting standards

- Takes into consideration actual market data
- Not based on a business plan or outlook or forecasting
- It is useful for measuring the value of loss-making companies, when other approaches are not applicable
- Future oriented approach
- Data are often publicly available
- Limited possibilities for manipulations of results

Possible disadvantages (7 statements):

- No consideration of the development of earnings, of synergies or future opportunities
- Complexity of the calculations involved
- The approach based on market data, which are relevant to speculative fluctuations and crisis
- Individual strengths and unique opportunities of the company to be valued are not taken into account
- Purely history based method
- Sometimes not applicable because of lack of data available to appraiser
- Projection on the basis of subject assessment and expectation of future of business

Advantages	Disadvantages
1)	1)
2)	2)
3)	3)
...	...

Ex.4.2 Find the cost-based value of a company Alfa Inc., using the following detailed balance sheet and information about its assets.

Assets		Liabilities	
Cash	35	Accounts payable	50
Accounts receivable	75	Bank debt	0
Inventories	120	Long-term debt	200
Patent (IP-portfolio)	50	Shareholder`s equity	1100
Buildings (Fixed assets)	120		
Machinery (Fixed assets)	550		
Stocks (Financial assets)	100		
Real Estate (land)	300		
Total Assets	1350	Total liabilities	1350

- Accounts receivable includes 25 millions of bad debt. According to accountant of a company 25 millions of accounts are to be paid in the end of the year, the rest – in 2 years later;
- To have a market value of inventories a discount of 20% is applied;
- Fixed assets (machinery and buildings) has a total market value of 760 according to an expert;

- Stocks are not public traded now and their book value should be adjusted subject to dividends are expected at \$20 per year at discount rate of 11% and growth rate of 4%;
- Patent's economic life is 7 years, with expected operating cash flows of \$30, \$30, \$15, \$15, \$40, \$20 and \$55 and discount rate of 40%. Present value of development cost – \$20;
- Real Estate has a fair market value of 320 according to an expert.

Ex.4.3. Fill in the empty cells in the table below and find the value of a land using the build-up method and the following information from an expert.

A developer purchases five acres of raw land at \$15,000.00 per acre; he surveys the lots and ends up with three lots per acre. He puts in sewer, water, streets, curb, and sidewalks.

Land Purchase	\$ 75,000
Street	\$ 89,300
Curbs	\$ 19,200
Storm Sewer & Inlets:	\$ 38,700
Sanitary Sewer:	\$ 21,600
Sidewalk:	\$ 8,000
Engineer fees	\$ 3,500
Total:	
Developer's profit – 20%	
Total value of land	

Ex.4.4 Fill in the empty cells in the table below and find the value of a land using the abstraction method and the following information from an expert.

Sales price	\$ 230,000
Replacement cost	\$ 280,000
Physical Depreciation:	30%
Functional Obsolescence:	10%
Economic Obsolescence:	0%
Estimated value of improvements	
Indicated value of land	

Ex.4.5. Fill in the empty grey cells in tables below and find the value of a land of 6.0 acres, using sales comparison method.

There are four transactions of comparable parts of land on the market. The results of comparison are in the table below.

	Site 1	Site 2	Site 3	Site 4
Price	55,000	100,000	125,000	200,000
Acres of land	5.0	7.5	8.0	10.00
Payment conditions	100%	100%	100%	40% at the date and 60% during 9 months (3% a year)

	Site 1	Site 2	Site 3	Site 4
Special time of sale	No	Short-time sale (2 months)	No	No
Location	Residential	Down town	Industrial area	Residential
Special features of topography	No	No	Irregular topography	No

The correction procedure is in the following table.

Points of comparison	Site 1	Site 2	Site 3	Site 4
Price	55.000	100.000	125.000	200.000
Acres of land	5,0	7,5	8,0	10,00
Price of an Acre				
Correction on special payments conditions	No	No	No	
Adjusted price	5,0	7,5	8,0	
Correction on special time of sales	No	+10%	No	
Adjusted price	5,0		8,0	
Correction on location	No	+5%	+10%	
Adjusted price	5,0			
Correction on special feature of topography	No		+12%	
Adjusted price				

The result of valuation is in the following table

The average price of acre of comparable sales of sites, \$ for an Acre	
Number of Acres of the target site	6.00
Value of land, \$	

Ex.4.6 Using the list of assumptions and information about benefits of patent possession for a Biotechnological Company find the net present value of a patent (DCF-model). To calculate the discount rate use CAPM model.

