



Basic Concepts

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The core of corporate finance is the company and its life cycle. The focus is on the analysis of how the company finances itself, how it spends the money acquired, and what the sources of income derived from projects are.

The objective of every company should be the maximization of its value through processing the capital raised by employing it in projects related to the core business, in view of capitalizing a positive outcome.

The road to profitability includes an understanding of the tools and processes that govern the daily life of the corporation and is based on the analysis of the opportunities offered by the market and the appropriate choice of the relevant ones.

Knowledge about the financials of the company must be crossed with the understanding of the dynamics of financial markets, in order to give a fair and robust valuation of the business, as a whole, as well as of single projects.

Before going into detail, it is necessary to give a robust introduction about the corporation. A company can take many organizational forms, and there are several issues involved in proper financial management.

Moreover, there are basic concepts of financial theory that cannot be ignored when being introduced to the world of corporate finance and company valuation, since they have a crucial impact overall learning experience.

After studying this chapter, you will be able to answer the following questions, among others:

1. What is a corporation?
2. What legal forms can a business take?
3. What is the importance of the financial statement of the firm?
4. How can pro forma financial statements be used to forecast the financing needs of the company?
5. How can arbitrage be used to understand financial markets?

The first section of the chapter is an introduction to the organizational forms a company can take, their main features, and the differences among them. The second section focuses on the analysis of the financial statement of the firm, which is made of the balance sheet, the income statement, and the cash flow statement. The third section deals with introducing the concept of arbitrage on financial markets, a foundation of modern financial economics. The law of one price is described, as well as the Brownian motion for stock prices and the market price of risk, in its analytical form.

1.1 The Corporation

Learning Outcomes

- Analyze and comment on the corporate organizational forms.
- Understand the objectives of a business.
- Become familiar with the role of financial management.

1.1.1 Organizational Forms

A business can be organized in several ways. The main issue is about legal liability associated with the business, which will change according to what corporate form is chosen.

What follows is a comprehensive analysis of the most common forms of corporate organization, and the impact of their structure on the responsibilities assigned to the ownership and management.

Sole proprietorship is represented by a company owned by just one person, and it is the simplest type of business organization and consequently the least regulated by commercial and financial laws (Allen and Sherer 1995).

In many places in the world, the start of a sole proprietorship is subject to getting a business license to begin operations. Given the ease of start-up, this form of organization is the most developed.

In general, most of the world's businesses that have become big enterprises had a start as small sole proprietorships, evolving during time. These companies benefited from an easy start while growing progressively to become big and fully regulated corporations.

Example 1.1 Bookkeeping, home healthcare, landscaper, computer repair services, catering company, and housecleaning service are typical examples of business that are normally structured in the form of sole proprietorship.

All profits of a sole proprietorship go to the owner, with the disadvantage that the owner is unlimitedly liable for the business obligations. Creditors can bypass the business and get to the personal wealth of the owner.

The distinction between personal and business income is not defined, and all income is taxed through personal income tax. The life of the business coincides with the life of the owner, with a limit in equity that can be raised equal to the personal wealth of the sole owner.

That limitation hinders the possibility to exploit business opportunities and limits the growth of the business, due to insufficient capital. That is why the ownership of a sole proprietorship is difficult to transfer, given that it represents a transfer of the whole business to another person.

The option of being a sole proprietor involves much less paperwork than other organizational forms, and the business is structured so that legal documents are not required to determine the allocation of profit sharing from business operations.

The sole proprietorship links the owner and the business very strictly, with no distinction. However, it does not preclude the use of a business name, brand, and denomination that is different from the owner's name. The income of the proprietor is taxed as self-employment income.

Sole proprietorship is not the right organizational form for high-risk business in that personal assets are put at risk. The need for a high amount of debt for business start-ups and a history of trouble with personal debt in the past may be a reason to choose a different legal structure, in order to protect the personal assets.

Examples of risky business are those involving human care, the manufacturing of food, the repairing of valuable items, and the alcohol-related business. In addition to these examples, many other activities can make your business high risk.

In case there are some risks involved in the business, but they are not very high, it is still feasible to choose the sole proprietorship; insurance policies are right to cover the basic risks associated with the business operations.

