Introduction to Corporate Finance

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Abstract This chapter provides a comprehensive overview of the main topics discussed in a first-year MBA class on corporate finance. One more motivation is not only to summarize them but also to provide some hands-on tools that can be applied in practice in relevant to corporate finance positions. Section 1 introduces the reader to the corporate finance field, the organizational structure of the firm, the conflicts between stakeholders, the financial management decisions as well as the financial markets. Section 2 refers to the utility of financial statements and provides the way to extract the necessary information from them. Later on, we discuss about the cost of capital and its fundamental importance in the capital structure of the firm. Finally, we present some tools for capital budgeting decisions and project valuation such as net present value, internal rate of return, and discounted payback period. Attention is also paid to the dividend policy of the firm and its consequences to the firm's earnings. The chapter concludes by presenting some of the most important techniques in equity and business valuation such as free cash flow and discounted cash flow analyses.

1 Introduction

Corporate finance is a specialization in finance that deals with the sources of funding, the capital structure of a corporation/entity, the actions that managers take to increase the shareholder value of the firm, as well as the tools and analysis used to allocate financial resources (Wikipedia).

In academic terms, the principal goal of a Corporation is to maximize shareholder value. It is also referred as value maximization or Net Present Worth maximization. This goal concerns the amount and share of national income which is

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paid to the owners of the firm. Therefore, managers should take the appropriate decisions that maximize the shareholder wealth or generate a Net Present Value (NPV).

Shareholder value is a situation where the value created by the use of resources is more than the total of input resources. Moreover, the profit maximization goal orients the investment, financing, and dividend decisions of the firm toward that. However, profit maximization is a vague and ambiguous concept. It ignores the differences in terms of the timing of benefits acquired from investment proposals. And it also ignores the quality of benefits associated with an investment proposal.

There are two approaches in corporate finance: the *traditional* and the *modern* one. The *Traditional approach* defines corporate finance as the management of financial resources of a corporation/business entity. Alternatively, it is also referred as *collection of funds approach* since it limits the finance functions only to the procurement funds and ignores the use of the other types of funds.

Corporate finance, within its *Modern Approach*, does not only deal with financing decisions, but also with investment and current management decisions. It is considered as an understandable and internationally accepted approach with the procurement of funds and its efficient usage.

Therefore, corporate finance is about planning, raising, investing, and monitoring the finance in a corporation.

1.1 Organizational Structure of the Firm

Corporate finance applies to all types of businesses. The financial management of a corporation/entity differs according to its type: *Sole Proprietorship*, *Limited Liability Company*, *Partnership*, *Trust*, *Corporation*, *Small and Medium* (SME) [7].

The decisions are taken by the owners in SMEs and by professional managers in large companies. Therefore, the authority/responsibility in running the financial management of a corporation/entity belongs to the *chief financial officer* (CFO). The *CFO or financial manager* is the buyer of capital (via the traditional corporate finance approach). He/She negotiates with various investors (bankers, shareholders, bond investors) in order to obtain the necessary funds to run the business at the lowest attainable cost. These transactions usually take place in the capital markets.

The *financial manager* also establishes the appropriate relationship among people involved in finance functions within the organization, assures division of work, and prevents confusions on roles and responsibilities of employees, duplication, and overlapping of activities. The *treasurer* follows in hierarchy and oversees *financial planning*, *capital expenditures*, *cash management*, and *credit management* within a firm. Finally, the *Controller* monitors *financial, cost accounting*, *and taxation*.

Figure 1 is taken by the Webpage www.slideshare.net and shows a business organ gram. Its practical usage is well acknowledged within practitioners as a way to avoid role confusions.

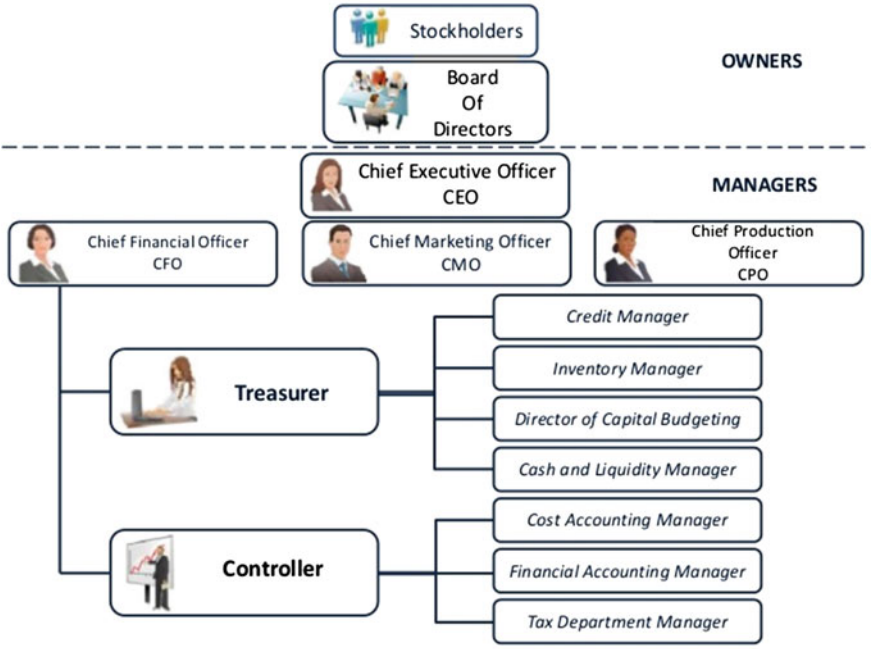

Fig. 1 Organ gram of a business entity (in this chapter, the focus is on the *left side* that represents the financial management of the firm and its managers)

The *financial management division* within a corporation accounts for the following functions:

I. planning and budgeting,
II. allocating resources,
III. operating, monitoring and safeguarding, and
IV. evaluating and reporting.

From a practitioner's point of view, the possible goals of *Financial Management* are various. First of all, it includes the survival of the firm and the fight against the competition. It also targets on the maximization of sales, net income, market share, and the value of investment shares while it also aims at minimizing costs.

From an academic point of view, the goal of *financial management* is to maximize the fundamental or economic value of investment shares. This goal stems from the fact that shareholders own shares and the principal goal of the firm is to maximize shareholder value. Manager's goal is to act in such a way as to accomplish this principal goal, as well. However, the limitation comes from the fact that this value is not directly observable.