Assumptions

Probability of Success	– 30.0%
Tax Rate	– 35.0%
Cost of Equity (all equity)	– 14.0%
Risk free Interest Rate	– 5.0%
Beta	– 1.5
Market Risk Premium	– 6.0%
Terminal Value	No

Net income forecasting

	0	1	2	3	4	5	6	7	8	9	10
Net operating income	-	\$10	\$10	\$15	\$15	\$25	\$32	\$50	\$115	\$170	\$200
Expected operating cash flow	-	\$5	\$5	\$6	\$7	\$12	\$26	\$45	\$90	\$120	\$160
Expected CFO after tax (35%)	-										
Discount rate, %											
Present Value of Operating Cash Flows											
Present Value of Development Costs	-\$50										
Net Present Value of Patent											

*Ex.4.7*** Find the value of a patent from Task 4.6, using real-option method and **Black-Scholes pricing model**, if it is known that Standard Deviation of Biotechnology Firms (stock market data) is 98.6% and there are 3,650 days until Patent Expiration.*

M5. Income-based valuation methods

→ SOURCES AND USEFUL LINKS

- 1) Pablo Fernandez. Company valuation methods. IESE Business School – University of Navarra, 2004 (see **Chapter 3**), available at <http://www.iese.edu/research/pdfs/DI-0449-E.pdf>
- 2) Damodaran on valuation, the 2nd edition (see **Chapter 7**), available at http://pages.stern.nyu.edu/~adamodar/New_Home_Page/dam2ed.htm
- 3) Print edition Shannon P. Pratt. Valuing a business, the 5th edition.– 1100 p
- 4) Print edition Copland, Koller, Murrin. Measuring and managing the value of a business.

→ LECTURE MATERIALS

5.1 This income-based business valuation method provides highly accurate estimate of business value based on the business earning potential. Under this method, we determine the business value by discounting the future business earnings using the so-called discount rate which captures the business risk.

5.2. The different cash flows methods start with the following expression:

Formula 8

$$V = \frac{CF_1}{1+k} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \dots + \frac{CF_n + VR_n}{(1+k)^n}$$

CF_i – cash flow generated by the company in the period i ;

VR_n – residual value of the company in the year n ;

K – appropriate discount rate for the cash flow's risk.

There are several cash flows – the **free cash flow**, the **equity cash flow**, the **capital cash flow** and the debt cash flow. The **free cash flow (FCF)** enables to measure the total value of a company ($V=E+D$). The **equity cash flow (ECF)** is applied to measure the equity value of a company, and the debt cash flow enables to estimate the investment value of a debt.

5.3. The income-based approach uses the cash flow statement data. You can see the example of free cash flow calculating, based on cash flow statement of Omega Inc. To develop the Cash flow statement you also need data from Income statement and Balance sheet of a company.

Income Statement, Omega Inc. (in \$th.)			
	Year 2010	Year 2011	Year 2012
Sales (revenue)	500	550	575
– Cost of sales	(350)	(300)	(280)
– Depreciation	(10)	(10)	(20)

Income Statement, Omega Inc. (in \$th.)			
	<i>Year 2010</i>	<i>Year 2011</i>	<i>Year 2012</i>
– General expenses	(40)	(45)	(55)
Earnings before interest and tax (EBTDA)	100	195	220
– Interest expenses	(4)	(15)	(35)
Earnings before tax	96	180	185
– Taxes (30%)	(32)	(54)	(55.5)
Net income	64	126	130
– Dividends	(34)	(40)	(45)
Retained earnings	30	86	85

Balance Sheet of Omega Inc. (in \$th.)			
Assets	<i>Year 2010</i>	<i>Year 2011</i>	<i>Year 2012</i>
Cash	20	25	45
Accounts receivable	50	70	100
Inventories	100	110	110
Assets	600	650	870
Total Assets	770	855	1125
Liabilities	<i>Year 2010</i>	<i>Year 2011</i>	<i>Year 2012</i>
Accounts payable	70	80	100
Bank debt	50	75	150
Long-term debt	150	200	375
Shareholder`s equity	500	500	500
Total liabilities	770	855	1125
Working capital*	100	125	155