Another form of business is partnership. It is a simple organizational form, which allows two or more partners to be owners of the company. The partners share gains and losses from the business, with unlimited liabilities on partnership obligations.

A partnership agreement describes all the conditions of the enterprise including how profits and losses are divided among partners. Such an agreement can be informal and oral, or a formal written document, depending on jurisdictions (Arrow 1974).

In summary, there are three possible forms of partnership, namely, the general partnership (GP), the limited partnerships (LP), and limited liability partnerships (LLP).

A limited partnership is characterized by the presence of both general partners and limited partners. General partners have unlimited liability and run the company on behalf of limited partners, whose liability is limited to the amount that they contribute to the partnership. Maybe arrange these with limited partnerships first, so they match the order in which they are introduced.

The advantages and disadvantages of a partnership are the same as those of a proprietorship. Partnerships based on a relatively informal agreement are easy and inexpensive to form.

Example 1.2 Companies like medical, legal, real estate, and creative are normally structured as partnerships.

The partnership for general partners terminates at the death of a partner or transfer of quotes. The partners are taxed by personal income tax, and the amount of equity that can be raised is limited to the partners' combined wealth.

The ownership of a general partnership is particularly hard to transfer, because it involves the formation of a new partnership. The limited partners can instead transfer the property of their shares without dissolving the partnership, but finding a buyer may be very difficult.

It is very important to get a written agreement when forming a partnership. In fact, a partner in general partnership can be held responsible for all business liabilities, making it very uncomfortable to not have all rights and duties spelt out from the beginning.

The limited partners are by logic not deeply involved in important decisions for the company, given that they are not personally liable for those. When things go bad, limited partnerships act as a shield against creditors, unless the partner has turned into a general partner for some reason.

The disadvantages of the partnership are the same as sole proprietorship and can be summarized as unlimited liability for business debts, limited life of the business, and difficulty of transferring the shares.

The growth of the business is seriously hindered by its own intrinsic features and can be seriously limited by an inability to raise cash for investment, due to the legal structure.

Limited partnerships are widely used by professionals such as doctors and lawyers, and the structure protects partners in these types of jobs that involve serious responsibilities. Different countries have varying regulations regarding these establishments of which business owners must take note.

Partnerships must file information returns with the fiscal agencies, but they do not file separate tax returns. For tax purposes, the partnership's profits or losses pass through to its owners, so a partnership's income is taxed at the individual level.

The limited liability company structure allows for separation between a company's liabilities and the owner's personal assets. In this way, the owner is not responsible for the company debt with his own wealth.

Special cases also entail personal responsibilities for the limited partnership owner, but they are limited to those cases where the partner intentionally does something fraudulent, reckless, or illegal or fails to adequately separate the activities of the LLC from personal affairs.

Depending on the location of the business, the rules governing the LLC can change considerably. Some countries or states, for example, do not allow banks, insurance companies, or nonprofit organizations to be LLCs.

In some federate countries like the United States, for example, the LLC is a state structure, with no special federal tax duties. It can take the form of individual, partnership, or corporation, and once the paperwork is filed and all fees are paid, the business can be started.

Some regulatory systems require simple documents to be filed, like articles of organization and the operating agreement containing information about each owner's percentage interest in the business, responsibilities, and voting power, as well, as how profits and losses will be shared and what happens if an owner wants to sell her interest in the business. In some cases, a notice in some local newspaper stating that you are forming an LLC should be published as well.

Similar to the LLC, the corporation form of organization separates the business entity from its owner, thus reducing the exposure to liabilities. The main difference resides in the taxation, accounting standards, record keeping, and paperwork requirements.

Corporation is not the most logical form of business for a start-up, unless required by circumstances, and the LLC is a much better choice in terms of accounting standards and regulatory issues.

In order to establish a corporation, many of the same steps of founding a LLC must be followed, including choosing a business name, appointing directors, filing articles of incorporation, paying filing fees, and following any other specific requirements.

Corporations may take different subforms. For example, in the United States, there are two types of corporations, namely, the C corporations and the S corporations. They differ in terms of management and legal and fiscal duties.

The C corporations have separate tax duties and file their own tax and income papers, with the income being retained as equity in the corporation until paid out as salaries and other benefits to the officers and employees.