Some academics consider that the principal goal of a corporation should be stock price maximization (as previously mentioned) rather than wealth maximization. Therefore, these two are deemed as equivalent.

1.2 Agency Problem

The *principal* (shareholders)—*agent* (manager) *problem*, *agency theory,* or *agency dilemma*—was first introduced by Jensen and Meckling, in 1976. According to Wikipedia, "*it occurs when one person or entity (agent) is able to make decisions on behalf of, or that impact, another person or entity (principal). The dilemma exists because the agent is sometimes motivated to act in his/her own best interests rather than those of the principal.*" [19]

In lots of firms, shareholders let the management of the firm to foreign control (managers/directors). However, based on this theory, this leads to a risk:

- in determining managerial accountability when letting managers run the firm.
- Another risk that exists is that shareholders are at information disadvantage as compared to managers.
- It is also very difficult to evaluate how well a manager has performed since he possesses information advantage over the shareholders.
- Finally, it takes significant amount of time to monitor the results of the decisions managers made.

1.3 Conflicts Between Company Stakeholders

As previously mentioned, in theory, managers should work, in the best interest of the shareholders. Unfortunately, this does not always happen in practice, since managers may maximize their own wealth (in the form of high salaries) at the cost of shareholders, buy other companies to expand their power, venturing onto fraud, manipulate financial figures to comment on bonuses and stock price-related options.

There are various solutions in order to resolve the conflicts between the shareholders and the managers:

- First, comes the increase of managerial compensation.
- Second, shareholders may intervene directly on to the matter.
- Third, there is a threat of firing.
- Fourth, there is a threat of hostile takeovers [4].

These conflicts do exist between shareholders and creditors as well. Shareholders via managers make decisions by ignoring the interest of creditors. Therefore, a manager may decide to invest in a risky project. If this project succeeds, all benefits go to its shareholders and creditors will only receive the already fixed low rate of return. On the contrary, if this project fails, creditors have to share the losses with all the other parties.

In order to resolve these conflicts between shareholders and creditors, creditors may request an additional compensation for the increased risk they are bearing or they may request protective terms and conditions into the contract they are signing with shareholders.

1.4 Financial Management Decisions

The three types of *financial management decisions* that corporate finance seeks to answer are the following:

- *Capital budgeting*,
- *Capital structure*, and
- *Working capital management*.

Within the Capital budgeting decisions, the firm seeks to answer:

- What long-term investments or projects should a firm take on?

Capital budgeting is a process of planning and managing the long-term investments of a firm [3]. In such type of decisions, a financial manager identifies potential investment opportunities that are profitable for the firm. For instance, a technology firm that decides on whether or not to open a new branch is a capital budgeting decision. Some of the main issues that capital budgeting deals with are the size of cash inflows and outflows of such a potential project, timing of cash flows and riskiness of them.

According to the capital structure decisions:

- How should a firm pay for its assets?
- Is it better to use debt or equity?

Capital structure refers to the combination of debt and equity a company uses to finance its long-term operations and growth. The proportions of short- and long-term debt are taken into account in the capital structure analysis of an entity [14]. The most insightful financial ratio in this case is the entity's debt-to-equity ratio that provides information about the level of riskiness of this corporation. It is common that an entity heavily financed by debt is perceived as riskier, due to its high leverage levels [15]. However, at the same time, this entity might enjoy significant tax benefits [1].

Finally, based on the working capital management decisions:

- How would the firm manage its everyday financial activities?

Working capital management refers to the firm's short-term assets including inventory and liabilities. It is a day-to-day operation. It involves planning and managing the firm's current assets and liabilities.

Some examples of working capital management include:

- How should the firm sell to on credit?
- How much inventory should it carry?
- When should it pay its suppliers?

Indeed, financial managers seek to answer some or all of the following questions: How should firms allocate scarce resources to minimize expenses and maximize revenues? How should they finance their activities—via stocks or bonds,

equity (owner capital), or debt (bank loan)? How should a firm use its profits? How much of it should it be reinvested into the company, and how much should it pay out to its shareholders?

1.5 Financial Markets

Financial Markets refer to an exchange where firms refinance their activities.

Cash enters the firm via the sale of debt or equity. This money is used to purchase assets. These assets generate cash that is used to pay stakeholders, reinvest in additional assets, repay debtholders, and pay dividends to stockholders/equityholders [23].

Three main types of exchange markets exist: *primary market, secondary market,* and *over-the-counter market*.

Primary market is where a newly issued security is first offered. Companies, governments, and other groups obtain financing through debt- or equity-based securities.

A *Secondary Market* is the stock market where investors purchase securities or assets from other investors, rather than from issuing companies themselves.

According to NASDAQ, an *Over-the-counter market* is a decentralized market where geographically dispersed dealers are linked by telephones and computers. The market trades securities not listed on a stock or derivatives exchange.

Firms issue stocks and bonds:

A *stock/equity* is a type of security that demonstrates ownership in a corporation and represents a claim on part of the corporation assets and earnings. Stocks are categorized as *common* and *preferred stocks.*

Common stock/equity gives the owner the right to vote at shareholders' meetings and receive dividends. *Preferred stock/equity* has no voting rights but a higher claim on assets and earnings than *common shares*. Holders of preferred stock/equity receive dividends before common stockholders and have priority in case of company's default and liquidation.

A *bond* is a debt instrument issued by governments, corporations, and other entities in order to finance projects or activities. Bonds are commonly referred to as *fixed-income securities.* Many corporate and government bonds are publicly traded on exchange markets, while others are traded only *over-the-counter* (**OTC**) [12].

1.5.1 Financial Market Efficiency

One of the most well-known topics in Financial Market Theory is the *Efficient market hypothesis* (**EMH**). This theory was developed by Eugene Fama in 1970s. It stands as of crucial importance for stock market investors who are usually wondering whether the market is efficient, i.e., whether it reflects all the information made available to market participants at any given point in time. Based on the

EMH, all stocks are perfectly priced according to their inherent investment properties, the knowledge of which all market participants possess equally. However, as every theory, EMH has also its deficiencies which are enumerated below.

- Firstly, EMH assumes that all investors perceive all available information in almost the same way. One main reason for that may be the numerous methods used to analyze and value stocks and the problems they impose on the validity of the EMH.
- Secondly, under the EMH, no single investor is able to attain greater profitability than another with the same amount of investments. This equal possession of information is interpreted as that investors can only achieve identical returns.
- Thirdly, under EMH, no investor should ever be able to beat the market.