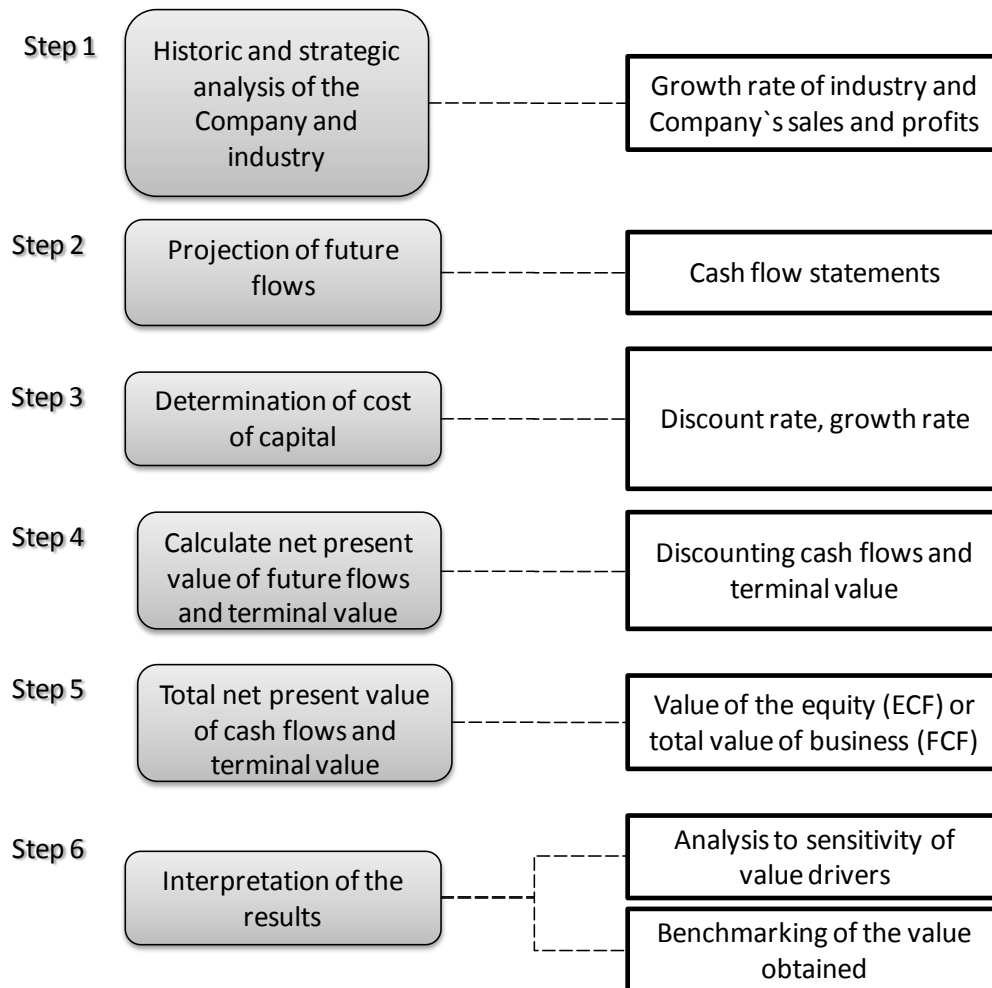
* **Working capital** = Cash + Accounts Receivable + Inventories – Accounts Payable

Free cash flow Statement, Omega Inc. (in \$th.)				Source of data
	<i>Year 2010</i>	<i>Year 2011</i>	<i>Year 2012</i>	
Earnings before interest and tax (EBTDA)	100	195	220	Income Statement
– Tax paid on EBT	(32)	(54)	(55.5)	Income Statement
Net income without Debt	68	141	164.5	
+ Depreciation	(10)	(10)	(20)	Income Statement
+ Increase in Debt	0	50	175	Balance Sheet
– Increase in Fixed Assets	0	(50)	(220)	Balance Sheet
– Increase in Working Capital	0	(25)	(30)	Balance Sheet
Free cash flow	58	106	69.5	

Note the source of data in Free Cash flow statement. To know the Earnings and Taxes an income statement is used. The increase in Debt, Fixed Assets and Working Capital are calculated by a balance sheet data.