Given that corporate tax is usually lower than personal income tax, in most cases it is preferable to leave the income in the company rather than take it out for personal wealth increase.

When the corporate income is just enough to support the owner's private expenses is of course a separate issue, and in this case, there is no way that money can be left in the company, since the owner needs it as cash.

In case of shareholders, the issue of double taxations arises in that the income earned by the corporation is taxed and dividends distributed to shareholders are taxed. However, provisions stand so that the owner of a one-person corporation does not have to worry about double taxation.

As opposed to C corporations, the S corporations are intermediary entities, and their income, losses, deductions, and credits pass through the company and become the direct responsibility of the company's shareholders.

It is the responsibility of the shareholders to report all the items associated with the corporate activities on their personal income tax returns; thus, S corps avoid the income double taxation that is associated with C corps.

In some countries, all shareholders must sign specific forms to make the business an S corporation for tax purposes. The authorities often require S corporations to meet the following requirements:

- Be a domestic corporation.
- Have only allowable shareholders, including individuals, certain trusts, and estates.
- Not include partnerships, corporations, or nonresident alien shareholders.
- Have no more than a certain number of shareholders.
- Have one class of stock.
- Be an eligible corporation.

Regardless of the way a business is structured, its owners will have the same overarching goals when it comes to the company's financial management.

1.1.2 The Corporate Objective

Corporate finance is the discipline that studies the relationship between the business and financial decision of the management, and their impact on the value of the business, by looking at how the capital is raised and how the value is generated.

The theory of corporate finance is led by a unifying objective, so that all models of the theory are built around it. The objective in conventional corporate financial theory when making decisions is to maximize the value of the business or firm (Coase 1937).

The main issue with the theory is that it is entirely built on that one objective, making the connection so strong that to the degree that this objective is flawed, it can be argued that the theory built on it is flawed as well.

The main disagreement between corporate finance theorists and practitioners is in fact the view they have about the real objective of the firm. Some critics of corporate finance argue that firms should have multiple objectives, in order to satisfy multiple interests (stockholders, labor, and customers).

Other experts suggest that companies should focus on what they view as simpler and more direct objectives, such as market share or profitability, regardless of the actual value the company has.

In order to fully understand the reasons to choose one objective among the abovementioned many, it is crucial to understand the reasons behind the choice of corporate finance to focus on corporate value.

Claiming that the objective of the firm is profit and value maximization is equivalent to saying that what stockholders do in their own self-interest is also in the best interests of the firm.

On the other hand, criticism points out that the goal is considered dependent on the existence of efficient markets, and it is often blind to the social costs associated with value maximization.

In this framework, the role of the financial managers in making decisions on behalf of the shareholders is crucial. The list of possible goals for a financial manager can be very long and diversified.

What really matters is the definition of a good financial management decision from the point of view of the shareholders. If we assume that stockholders buy stock

because they seek to gain financially, then the obvious definition is that good decisions increase the value of the stock, and poor decisions decrease the value of the stock.

It follows that the appropriate goal for the financial manager is to make decisions that increase the value of the stock, therefore maximizing the current value per share of the existing shares.

Having such a target helps in overcoming the difficulties implicit in assuming a complicated list of many different goals. The criterion is not ambiguous, and there is no short-run versus long-run issue.

The concept of value maximization as the core objective of the firm is justified by considering the shareholder as residual owner. This means that after having paid for the employees, suppliers, creditors, and taxes, what is left belongs to the shareholder.

If any of the above obligations (or any other arising from the corporate activities) are not met, the shareholder gets nothing. Therefore, if the shareholders are getting a positive income from the corporation, it means that everyone else has also been satisfied.

The core of the financial manager's activity is therefore to identify the investments and financing arrangements that have a favorable impact on the profitability of the company and its overall value consequently.

Although the following chapters are dedicated to the corporation, the basic idea applies to all forms of business, with slight differences. Some considerations even apply to nonprofit organizations, which are beyond the scope of the book.

It is also true that the objective should be reached by avoiding illegal or unethical actions in the hope of increasing the value of the equity in the firm. Therefore, the financial manager best serves the owners of the business by identifying goods and services that add value to the firm because they are valued in the free marketplace.