All the above imply that markets are not truly efficient. For greater efficiency to occur, the following prerequisites must be met:

- universal access to high-speed and advanced systems of pricing analysis,
- universally accepted analysis system of pricing stocks,
- absolute absence of human emotion in investment decision making,
- investors' willingness to accept that their returns or losses will be exactly identical to all other market participants.

1.5.2 Fundamental Concepts of Risk and Return

– *Arithmetic mean return*

Arithmetic mean return (**AM**) is usually referred to as a simple average or mean and is calculated as such

$$\mathrm{AM} = \frac{\sum_{i=1}^{n} R_t}{T} \tag{1}$$

where
$\mathbf{R_t}$ simple return in period **t** and
T the number of returns.

– *Geometric mean return*

Geometric mean return (**GM**) is referred to as the compound *annual growth rate* or *time-weighted rate of return*, as well. It is the average rate of return on a given set of values calculated using the products of the terms. Its difference from the previous AM is that GM takes into account the effects of compounding, whereas AM fails to do that. In addition, AM is always higher than GM in value. It is given by the following formula:

$$\mathrm{GM} = \prod_{i=1}^{T} (1 + R_i)^{\frac{1}{T}} - 1 \tag{2}$$

– *Standard deviation*

Standard deviation (SD) is considered as a measure of total risk. It measures the dispersion of a set of returns from its mean.

The part of the risk in a portfolio that is diversified is called *non-systematic risk* or *idiosyncratic risk* and consists of all those company-specific and industry-specific factors that affect the stock price of companies. The risk in a portfolio that cannot be diversified consists of changes in interest rates, macroeconomic factors, and political events. The *standard deviation* can be calculated by the following formula:

$$\mathrm{SD} = \frac{\left[\sum_{t=1}^{T} (R_t - \mathrm{AM})^2\right]^{\frac{1}{2}}}{T} \tag{3}$$

where

R_i return in period **T**
AM arithmetic mean return of the asset over the period considered
T number of returns during that period

– *Beta*

Beta is referred to *systematic or market risk* and is measured by a stock's beta (**β**). It is considered as a relevant measure of asset's risk only when you hold the asset within a widely diversified portfolio. In that case, the asset's beta is the contribution of the asset to the volatility of the whole portfolio.

Beta is also interpreted as the reaction of stock to fluctuations in the market. It is the average return of the stock given a 1 % fluctuation in the market. Therefore, beta of 1 indicates average risk or return fluctuations similar to those of the market; a beta higher than 1 indicates higher risk (larger fluctuations) than the market and beta lower than 1 indicates lower risk (smaller return fluctuations) than the market.

In addition, based on financial market professionals, corporations' betas are usually calculated every 5 years.

– *Diversification*

The concept of diversification was first introduced by Markowitz, while developing his *capital asset pricing model* and is about combining multiple assets in a portfolio. This diversification strategy aims to protect the investor via mitigating corporate risks such as company-specific or industry-specific risks. In general, it aims to reduce non-systematic or diversifiable risk.

– *Correlation coefficient*

The correlation coefficient is the magnitude that measures the sign and strength between two variables. When these two variables tend to move together, the correlation coefficient is positive; otherwise, it is negative. The correlation coefficient can take any value between −1 and 1 [10, 11].

2 Analysis of Financial Statements

Financial statements refer to a collection of reports regarding the entity's financial results, financial condition, and cash flows (CFs). They provide information to owners and creditors about the firm's financial performance. They can further be used by owners and creditors to set performance targets, impose restrictions on the managers of the firm, and set up a convenient template for financial planning.

- They determine the ability of a corporation to generate cash as well as the sources and uses of that cash.
- They also determine whether the company has the capacity to pay back its debts.
- They track financial results on a trend line to spot any looming profitability issues.
- Moreover, it is possible to derive financial ratios from the statements in order to determine the business condition and current performance.
- Finally, they investigate the details of certain business transactions, as outlined in the disclosures that accompany the statements.

The main contents of a set of financial statements are the following:

- *Balance sheet* shows the entity's assets, liabilities, and stockholder's equity as of the issue date.
- *Income statement* shows the results of the entity's operations and financial activities for the reporting period. It includes *revenues*, *expenses*, *gains,* and *losses*.
- *Statement of cash flows* shows changes in the entity's cash flows during the reporting period.
- *Supplementary notes* include explanations of various activities, additional detail on some accounts and items as mandated by the applicable accounting framework such as GAAP or IFRS.

At the most minimal level, a business is expected to issue a *balance sheet* and an *income statement* to document its monthly results and ending financial conditions. The full set of *financial statements* is expected when a business is reporting the results for a full fiscal year, or when a publicly held business is reporting the results of its fiscal quarters.

2.1 Balance Sheet

Balance sheet is considered as an "*inventory*" of what the firm owns (*assets*) and how those assets are financed (*liabilities and shareholder's/owner's equity*). Therefore, the following equation needs to be fulfilled:

$$\text{Assets} = \text{Liabilities} + \text{Shareholder's Equity} \tag{4}$$

Assets are resources controlled by the entity as a result of past events and from which future economic benefits are expected to flow to the entity.

Liabilities concern the list of sources where the assets came from as well as the monetary amounts of the sources from which the entity obtained its present stock of resources.

Equity, in the accounting context, means the owner's stake in the entity.

2.2 Income Statement

The *Income statement* is also known as *profit and loss statement.* It summarizes the entity's profitability over a given period of time. It records *sales*, *expenses*, *taxes,* and *net income*.

$$\text{Revenue} - \text{Expenses} = \text{Income} \tag{5}$$

The *expenses* are categorized as such:

- *Operating expenses* provide benefits only for the current period (*cost of labor and materials, depreciation based on historical cost, R&D*);
- *Financing expenses* arise from *non-equity financing* (interest expenses);
- *Capital expenses* generate benefits over multiple periods written off as depreciation (buying land and buildings).

The *total operating revenues* subtract from the sold cost of goods, selling, general, and administrative expenses, and depreciation. The operating income adds to the other income. The EBIT (earnings before interest and taxes) subtracts interest expense. The taxable income includes current and deferred taxes.

Retained earnings are not added to the cash balance in the *balance sheet* but are added to *shareholder's equity*. Therefore, net income is calculated by

$$\text{Net Income} = \text{Retained Earnings} + \text{Dividends} \tag{6}$$

However, inflation distorts the measuring of income and the valuation of assets.