5.4. The procedure of income-based approach includes several steps (see Scheme 5).

Scheme 5



→ **FORMULAS**

To calculate free cash flows and total value of business by DCF-method you need formulas below:

Formula 9

$$FCFF_t = (EBIT) * (1 - T) - (CE - D) - \Delta NCWC$$

- FCFF – free cash flow to firm;
- EBIT – earnings before interest and taxes;
- CE – capital expenditures;
- D – Depreciation;

Δ NCWC – changes in non-cash working capital

Formula 10

$$V_{FCFF} = PV + \frac{TV_{n+1}}{(1 + WACC)^n}$$

V_{FCFF} – total value of business (E+D), measured by DCF-method;
 PV – present value of future cash flows;
 TV – terminal value of a firm;
 WACC – weighted average cost of capital.

Formula 11

$$PV = \sum_{t=1}^n \frac{FCFF_t}{(1 + WACC_t)^t}$$

n – quantity of years in forecasting period.

Formula 12

$$TV = \frac{FCFF_{n+1}}{WACC - g}$$

g – growth rate of future free cash flows after the forecasting period.

Formula 13

$$WACC = k_e \cdot \frac{E}{E + D} + k_d \cdot (1 - T) \cdot \frac{D}{E + D}$$

k_e – cost of equity (required return to equity which reflects the equity's risk);
 k_d – cost of debt (required return to debt);
 E – market value of the Equity;
 D – market value of the Debts;
 T – Tax rate.

To determine the cost of equity the **Capital Asset Price Model** can be applied (CAPM).

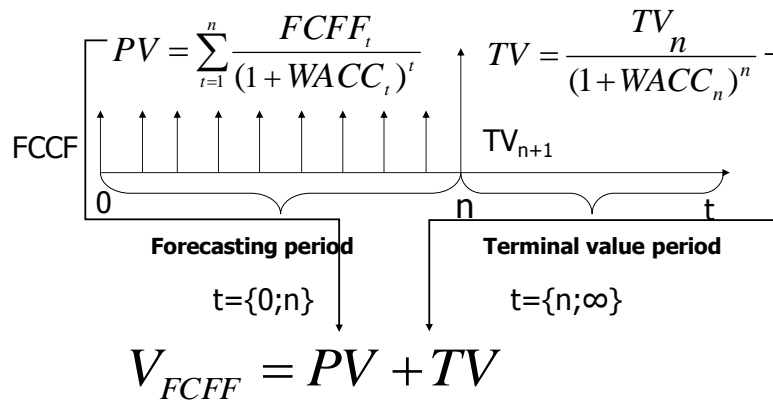
Formula 14

$$k_e = R_{fr} + \beta \times (R_M - R_{fr})$$

k_e – cost of equity (required return to equity which reflects the equity's risk);
 R_{fr} – free risk Rate;
 β – betta coefficient of publicly-traded shares of a Company;
 R_M – rick-premium (average market rate of return).

To understand the valuation procedures see the Scheme 6.

Scheme 6


→ EXAMPLE

Let's find the total value and equity value of Omega Inc., using the income-based approach and DCF-methods of valuation.

Step 1 /Historic and strategic analysis/

After analyzing the industry and its perspectives the following statements about the future business of Omega Inc. were made by an expert:

- The forecasting period is of 8 years and it includes the inertial period of 4 years and 4 years of investment program period;
- The first 4 years the sales` growth is of 2% because of the industry growth;
- The investment program of Omega Inc. during the following 4 years enables to increase the growth of sales by 12% every year and to decrease the share of cost of sales from 65% to 50%;
- The depreciation will increase from \$th.20 to \$th.50 in the investment period;
- The investment program is of \$ th.400, and is to be financed by bonds issuing of \$th.400 at a rate of 4% a year;
- The share of working capital is 27% and will be fixed during the forecasting period;
- The general expenses are growing at inflation rate (2%) during the forecasting period;
- The growth rate of flows of terminal value after the end of forecasting period is of 0%.

To calculate the discount rate the following adjustments were made:

- | | |
|----------------------------------------------------|------|
| ○ The cost of Debt during the inertial period is | 3.5% |
| ○ The risk-premium (average market rate of return) | 10% |
| ○ Free-risk Rate | 3% |
| ○ β -coefficient | 0.8 |

Step 2 /Projection of future cash flows/

The following projection of three statements was made on the basis of results of strategic and historic analysis. First of all the Income statement (see Scheme 7) and the Balance sheet (Scheme 8) were made for 8-years forecasting period.