In corporations where there are many shareholders, and the property is heavily diluted, the manager gets effective control of the firm and may not necessarily act in the best interest of the shareholders.

Put another way, the management might be tempted to pursue its own objectives, of salary maximization through incentives, and job securing, at the stockholders' expense. These considerations must be taken into account when exploring financial management.

The relationship between stockholders and management is called an agency relationship. It is established when an owner or group of owners hires an agent to manage the corporation.

As mentioned above, there is an agency problem whenever the interest of the company's manager differs from that of the shareholders. For example, consider a new investment providing a high value at the cost of relatively high risk.

The owners of the firm will wish to take the investment (because the stock value will rise), but management may not because there is the possibility that things will turn out badly and managerial jobs will be lost.

So one choice is to not pursue the project, but on the other hand, the shareholders may lose value from that decision, involving an agency costs. Agency models are the focus of Chap. 7.

The scope of this section is to introduce the topic, in light of managerial issues. The agency costs can be indirect, when they translate in a lost opportunity for the business, or they can be direct.

Direct costs get two possible forms. The first type is a corporate expenditure that benefits management but costs the stockholders. The second type of direct agency cost is an expense that arises from the need to monitor management actions.

Some experts argue that letting managers decide by themselves would result in them trying to maximize the amount of resources over which they have control or, more generally, corporate power or wealth.

Managers typically will act in the interest of their job position first, and the risk is that they will try to demonstrate corporate power or even increase the nominal value of the business by, for example, overbuying other companies.

There are two factors at the basis of the behavior of the management toward the interest of the shareholders. First, the owners of the company should make sure that their goals are aligned to those of the managers. The alignment of goals can be done in various ways, for example, through a well-structured compensation plan.

Managerial compensation management acts in defense of shareholder rights by tying incentives to the financial performance of the firm, thus aligning the objective of the manager to that of the ownership.

For example, managers are frequently given the option to buy stock at a bargain price. The more the stock is worth, the more valuable is this option. In fact, options are increasingly being used to motivate employees of all types, not just top management.

Another factor is the job prospect, in the sense that better performances are rewarded with promotions and longevity of managerial contracts. Managers who are successful in pursuing stockholder goals will be in greater demand in the labor market and thus command higher salaries (Fama and Jensen 1983).

Executive compensations are public information and can be easily retrieved on the websites or papers of any public company (see Table 1.1), together with all the other pieces of financial information.

A particular form of defense for shareholders against an unwanted manager is called a proxy fight, which allows some of the shareholders to vote on behalf of someone else's stock.

This particular situation happens when a group solicits proxies in order to replace the existing board and thereby replace existing management. The mechanism is that of shareholders trying to put their nominees on the board and let them fire the management on their behalf.

One of the main tools companies use for value maximization is cost control. By controlling costs, they can manage and reduce their business expenses in order to maximize the profit from operations.

A crucial duty of a financial manager is to identify and evaluate all of the business's expenses, to determine whether those costs are reasonable and affordable, and reject them if useless or superfluous (Winton 1993).

Financial management deals with costs on a daily basis, by looking at ways to reduce them through various methods. Cutting back, moving expenses in time, or

Table 1.1 10 Highest paid CEOs in the United States in 2016 (total compensation)

Name	Company	Approx. salary (\$)
Tom Rutledge	Charter Communications	98,000,000
Les Moonves	CBS Corp	68,600,000
Bob Iger	Walt Disney Co.	41,000,000
David Zaslav	Discovery Communications	37,200,000
Robert Kotick	Activision Blizzard Inc.	33,100,000
Brian Roberts	Comcast Corp.	33,000,000
Jeff Bewkes	Time Warner Inc.	32,600,000
Ginni Rometty	IBM	32,300,000
Leonard Schleifer	Regeneron Pharmaceuticals	28,300,000
Steve Wynn	Wynn Resorts	28,200,000

Source: Business Insider: <http://www.businessinsider.com/highest-paid-ceos-2016-2017-5>

changing suppliers are some of the tricks a manager can adopt in order to reduce costs.

The task seems to be very complicated if one thinks about how many different expenses a company incurs during daily activities, from energy to phone, Internet and various utilities, employees' salaries, outsourced services, and more.