2.3 Cash Flow Statement

The *Cash flow statement* reports how much cash is generated during a period and indicates where the cash comes from as well as what the firm does with that cash. Unlike the *balance sheet* and *income statement*, *cash flow statements* are independent of accounting rules as the latter have a second-order effect in cash flows via taxes.

2.4 Financial Ratios

Financial ratios help us extract the necessary information from an entity's set of *financial statements*. There are also various other methods in order to analyze financial statements such as *trend analysis* or *cross-sectional analysis*.

– ***Profitability ratios***

$$\text{Return on Assets (ROA)} = \frac{\text{EBIT}(1 - \text{tax})}{\text{Total Assets}} \tag{7}$$

$$\text{Return on Equity(ROE)} = \frac{\text{Net Income}}{\text{Book Value (Equity)}} \tag{8}$$

$$\text{Gross Profit Margin} = \frac{\text{Revenue} - \text{Cost of Goods Sold}}{\text{Revenue}} \tag{9}$$

$$\text{Operating Profit Margin} = \frac{\text{EBIT}}{\text{Sales}} \tag{10}$$

$$\text{Net Profit Margin} = \frac{\text{Net Income}}{\text{Sales}} \tag{11}$$

– ***Activity ratios*** measure the efficiency of *working capital management*:

$$\text{Accounts Receivable turnover} = \frac{\text{Sales}}{\text{Average Accounts Receivable}} \tag{12}$$

$$\text{Inventor Turnover} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}} \tag{13}$$

$$\text{Total Asset Turnover} = \frac{\text{Sales}}{\text{Total Assets}} \tag{14}$$

– *Liquidity* measures how fast and/or easy it is to generate cash from an asset. ***Liquidity ratios*** measure short-term liquidity:

$$\text{Current ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} \tag{15}$$

$$\text{Quick ratio} = \frac{\text{cash} + \text{short-term investment} + \text{receivables}}{\text{current liabilities}} \tag{16}$$

$$\text{Cash ratio} = \frac{\text{cash} + \text{receivables}}{\text{current liabilities}} \tag{17}$$

– ***Financial Leverage ratios***

$$\text{Debt-to-Capital ratio} = \frac{\text{Debt}}{\text{Debt} + \text{Equity}} \tag{18}$$

$$\text{Debt-to-Equity ratio} = \frac{\text{Debt}}{\text{Equity}} \tag{19}$$

The debt-to-equity ratio can be based on either *book value* (BV) or *market value* (MV). Similar condition holds for *long-term debt ratios*.

– ***Market value ratios***

The *price-to-earnings ratio* expresses the stock market price (PS) to earnings per share (EPS):

$$\text{Price-to-Earnings ratio} = \frac{\text{PS}}{\text{EPS}} \tag{20}$$

The *Dividend Yield* expresses the *latest dividend* (D) to *current stock price* (PS):

$$\text{Dividend Yield} = \frac{D}{\text{PS}} \tag{21}$$

$$\text{Market-to-Book Value} = \frac{\text{MV}}{\text{BV}} \tag{22}$$

$$\text{Market-to-Book Equity} = \frac{\text{Market Equity (ME)}}{\text{Book Equity (BE)}} \tag{23}$$

$$\text{Tobin's } q = \frac{\text{MV}}{\text{Replacement Value}} \tag{24}$$

– ***Links between the ratios***

$$\text{ROA} = \text{Profit Margin} * \text{Asset Turnover} \tag{25}$$

This ratio holds for both net and gross ROA and profit margin. An increasing ROA can be interpreted as a trade-off between profit margin and asset turnover.

$$\text{ROE} = \text{ROA} * \text{Equity Multiplier} \tag{26}$$

where

$$\text{Equity Multiplier} = \frac{\text{Assets}}{\text{Equity}} \tag{27}$$

A high *financial leverage* in an entity magnifies ROE when (gross) ROA excesses the interest on debt.

– ***Non-financial measures of operating effectiveness***

Non-financial measures can account for the following:

- innovation,
- customer service,
- product quality,
- reputation, and
- good employee relations.

3 Time Value of Money

The time value of money provides an introduction to the tools of valuation of cash flows of a project of a firm or the firm by itself. *Time value of money* (**TVM**) *principle* applies when the value of a given amount of money to be received on a specific date is more than the same amount of money to be received on a later date. In simple terms, it means that cash in the future is worth less than cash today. One reason is that money can be reinvested and generate even more money. Another reason is the inflation which is the rise in the general level in prices and results in a deterioration of our purchasing power [6].

The concepts of *discounting* and *compounding cash flows* are largely used in corporate finance. *Discounting cash flows* moves corporation's cash flows back in time while *compounding* moves them forward in time.

Concepts such as *present value* and *future value* of a single sum of money; *present value* and *future value of an annuity;* and *present value of a perpetuity* are largely used in investment valuation as well.

Present value refers to the current value of a future payment or even a series of payments that are discounted at a given interest rate up to today, in order to reflect the TVM. It is calculated based on the following formula:

$$\text{Present Value of a single sum of Money: } \text{PV} = \frac{\text{FV}}{(1+R)^T} \tag{28}$$

where

FV Future value of a single sum of money

R rate of return offered in the capital markets, alternatively referred as *discount rate*

T number of compounding periods

The *future value* reflects the value of money or cash at a prespecified future date that is also equivalent to the value of sum today. It is calculated based on the following formula:

$$\text{Future Value of a single sum of Money: } \text{FV} = \text{PV} * (1+R)^T \tag{29}$$

An ***annuity*** is a series of evenly spaced equal payments made for a certain amount of time. The *present value of an annuity* can be calculated if we discount each periodic payment separately to the starting point and then add up all the discounted parts.

$$\text{Present Value of an Annuity: } \text{PV}_{\text{annuity}} = \frac{\text{PMT}}{i} * \left[1 - \frac{1}{(1+i)^n}\right] * (1+iT) \tag{30}$$

where

PMT fixed periodic payment, alternatively referred to as cash flow

i interest rate per compounding interval *n*

n = m * t total number of compounding intervals

t time or number of periods

The *future value of an annuity* is equal to the sum of face value of periodic annuity payments and the total compound interest earned on all periodic payments till the future value point. It is calculated by the following formula:

$$\text{Future Value of an Annuity: } \text{FV}_{\text{annuity}} = \frac{\text{PMT}}{i} * [(1+i)^n - 1](1+iT) \tag{31}$$

where

i interest rate per compounding interval *n*

n = m * t total number of compounding intervals

PMT fixed periodic payment
t time or number of periods

The *present value of a growing annuity with constant rate g* ($g \neq i$) is used to calculate the present value of a series of cash flows, or payments that grow at a constant growth rate g. It is calculated by

$$\mathrm{PV_{GA}} = \frac{\mathrm{PMT}}{(i-g)}\left[1 - \frac{(1+g)^n}{(1+g)^n}\right](1+iT) \tag{32}$$

where
PMT fixed periodic payment
i rate per period
g growth rate
n number of compounding intervals
t time unit