Scheme 7

65% and 50% - share of costs

2% and 12% - sales growth

	(1) Year 2013	(2) Year 2014	(3) Year 2015	(4) Year 2016	(5) Year 2017	(6) Year 2018	(7) Year 2019	(8) Year 2020
Sales (revenue)	587	598	610	622	697	781	874	979
- Cost of sales	- 381	- 389	- 397	- 405	- 349	- 390	- 437	- 490
- Depreciation	- 20	- 20	- 20	- 20	- 50	- 50	- 50	- 50
- General expenses	- 56	- 57	- 58	- 60	- 61	- 62	- 63	- 64
- Interest expenses	-35	-35	-35	-35	-51	-51	-51	-51
Earnings before tax	94	97	100	103	187	227	273	324
- Taxes (30%)	28	29	30	31	56	68	82	97
Net income	122	126	130	134	243	296	355	422
- Dividends (100%)	-122	-126	-130	-134	-243	-296	-355	-422
Retained earnings	0	0	0	0	0	0	0	0

Inertial period Investment period

4% - bonds' interest rate

Scheme 8

27% - share of WorkCap in Sales

Assets								
	(1) Year 2013	(2) Year 2014	(3) Year 2015	(4) Year 2016	(5) Year 2017	(6) Year 2018	(7) Year 2019	(8) Year 2020
Working capital	158	162	165	168	188	211	236	264
incl. Accounts receivable&Inventories								
- Accounts payable								
Assets	870	870	870	870	1270	1270	1270	1270
Total Assets	1028	1032	1035	1038	1458	1481	1506	1534
Liabilities								
	(1) Year 2013	(2) Year 2014	(3) Year 2015	(4) Year 2016	(5) Year 2017	(6) Year 2018	(7) Year 2019	(8) Year 2020
Accounts payable (incl.in work.cap.)								
Bank debt	153	157	160	163	183	206	231	259
Long-term debt	375	375	375	375	775	775	775	775
Shareholder's equity	500	500	500	500	500	500	500	500
Total Liabilities	1028	1032	1035	1038	1458	1481	1506	1534
Share of Work.Cap. In sales	27,0%	27,0%	27,0%	27,0%	27,0%	27,0%	27,0%	27,0%

\$th.400 of investments

Based on Income Statement and Balance Sheet the forecasting of free cash flows (Formula 9) were made (Scheme 9).

Scheme 9

	(1) Year 2013	(2) Year 2014	(3) Year 2015	(4) Year 2016	(5) Year 2017	(6) Year 2018	(7) Year 2019	(8) Year 2020
Earnings before interest and tax (EBTDA)	129	132	135	138	238	278	324	375
- Tax paid on EBT	- 28	- 29	- 30	- 31	- 56	- 68	- 82	- 97
Net income without Debt	101	103	105	107	182	210	242	278
+ Depreciation	20	20	20	20	50	50	50	50
- Increase in fixed assets	0	0	0	0	-400	0	0	0
- Increase in Working Capital	0	- 3	- 3	- 3	- 20	- 23	- 25	- 28
Free cash flow	121	120	122	124	-188	238	267	300

Step 3 /Determination of cost of capital/

To calculate the discount rate (the weighted average cost of capital (Formula 13)) CAPM-model (Formula 14) were applied:

$$K_e = 3\% + 0.8(10\% - 3\%) = 8.4\%$$

2013-2016:

$$K_d = 3.5\% \quad D/(E+D) = 0.43$$

$$K_e = 8.4\% \quad E/(E+D) = 0.57$$

$$WACC = 8.4\% \times 0.57 + 3.5\% \times 0.43 \times (1 - 0.3) = 5.85\%$$

2017-2020:

$$k_D = 3.5\% \times \frac{375}{375 + 400} + 4\% \times \frac{400}{375 + 400} = 3.76\%$$

$$K_d = 3.5\% \quad D/(E+D) = 0.43$$

$$K_e = 8.4\% \quad E/(E+D) = 0.57$$

$$WACC = 8.4\% \times 0.57 + 3.5\% \times 0.43 \times (1 - 0.3) = 4.89\%$$

Step 4 /Calculation of the net present value of future cash flows and terminal value/