When costs are too high, profit margins shrink, and it becomes difficult for a company to be successful against competitors. For a public company, high costs involve a decrease in the shares' value and difficulty in attracting investors.

Another possible goal of the corporation is the market share maximization. Market share is the ratio between the total sales of the company and the total sales of the industry over the same period.

The measure gives the size of the company relative to the market and competitors, defining the position of the firm in the industry sector of reference. That is why companies are always looking to expand their share of the market. On top of that, it is common practice to grow the size of the total market by appealing to larger demographics and lowering prices or through advertising.

When market share increases, a company gets the opportunity to expand its business by growing the scale of the operations and improving profitability. The market size itself is not fixed, but it varies according to it being mature or growing.

The market share of a firm is a good indicator of the competitiveness of its products and services in the industry sector of pertinence. As the total market for a product or service grows, a company that is maintaining its market share is growing revenues at the same rate as the total market (Williamson 1981).

A consistent growth in market share will be reflected in a growth of the firm's revenues, at a rate much faster than nongrowing competitors. Growth markets are typical of technology sectors; consumer goods companies generally operate in a mature market.

Start-ups and small companies usually experience higher growth rates than well-established mature ones. This is because a company that has already achieved a large

market share will grow its sales more difficultly as the potential customers decrease in number.

It seems appropriate at this stage to dedicate a final consideration to companies that are not publicly traded. In this case, the objective has to be defined as a more general goal, given that corporations are not the only type of business in the economy.

A difference can be made between companies that have traded stocks and companies that do not. Corporations are certainly not the only type of business, and the stock in many corporations rarely changes hands, so it is difficult to say what the value per share is at any given time.

Anyway, no big modifications are needed when dealing with for-profit organizations. The total value of the company can be seen in fact as the value of the equity in the hands of the owners.

The corporate objective can then be stated in more general terms as to maximize the market value of the existing owners' equity. With this in mind, it does not matter whether the business is a proprietorship, a partnership, or a corporation.

1.2 Financial Statement Analysis

Learning Outcomes

- Learn how to analyze the financial statements of the corporation.
- Learn how to calculate and interpret financial ratios.
- Learn how to build and analyze pro forma financial statements.

1.2.1 Balance Sheet

Financial accounting takes care of the papers of the company and the numbers generated by the business. In the very general case, the papers take the form of a balance sheet, an income statement, and a cash flow statement.

The simplest forms of business are allowed by law to keep record in a very simplified form, thus not recognizable in the above definition of financial accounting, applying instead to limited liability ventures and corporations.

A standard balance sheet is the only part that applies to a single point in time of a business' calendar year. It is structured in three parts: assets, liabilities, and ownership equity.

Assets are listed in order of liquidity, with main categories being first in the list. After the assets, the liabilities are listed. The difference between the assets and the liabilities is known as equity.

The equity of a firm is also known as the net assets or the net worth or capital of the company, and it is straightforward from the accounting equation that the net worth must equal assets minus liabilities.

The sense of the balance sheet equation is that equity and liabilities finance the assets of the corporation. The financing happens either by borrowing money (liability) or by using the owner's money (owner or shareholders' equity).

This is why the layout of the balance sheet is such that it is usually presented with assets in one section and liabilities and equity in the other section, so that the algebraic sum of the two sections equates.

The simplest forms of business that operate only in cash can simply check the bank balance at the end of the observation period and sum up the cash in hand, in order to get the financial picture of the business.

However, most businesses, and corporations especially, operate through debit and credit, meaning that they do not pay their obligations immediately, nor are paid for the goods and services they supply, immediately.

Corporations build up inventories of goods, and they acquire buildings and equipment, so that they have assets that they cannot, even if they want to, immediately turn into cash at the end of each period.

As opposed to the other parts of the financial statement, a balance sheet is a static snapshot of the firm at the end of each fiscal year. It organizes and summarizes the assets and liabilities to create a picture of what the firm owns and what it owes.

Assets usually are put on the right-hand side of the balance sheet, and their first classification of assets is between current and noncurrent. Current assets are cash, receivables, and any other assets that can be easily converted to cash within a short time (usually 1 year) or whose life is shorter than that time.