The *future value of a growing annuity* with constant rate g ($g \neq i$) is calculated by

$$\mathrm{FV_{GA}} = \frac{\mathrm{PMT}}{(i-g)}[(1+i)^n - (1+g)^n](1+iT) \tag{33}$$

where
PMT fixed periodic payment
i rate per period
g growth rate
n number of compounding intervals
t time unit

A ***perpetuity*** refers to an infinite and constant stream of identical cash flows. The *present value of perpetuity* is the sum of the discounted value of each periodic payment of the perpetuity. *Present value of perpetuity* is finite because the discounted value of far future payments of the perpetuity reduces considerably and reaches close to zero. Therefore, it is calculated by the following formula:

$$\text{Present Value of a Perpetuity: } \mathrm{PV_{perpetuity}} = \frac{A}{R} \tag{34}$$

where
A fixed periodic payment
R interest rate or discount rate per compounding period

A *growing perpetuity* is a series of periodic payments that grow at a constant (proportionate) rate g and are received for an infinite amount of time. The *present value of a growing perpetuity* is the cash flow after the first period divided by the difference between the discount rate and the growth rate:

$$\mathrm{CF}_{t+1} = (1+g) * \mathrm{CF}_t \tag{35}$$

$$\mathrm{PV}_{\mathrm{GP}_t} = \frac{D_1}{(R-g)} \tag{36}$$

where
CF cash flow,
D_1 dividend or coupon at period 1,
R discount rate,
g growth rate.

The formula (36) can be used to calculate the *present value of a growing perpetuity* (GP) in commercial real estate. The rental cash flows can be considered as indefinite and will grow over time. In addition, it is noteworthy to mention that the discount rate **R** must be higher than the growth rate **g** when using this formula.

In theory, if the growth rate is higher than the discount rate, the growing perpetuity would have an infinite value.

Inflation has an impact on our consumption and not on our amount of money. Alternatively referring to, it has an impact on our purchasing power and our decision making.

Real return (**RR**) is calculated based on the following formula:

$$\text{Real Return: } 1 + \mathrm{RR} = \frac{1+R}{1+\pi} \approx R - \pi \tag{37}$$

where
R nominal return
π rate of inflation

Annual percentage rate (**APR**) measures the amount of simple interest earned in a year. It is not considered as a discount rate but is used in order to get a discount rate (such as the *effective annual rate* (**EAR**)).

Annual percentage yield is equal to *effective annual rate*. The latter measures the actual amount of interest earned or paid in a year. It is considered as a discount rate and is what matters for computing interest and discounting cash flows.

The relation between **APR** and **EAR** is represented by the following formula:

$$\mathrm{EAR} = \left(1 + \frac{\mathrm{APR}}{m}\right)^m - 1 = (1 + \mathrm{PIR})^m - 1 \tag{38}$$

where
m number of compounding periods per year
PIR *Periodic interest rate* (PIR) or *periodic discount rate* (PDR)

$$\text{PIR} = \frac{\text{APR}}{m} \tag{39}$$

3.1 Cost of Capital

The *cost of capital* is fundamentally important in both the investment decision making from entity's management as well as the entity's investment valuation by investors. More precisely, if an entity decides to invest on projects with long-term benefits (potential projects generate return in excess of the cost of capital), then the entity has created value; in the opposite direction, the entity has destroyed value.

The *cost of raising capital for a* corporation is usually calculated based on its *cost of debt*, its *cost of equity,* and some other ways of *investment financing, such as preferred stock and convertible bond, if applicable.*

The *cost of capital* is defined as the required rate of return that bondholders and owners require as compensation for their capital investment in the company as well as for the average-risk investment of a company. The most common measure to use is the *weighted average cost of capital* (WACC) [8].

The weights within the WACC calculation are the proportions of the various sources of capital that the entity uses to support its investment operations. WACC is calculated as the weighted average of the after-tax marginal costs of each source of capital, as in the following equation:

$$\text{WACC} = w_\text{d} * r_\text{d}(1 - t) + w_\text{p} * r_\text{p} + w_\text{e} * r_\text{e} \tag{40}$$

where
$\mathbf{w_d}$ proportion of debt (used by entity to raise new capital)
$\mathbf{r_d}$ before-tax marginal cost of debt
t entity's marginal tax rate
$\mathbf{w_p}$ proportion of preferred stock
$\mathbf{r_p}$ marginal cost of preferred stock
$\mathbf{w_e}$ proportion of equity
$\mathbf{r_e}$ marginal cost of equity

WACC is extremely useful and is widely used by financial analysts in business valuation. The different components of WACC are calculated via different methods.

The *before-tax cost of debt* is estimated based on the yield to maturity or the bond rating. The *yield to maturity method* is based on the bond valuation equation. It is calculated based on:

$$P_0 = \frac{\mathrm{CF}}{(1+y)} + \frac{\mathrm{CF}}{(1+y)^2} + \cdots + \frac{\mathrm{CF}+A}{(1+y)^n} = \left(\sum_{t=1}^{n} \frac{\mathrm{CF}}{(1+y)^t}\right) + \frac{\mathrm{FV}}{(1+y)^n} \quad (41)$$

where
CF coupon of a bond (fixed payment amount for a prespecified period of time)
A principal or face value
y Yield or Mean Annual Return

It is also important to mention that interest payments are generally tax-deductible, and the after-tax cost of debt is the true, effective cost of debt to the entity.

The *cost of preferred stock* is the preferred stock dividend divided by the current preferred stock price:

$$r_p = \frac{D_p}{P_p} \quad (42)$$

where
$\mathbf{D_p}$ preferred stock dividend
$\mathbf{P_p}$ current preferred stock price

The cost of equity is the rate of return required by the entity's stockholders/equity holders. This cost is mainly estimated via the *CAPM* (usually used by large publicly traded corporations) and in some other cases via the *dividend discount model.* Other methods that are used are the following: *arithmetic average, historical return, multibeta CAPM, investor expectations,* and *regulator decisions*.