Scheme 10

Formula 11

	(1) Year 2013	(2) Year 2014	(3) Year 2015	(4) Year 2016	(5) Year 2017	(6) Year 2018	(7) Year 2019	(8) Year 2020
Free cash flow	121	120	122	124	- 188	238	267	300
Weighted average cost of capital	5.85%	5.85%	5.85%	5.85%	4.89%	4.89%	4.89%	4.89%
Discount coefficient	1.0585	1.1204	1.1860	1.2553	1.3167	1.3811	1.4487	1.5195
Discounted free cash flow	114	107	103	99	- 143	172	184	197
Sum of Discounted FCF	833							
Terminal value								6 127
Discounted terminal value	4 033							
Total Value	4 866							

$$= 6127 / 1.5195$$

Formula 10

$$= 300 / (0.0489 - 0)$$

Formula 12

$$= 1.0585 \times (1 + 0.0585)$$

$$= 238 / 1.3811$$

Step 5 /Total value and Equity value of a Company/

The total value of Omega Inc. by income-based approach (DCF-method) is **4,866 \$th**

The equity value is calculated as

$$E = V - \text{Net Debt, where Net Debt} = \text{Debt} - \text{Cash}$$

$$4,866 - (375 - 45) = \mathbf{4,536 \$th}$$

→ WIKI

EQUITY CASH FLOW (ECF) – represents funds a company receives from investors. While the most common form of equity financing is from common and preferred stock sales, companies can also receive direct investment from other companies and large private investors.

FREE CASH FLOW (FCF) – A measure of financial performance calculated as operating cash flow minus capital expenditures. Free cash flow (FCF) represents the cash that a company is able to generate after laying out the money required to maintain or expand its asset base.

CAPITAL ASSET PRICE MODEL (aka CAPM) – is used to determine a theoretically appropriate required rate of return of an asset, if that asset is to be added to an already well-diversified portfolio, given that asset's non-diversifiable risk. The model takes into account the asset's sensitivity to non-diversifiable risk (also known as systematic risk or market risk), often represented by the quantity beta (β) in the financial industry, as well as the expected return of the market and the expected return of a theoretical risk-free asset.

WORKING CAPITAL (WCR) – is a financial metric which represents operating liquidity available to a business, organization or other entity, including governmental entity. Along with fixed assets such as plant and equipment, working capital is considered a part of operating capital. Net working capital is calculated as current assets minus current liabilities.

→ QUIZZES AND EXERCISES

Ex.5.1. What`s the advantages and disadvantages of the income-based approach. Please fill the table below, choosing the proper answer from the following list of statements:

Possible advantages (10 statements):

- Includes the financial structure of the company/transaction (and leverage effect)
- Simple valuation method based on limited data
- Clear statement on the fundamental value of company
- Independence from accounting standards
- Takes into consideration actual market data
- Not based on a business plan or outlook or forecasting
- It is useful for measuring the value of loss-making companies, when other approaches are not applicable

- Future oriented approach
- Data are often publicly available
- Limited possibilities for manipulations of results

Possible disadvantages (7 statements):

- No consideration of the development of earnings, of synergies or future opportunities
- Complexity of the calculations involved
- The approach based on market data, which are relevant to speculative fluctuations and crisis
- Individual strengths and unique opportunities of the company to be valued are not taken into account
- Purely history based method
- Sometimes not applicable because of lack of data available to appraiser
- Projection on the basis of subject assessment and expectation of future of business

Advantages	Disadvantages
1)	1)
2)	2)
3)	3)
...	...

Ex.5.2. Using the Pablo Fernandez` publication (Valuing companies by cash flow discounting: ten methods and nine theories), study the other formulas and methods of DCF-valuation. Fill the gaps in the following formulas.

To measure the value of a company by **discounting the equity cash flows** at the required return of equity, you may use the following formulas:

$$ECF = \text{_____}$$

Where FCF – free cash flow;
 ΔD – changes in the market value of debts;
 I – interest rate;
 T – taxes.

$$V_{ECF} = \text{_____}$$

Where ECF – equity cash flow
 K_e – required return to equity (incl.equity`s risk).