The current assets convert to cash in less than 12 months, thus including the inventories that are processed into final products and sold in a short time, or accounts receivable (credits) to be cashed in a short time. Examples of current assets are:

- Cash: it includes the accounts used by the business to receive customer payments and pay business expenses, or any quick-access account, which keeps a fixed amount of cash in it.
- Accounts receivable: it shows all credits that the firm has toward customers to get to a completed sales transaction. It is money not yet received, but expected supposed to flow in the near future.
- Inventory: it includes the goods available for sale, after completing the production process, or also products on shelf for a distribution store. For a manufacturing company, the definition also includes the raw materials used for production.
- Prepaid expenses: these are expenses paid for in advance, such as rent, insurance, office supplies, postage, travel expense, or advances to employees. If they carry benefits in the 12-month period, they qualify for inclusion in current assets.

Noncurrent assets have a relatively long life and cannot be easily turned into cash in a reasonably short time. There can be tangible noncurrent assets (usually buildings, equipment, vehicles, and more) and non-tangible assets (trademark, patents, brand, and more) which are not physically consistent but represent a value to the company. Examples of noncurrent assets are:

1. Long-term assets: these are supposed to be held by the company for more than 1 year. The category includes investments and property, plant, and equipment currently in use by the company in day-to-day operations.
2. Fixed assets: it includes the company's physical assets like property, plant, and equipment. The account also includes long-lived assets, such as a car, land, buildings, office equipment, and computers.
3. Long-term investments: these investments are financial assets held by the company, such as bonds, stocks, or notes.
4. Intangible assets: the category includes assets that are not physical but still have a value to the company, like patents, trademarks, and goodwill. They all classify as noncurrent assets.

The right-hand side of the balance sheet incorporates liabilities and shareholders' equity.

Liabilities are obligations of the firm that have to be paid in cash within a stipulated period. In most cases, the obligation implies the payment of some capital plus the interest accrued over time.

First, liabilities are listed, and as for the assets, it is possible to differentiate between current liabilities and noncurrent liabilities.

Current liabilities are listed before the noncurrent liabilities in the balance sheet. They are obligations due for payment within 12 months, with the same life span of current assets.

The settlement of current liabilities is done by using current assets, mostly cash, or current sales of inventory. In some cases, it is also possible to swap out one current liability for another.

Examples of current liabilities are:

- Short-term notes payable: these are notes due in less than 12 months after being registered in the balance sheet. A working capital loan, issued by banks with the expectation that it will be paid back from collecting accounts receivable or the sale of inventory, is an example.
- Accounts payable: this account shows the amount of money the company owes to its vendors, for having acquired supplies or services.
- Dividends payable: payments due to shareholders of record after the date of dividend declaration.
- Payroll liabilities: as it is typical for a company to owe the payroll and related taxes, having not paid them yet, it is typical for companies to accrue them in the balance sheet.
- Current portion of long-term notes payable: when the company has a long-term note on payment (due after a 12-month period). The portion of that note that is paid at registration must be showed on the balance sheet as a current liability.
- Unearned revenue: this category includes money the company collects from customers that it hasn't yet earned by doing the complete job for the customers but that it anticipates earning within 12 months of the date of the balance sheet.

Debts with maturity longer than 12 months are commonly classified as noncurrent liabilities. Firms borrow long-term funds from a variety of sources. Common terminology use in finance is to use the terms debt and debt holders to refer to the amount owed and to whom it is owed, respectively.

Examples of noncurrent liabilities are:

- Bonds payable: the term indicates long-term lending agreements between borrowers and lenders. It is an alternative way to raise capital for a company, besides selling stocks.
- Long-term leases: capital lease is recorded on the balance sheet as an asset, rather than in the income statement as an expense. The related lease obligation must be recorded as a liability.
- Product warranties: the repairing and replacing obligations on products sold by the company that extend beyond 12 months are registered in the balance sheet as long-term liability.

As mentioned above, the shareholders' equity, which closes the right-hand side of the balance sheet, is calculated as the difference between the total value of assets and the total value of liabilities.

The equity of shareholders is a claim against the firm's asset, residual after payment of all the debt. The debt holder has the first claim on the company value, when borrowing is put in place.