The *capital asset pricing model* formula that is used to estimate the *cost of equity* is the following:

$$E(r_i) = r_f + \beta_i[E(r_m) - r_f] \quad (43)$$

where
$\mathbf{E(r_i)}$ expected cost or equity (common stock)
$\mathbf{r_f}$ risk-free rate
$\mathbf{r_m}$ Market/equity risk premium
$\boldsymbol{\beta_i}$ beta

In cases where country and exchange rate risks are not diversified, we can adjust our measure of systematic risk by a *country equity premium* to reflect this no diversifiable risk. In order to calculate the *country equity premium,* we use the following formula:

$$\text{Country Equity Premium} = \text{Country Default Spread} * \frac{\sigma_{\text{equity}}}{\sigma_{\text{sovereign bond}}} \tag{44}$$

where

σ_{equity}	annualized standard deviation of equity index
$\sigma_{\text{sovereign bond}}$	annualized standard deviation of the sovereign bond market in terms of the developed market currency

The *dividend discount model approach* is used alternatively to CAPM as a way to calculate the cost of equity via the following formula:

$$r_e = \frac{D_1}{P_0} + g \tag{45}$$

where

$\mathbf{P_0}$	current market value of the financial market index
$\mathbf{D_1}$	next period's expected dividends on the index
$\mathbf{r_e}$	required rate of return on the market
g	expected growth rate of dividends

We can also estimate the *sustainable growth rate* in *the dividend discount model* by

$$g = \left(1 + \frac{D}{\text{EPS}}\right) * \text{ROE} \tag{46}$$

where

g	growth rate of dividends
D	dividend
EPS	Earnings per share
ROE	return on equity

Alternatively, we can estimate the *growth rate* by using published forecasts of financial analysts.

Other approaches in estimating the *cost of equity* comprise the *bond yield plus risk premium approach*. This approach is based on financial theory that the cost of capital of riskier cash flows is higher than that of less risky cash flows.

Therefore, we sum the before-tax cost of debt and add a risk premium that compensates for the additional risk of equity as opposed the one of debt. The formula to be estimated is the following:

$$r_e = r_d + \text{Risk premium} \tag{47}$$

where
$\mathbf{r_e}$ return on equity
$\mathbf{r_d}$ return on debt

The *risk premium* within the framework of *bond yield plus risk premium approach* is defined as the difference between the cost of equity and the entity's cost of debt. It is a forward-looking measure that reflects the additional risk associated with the shares of the entity as opposed to the bonds of the entity. We usually estimate this premium using historical spreads between bond yields and stock yields.

Under the developed country markets context, a usual risk premium added is within the range of 3–5 %.

Please take into account that these three different approaches of estimating the cost of equity might yield different results. These disparities are not unusual and reflect the difficulty of this estimation.

4 Capital Budgeting

Capital budgeting is the process of making decisions about long-term projects the entity should accept for investment or should reject. This kind of projects have usually a life of one year or more [24].

The typical steps in a capital budgeting process are the following:

- generating ideas,
- analyzing individual proposals,
- planning the capital budget, and
- monitoring and post-auditing.

The candidate projects for the capital budgeting process are as follows:

- Replacement;
- Expansion;
- new products and services; and
- regulatory, safety, and environmental.

These projects are evaluated based on the various methods.

- One of them is the *net present value.* It is considered as the *present value of all after-tax cash flows* and is calculated by the following formula:

$$\mathrm{NPV} = \sum_{t=1}^{T} \frac{\mathrm{CF}_t}{(1+R)^t} \tag{48}$$

where
R required rate of return,
CF cash flow at time **t**, for **t = 1**, …, **T**

One characteristic example of a project valuation for a company that involves WACC for the calculation of NPV is the following:

$$\text{NPV} = \text{PV of inflows} - \text{PV of outflows} \tag{49}$$

Theoretically, projects with positive NPV increase the value of the company and the value of its stock.

- The *internal rate of return* (IRR) is the discount rate that sums up the present value of all future cash flows to zero. The following formula is solved for the IRR:

$$\sum_{t=0}^{T} \frac{\text{CF}_t}{(1+\text{IRR})^t} = 0 \tag{50}$$

The capital budgeting decision rules concern investing when NPV > 0, IRR > R, or when PI > 1.0.

For mutually exclusive projects with different ranking between NPV and IRR, the project with the highest NPV is the one that prevails.

- The *payback period* is based on cash flows and is the number of years needed to recover the original investment in a project. Accordingly, the *discounted payback period* is the number of years required for the *cumulative discounted cash flows* from a project to equal the original investment.
- The *average accounting rate of return* (AAR) is defined as follows:

$$\text{AAR} = \frac{\text{Average net income}}{\text{Average Book Value}} \tag{51}$$

- Finally, the *profitability index* (PI) is defined as the present value of a project's cash flows divided by the initial investment:

$$\text{PI} = \frac{\text{PV of future cash flows}}{\text{Initial investment}} = 1 + \frac{\text{NPV}}{\text{Initial investment}} \tag{52}$$

There are no capital budgeting decision rules for the *payback period*, *discounted payback period,* and *average accounting rate of return*, since they are not considered quite reliable measures.

4.1 Practical Tips in Capital Budgeting

Firms have to invest in projects that by definition exceed their costs. This results in a positive NPV, which is forecasted. However, investment projects that may appear with a positive NPV may be due to forecasting errors. In order to evaluate the influence of forecasting errors on the estimated NPV of the project, several tools exist and are listed below:

- *Sensitivity Analysis*:
  - It provides an analysis of the effect on the estimated NPV when an underlying assumption changes such as market size, market share, or the opportunity cost of capital.
  - It also uncovers the NPV sensitivity to changes in key variables.
- *Scenario Analysis* analyzes the impact on NPV under a particular combination of assumptions. This type of analysis is particularly convenient when the variables are interrelated. A characteristic example can be an economy that enters to a recession due to high oil prices. Indeed, the firm's cost of capital structure, the demand for the product, and the inflation may differ. Therefore, instead of analyzing the effect on NPV of a single variable (as in sensitivity analysis previously), scenario analysis considers the effect on NPV of a consistent combination of variables.
- *Break-even Analysis* analyzes the level at which the company breaks even. This is the point at which the present value of revenues is exactly equal to the present value of total costs. Therefore, break-even analysis tries to respond to the question on how much should the firm sell before the production becomes profitable.
- *Simulation Analysis*
  - The investment project is modeled via Monte Carlo simulation which considers all possible combinations of outcomes. This simulation analysis involves the following three steps:
    I. We first model the investment project by specifying the project's cash flows as a function of revenues, costs, depreciation, as a function of market size, market shares, unit shares, and costs.
    II. Later, we specify the probabilities for each of the underlying variables. Some examples include specifying the range for the expected market share as well as other variables in the model.
    III. Finally, we simulate the cash flows using the model and probabilities assumed above and calculate the NPV.