To measure the value of a company by **discounting the capital cash flows** at the weighted average cost of equity and debt before tax ($WACC_{bt}$) you may use the following formulas:

$$CCF = \text{_____}$$

Where ECF – equity cash flow;
 ΔD – changes in the market value of debts;
 I – interest rate.

$$WACC_{bt} = \text{_____}$$

Where E – market value of equity;
 D – market value of debt;
 K_e – required return to equity (incl.equity`s risk);
 K_d – required return to debt (market cost of Debts).

$$V_{CCF} = \text{_____}$$

Where CCF – capital cash flow
 $WACC_{bt}$ – weighted average cost of equity and debt before tax.

Ex.5.3. By using the formulas of the Capital cash flow and Equity cash flow methods from Ex.5.2., calculate the total value and the equity value of Omega Ltd. Fill the table below.

Results of ECF-method of valuation	
Value of equity (ECF-method) of Omega Ltd. =	
Total value of Omega Ltd. by ECF-method =	
Results of CCF-method of valuation	
Weighted average cost of equity and debt before tax=	
Value of equity (CCF-method) of Omega Ltd. =	
Total value of Omega Ltd. by CCF-method =	

Ex.5.4. Fill the gaps (the empty cells) in the table below and develop the Cash Flow Statement of Alfa Inc. To calculate the gaps use the balance sheet and income statement of the Company.

Income Statement, Alfa Inc.			
	Year 2010	Year 2011	Year 2012
Sales (revenue)	600	750	580
– Cost of sales	(300)	(450)	(300)
– Depreciation	(20)	(20)	(40)
– General expenses	(40)	(45)	(55)
Earnings before interest and tax (EBTDA)			
– Interest expenses	(14)	(25)	(55)
Earnings before tax			
– Taxes (30%)			

Income Statement, Alfa Inc.			
	<i>Year 2010</i>	<i>Year 2011</i>	<i>Year 2012</i>
Net income			
– Dividends (50%)			
Retained earnings			

Balance Sheet of Alfa Inc.			
Assets	<i>Year 2010</i>	<i>Year 2011</i>	<i>Year 2012</i>
Cash	30	45	55
Accounts receivable	55	60	110
Inventories	80	85	80
Assets	700	850	970
Total Assets			
Liabilities	<i>Year 2010</i>	<i>Year 2011</i>	<i>Year 2012</i>
Accounts payable	100	120	130
Bank debt	50	75	150
Long-term debt			
Shareholder`s equity	600	600	600
Total liabilities			
Working capital*			

Free cash flow Statement, Alfa Inc.				Source of data
	<i>Year 2010</i>	<i>Year 2011</i>	<i>Year 2012</i>	
Earnings before interest and tax (EBTDA)				Income Statement
– Tax paid on EBT				Income Statement
Net income without Debt				
+ Depreciation				Income Statement
+ Increase in Debt				Balance Sheet
– Increase in Fixed Assets				Balance Sheet
– Increase in Working Capital				Balance Sheet
Free cash flow				

Ex.5.5. Find the total value and the equity value of Alfa Inc. by DCF-method (FCFF), using the Example following adjustments about the forecasting of future cash flows of the Company:

After analyzing the industry and its perspectives the following statements about the future business of Alfa Inc. were made by an expert:

- The forecasting period is of 8 years and it includes the inertial period of 4 years and 4 years of investment program period;
- The first 4 years the sales` growth is of 5% because of the industry growth;

- The investment program of Alfa Inc. during the following 4 years enables to increase the growth of sales by 18% every year and to decrease the share of cost of sales to 40%;
- The depreciation will increase from \$th.40 to \$th.100 in the investment period;
- The investment program is of \$ th.600, and is to be financed by bonds issuing of \$th.600 at a rate of 6% a year;
- The share of working capital will be fixed during the forecasting period;
- The general expenses are growing at inflation rate (3%) during the forecasting period;
- The growth rate of flows of terminal value after the end of forecasting period is of 1%.

To calculate the discount rate the following adjustments were made:

- | | |
|----------------------------------------------------|-----|
| ○ The cost of Debt during the inertial period is | 5% |
| ○ The risk-premium (average market rate of return) | 15% |
| ○ Free-risk Rate | 4% |
| ○ β -coefficient | 0.6 |