4.2 Business Risks

Business analysts refer to the use of fixed costs in a corporation's capital structure as *leverage* because it influences corporation's earnings. Leverage can magnify earnings both on the upside and the downside.

Business risk is the risk associated with *operating earnings* and refers to both *sales risk* (uncertainty taking into account the price and quantity of sales) and *operational risk* (related to the use of fixed costs in operations). *Financial risk* is the risk associated with the way the corporation finances its operations (choice between debt and equity). There are several *capital structure theories* in corporate finance that attempt to answer to this dilemma of choice.

In particular, the *degree of operating leverage* is the ratio of the percentage change in operating income to the percentage change in units sold. The *degree of financial leverage* is the percentage change in net income for a given percentage change in operating income. Finally, the *degree of total leverage* is a measure of sensitivity of the CFs to owners to changes in unit sales. It is considered as the *degree of operating leverage* plus the *degree of financial leverage* [21].

5 Fundamentals on Payout Policy

Payout policy of the firm constitutes the entity's cash dividend payments and share repurchase policies together. Both contribute to the distribution of the corporation's cash to its shareholders.

Payout policy is considered as second most important for approval, in terms of decision making by the board of directors. Capital expenditures and its way of being finance follows.

The heart of the dividend policy debate concerns the following question: *Should the firm pay out money to its shareholders, or should the firm take that money and invest it for its shareholders?* Therefore, dividend policy can be accounted as a time pattern of dividend payout [13]. More precisely, should the corporation pay out a large percentage of its earnings now, or a small (or even nonexistent) percentage? [16]

Dividends can take different forms: *regular or irregular cash payments*, *stock dividends,* or *stock splits*. The term dividend refers to cash paid out for earnings. Only *cash dividends* are considered as payments for the shareholders. In general, any direct payment by the corporation to the shareholders may be accounted as a dividend or a part of dividend policy.

The main types of cash dividends are the following:

- *regular cash dividends,*
- *extra dividends*: may or may not be repeated in the future,

- *special dividends*: their payment happens once and is not yet repeated,
- *liquidating dividends*: some or all of the business has been liquidated or sold off, and
- *stock repurchase*: another method to pay out a firm's earnings to its owners. In some jurisdictions, it provides favorable tax treatment compared to dividends.

Distribution happens only if a payment is made from sources other than current or accumulated retained earnings [2].

Stock dividends and splits do not create wealth for shareholders. They only serve to split equity into smaller pieces. *Reverse stock splits* usually happen when a stock has reached one of its lowest prices and do not directly affect shareholder wealth. *Regular cash dividends*, as opposed to *irregular cash dividends*, *stock splits* and *stock dividends*, demonstrate a commitment to pay cash to stockholders/equity holders on a regular basis (quarterly, semiannual, or annual).

A *share repurchase* is taken as equivalent to the payment of a cash dividend of equal amount in its effect on shareholder's wealth. The announcement of *share repurchases* is quite often accompanied by positive excess returns in the market when the market price is perceived as reflecting management's view that the stock is undervalued, and earnings per share can increase as a result of fewer shares outstanding [25].

A further initiation of regular cash dividends will also have a positive impact on share value. The management is perceived as having confidence in the future to commit on paying out cash to shareholders. This is also named as the *signaling hypothesis.* In addition, from an investor's side, some institutional, as well as individual, shareholders consider regular cash dividend payments as a measure of investment quality.

Some of the factors that favor a low-dividend payout may be the taxation of dividend income and capital gains and flotation costs. Of course, taxation issues differ among countries. In addition, a corporation may be prohibited by law from paying dividends if the dividend amount exceeds the firm's retained earnings.

On the contrary, there are also other real-world factors that favor a high-dividend payout. Some of them are the following:

- *desire for current income;*
- *resolution of uncertainty*: Gordon stated that a high-dividend policy benefits stockholders because it resolves uncertainty [5]; and
- *tax and legal benefits from high dividends*: Some characteristic examples account for pension funds and university endowment funds. The former have a fiduciary responsibility to invest the money prudently, while the latter are frequently prohibited from spending any of their principal. Therefore, they have strong desire to hold high-dividend yield stocks in order to be able to spend. The previous categorization also includes tax-free institutions as well.

6 The Discounted Cash Flow Approach to Investment Valuation

6.1 Equity Valuation

Equity valuation refers to the valuation of an equity stake of an entity. Some principal categories of models in equity valuation do exist:

- *Present Value Models* or alternatively *discounted cash flow models*, estimate the intrinsic value of a security as the present value of future benefits (dividends) expected to be received from the security. In these types of models, benefits are defined in terms of cash expected to be distributed to shareholders (*DDM* discussed earlier) or in terms of CFs available to be distributed to shareholders after meeting the capital expenditure and working capital needs. The *free-CF-to-equity model* is given by the following formula:

$$\text{Future benefits} = \text{free cash flow}$$

$$\text{Value}_0 = \sum_{t=1}^{\infty} \frac{\text{FCFE}_t}{(1+R)^t} \tag{53}$$

- *Multiplier Models* or alternatively *market multiple models* are based on *share price multiples* or *enterprise value multiples* [22]. *Share price multiples* compare relative values and estimate the intrinsic value of a common share from a price multiple for some fundamental variable, such as *revenues*, *earnings*, *cash flows*, or *book value*. Some of the multiples are the following:

$$\text{price to earnings} = \frac{P}{E} \tag{54}$$

$$\frac{P}{E} = \frac{\text{PV}_0}{\text{EPS}} = \frac{1}{R} + \frac{\text{NPVGO}}{\text{EPS}} \tag{55}$$

where

PV_0 Present value at time 0
R discount factor
NPVGO Net present value of growth opportunities

$$\text{price to sales} = \frac{P}{S} = \frac{\text{share Price}}{\text{Sales per share}} \tag{56}$$

– *comparative approach*
This approach is characterized as a relative valuation approach. The basic aspect in such an approach is that it should bear some similarity with other equities at the same class and industry. If we take into account a stock, this has to be compared with its key competitors. Differences in value between firms are translated as an opportunity. It actually results that the equity being valued is undervalued and can be bought and held until value increases. The opposite could hold true, which could present opportunity for selling the stock.
There are two primary comparative approaches:

I. The first approach checks the market comparables for a firm and for its other competitors. Usual market multiples include *price to earnings* (P/E), *price to book value* (P/B), *price to free cash flow* (P/FCF), *enterprise value to sales* (EV/S), and *enterprise multiple* [9].
II. The second approach accounts for market transactions where similar type of firms have been bought out, acquired by other competitors, private equity firms, or other institutional investors.

– *Asset-based valuation models* estimate the intrinsic value of a common share from the estimated value of the assets on an entity minus the estimated value of its liabilities and preferred shares. The equation resembles with the principal equation of a balance sheet. The estimated market value of the asset is determined by making adjustments to the book value of assets and liabilities. The academic theory that backs up the asset-based valuation approach considers that the value of the business is equal to the sum of the value of its business's assets.

A financial analyst may compare estimates of *value* and *market price* in order to arrive to the conclusion on whether the asset is fairly valued, overvalued, or undervalued. More precisely,

- an overvalued asset is the one that has an intrinsic value higher than the market value,
- a fairly priced asset is the one that has an intrinsic value equal to the market value, and
- an undervalued asset is the one that has an intrinsic value lower than the market value.

The *value of equity* is taken by discounting the expected cash flows to equity, which means the *residual cash flows* after taking into account all the *expenses*, *tax obligations*, *interest, and principal payments*, at the *cost of equity*. The *market value of equity* is given by the following formula:

$$\text{Market Value of Equity} = \sum_{t=1}^{T} \frac{\text{CF to Equity}_t}{(1 + r_e)^t} \tag{57}$$

where
CF to Equity$_t$ expected cash flow to equity in period t
r_e cost of equity

The computation of *growth rate of dividends* is also important for ***equity valuation of the firm***. Assume that the company does not grow unless a *net investment* is made. Then, the company needs to retain part of its *earnings* to grow. The calculation of these *earnings* is given by the following formula:

$$\text{Earnings}_{t+1} = \text{Earnings}_t + \text{Retained Earnings}_t * R \tag{58}$$

where
R return on the retained earnings, usually estimated by ROE

In this case, the *sustainable growth rate* is calculated if we divide by earnings as follows:

$$1 + g = 1 + \text{Retention Ratio} * \text{ROE} \tag{59}$$

where

$$\text{Retention Ratio} = \frac{\text{Retained Earnings}}{\text{Earnings}} \tag{60}$$

6.2 Business Valuation

Financial analysts usually use the term Business Valuation when they want to value not only the equity of a business but also other claimholders in the firm. Some of the methods they use are the following:

- The *Free Cash Flow for the Firm* (FCFF) is considered as a financial performance measure that shows the net amount of cash that is generated for the firm, consisting of *expenses*, *taxes*, *changes in net working capital* (NWC), *and investments* [18]. It is calculated as follows:

$$\begin{aligned}\text{FCFF} = {} & \text{Operating Cash Flow} - \text{Expenses} \\ & - \text{Taxes} - \text{Changes in NWC} - \text{Changes in Investments}\end{aligned} \tag{61}$$

- The *Discounted Cash Flow for the firm* (DCFF) is considered as an essential valuation method that intends to estimate the attractiveness of an investment opportunity (from an investor's point of view). From a firm's point of view, it aims to estimate the intrinsic value of a company [20].

- Based on A. Damodaran's steps, we first estimate the discount rate or rates to use in the valuation. Our discount rate can be either the cost of equity (if we use it to make equity valuation) or cost of capital (if it is used for business valuation). It can also be in real or nominal terms depending on whether the cash flows are in nominal or real terms [17].
- Second, we estimate the current earnings and cash flows on the asset being valued by estimating an expected growth rate in earnings.
- Third, we estimate when the firm will achieve a stable growth rate and what characteristics it will have, in terms of risk and cash flows.
- Finally as a last step, we choose the right DCF model for this asset or corporation and value it.

In order to account for the value of the firm, we discount the expected cash flows of the corporation, which means the residual cash flows after all operating expenses and taxes, prior to debt payments at the WACC. The value of the firm is calculated by the following formula:

$$\text{Value of Entity} = \sum_{t=1}^{T} \frac{\text{CF to Entity}_t}{(1 + \text{WACC})^t} \tag{62}$$

where

CF to entity$_t$	Expected cash flow to entity in period t
WACC	Weighted average cost of capital

Therefore, as previously mentioned, we discount the cash flow to entity at the cost of capital in order to get the value of the firm, whereas we discount the cash flow to equity at the cost of equity to get the value of the equity.

7 Multiple Choice Questions

1. In the CAPM formula, the risk-free rate is the compensation for the expected loss of the purchasing power.

   a. True
   b. False

2. The debt-to-equity ratio shows the profitability of the firm.

   a. True
   b. False

3. Which are the tools to evaluate the forecasting errors of the estimated NPV? Select from the following (more than one apply):

   a. Discounted payback period
   b. Simulation analysis

c. Payout policy
d. Scenario analysis
e. Business valuation
f. Break-even analysis

4. Leverage is referring to

a. Company's debt
b. Company's equity
c. Both

5. Corporate finance is a field in finance that is dealing with capital budgeting, capital structure, and working capital management functions within a firm.

a. True
b. False

6. John decides to put 100 € in a bank account with interest rate 10 % per year. Which is the future value after 4 years:

a. 234.15 €
b. 139.23 €
c. 146.41 €
d. 187.35 €

7. The company ABC wants to raise €3 million in order to expand its business to other countries. Its corporate tax rate is 20 %. The yield to maturity of its bonds is 6 %.
Calculate the cost of debt for that company.

a. 2.1 %
b. 4.8 %
c. 5.3 %

8. Which of the following consists a potential solution to resolve a shareholders–managers conflict in favor of shareholders?

a. give incentives to the current manager to expand the business activities
b. increase managerial compensation
c. do not do anything

9. Cash dividends are considered as claims for the shareholders.

a. True
b. False

10. The cost of capital accounts for the interactions between corporations and investors in the market.

a. True
b. False

Multiple Choice Answers

1. a,
2. b,
3. b., d., f.,
4. a,
5. a,
6. c,
7. b,
8. c,
9. b,
10. a.

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