Thus, the equity can be calculated as a difference between the total value of corporate assets and the amount of liabilities in the balance sheet, with the formula

$$\text{Assets} - \text{Liabilities} = \text{Equity}$$

This feature of the balance sheet is intended to reflect the fact that, in case the firm would sell all of its assets and use the proceedings to pay off its debts, the eventual residual value remaining belongs to the shareholders. Therefore, the value of the left-hand side always equals the value of the right-hand side, giving the balance (Table 1.2).

The accounting value (also named book value) of the equity is then dependent on the level of assets and liabilities and increases when earnings are partly retained, instead of being distributed as dividends.

The accounting value of a firm is generally recorded on a cost value base, meaning they do not reflect the actual value of the assets, so to make almost meaningful to call it book value.

Market value on the other hand is the price at which buyers would be willing to trade the asset at present time. This value is usually different from accounting value, and the management's job is to create a value for the firm that is higher than its cost.

There are two major accounting standards that are used worldwide, namely, Generally Accepted Accounting Principles (GAAP) and the International Financial Reporting Standards (IFRS).

Table 1.2 A balance sheet for a hypothetical company AAA

Balance sheet (€ 000s)			
Company AAA			
<i>Current assets</i>		<i>Current liabilities</i>	
Cash	1,330,000	Accounts payable	382,000
Short-term investments	250,000	Accrued interest	8000
Accounts receivable	320,000	Other current liabilities	350,000
Inventory	225,000	Total current liabilities	740,000
Other current assets	52,000		
Total current assets	2,177,000		
<i>Fixed assets</i>		<i>Long-term liabilities</i>	
Property, plant, and equipment	11,250,000	Notes payable	118,000
Accumulated depreciation	(2,125,000)	Mortgages	3,600,000
Total net fixed assets	9,125,000	Other long-term debt	1,224,000
		Total long-term liabilities	4,942,000
		<i>Equity</i>	
		Stocks	5,300,000
		Retained earnings	320,000
		Total equity	5,620,000
Total assets	11,302,000	Total liabilities and equity	11,302,000

The GAAP is the accounting standard used in the United States, while IFRS is used in over 110 countries around the world. GAAP is considered more rule oriented, while IFRS is more principles based.

The two systems have been progressively converging in the last years to a similar standard, and the US Securities and Exchange Commission is looking to switch to IFRS by 2015, meaning that GAAP will no longer be used in the future.

There are some key differences between the two standards. In general, due to its principle-based nature, IFRS is supposed to represent and capture the economics of a transaction better than US GAAP.

The main differences between GAAP and IFRS can be summarized as follows:

- **Intangibles:** GAAP recognizes intangibles at their fair value, while IFRS only recognizes them if the asset will have a future economic benefit and has measured reliability.
- **Inventory costs:** IFRS does not allow for the last-in, first-out (LIFO) method to be used, while GAAP allows both LIFO and first-in, first-out (FIFO) standards to be used for inventory accounting. Moreover, the IFRS allows revision of the write-down of inventory in the future, according to some criteria being met, while GAAP does not allow for any revision once the inventory has been written down.
- **Consolidation:** in the IFRS, a control model is preferred, while in GAAP a risk-reward model is used.
- **Extraordinary items:** according to IFRS, extraordinary items are not segregated in the income statement, while they are shown below net income in the GAAP.

- Earnings per share: under IFRS, the earning-per-share calculation does not average the individual interim period calculations, whereas under US GAAP, the computation averages the individual interim period incremental shares.
- Development costs: these are considered expenses under GAAP standards, while they are capitalized under IFRS only if they meet some specific criteria.
- Write-downs: IFRS uses a single-step method for impairment write-downs rather than the two-step method used in US GAAP, making write-downs more likely.

In general, IFRS involves less paperwork, and it gives a detailed picture of the corporate financials in a more synthetic way, making it a desirable standard worldwide. That is probably the reason behind the shift to IFRS all over the world.

At present, most liabilities show up on the balance sheet at historic cost rather than fair value. Moreover, as long as they are properly classified as current, there are no requirements from GAAP for the order in which they appear on the balance sheet.

1.2.2 Income Statement

The income statement measures a company's financial performance over a specific accounting period. It summarizes the incomes and expenses incurred by the business in the period considered, including both operating and nonoperating activities.

As a final result, it shows the profit or loss incurred in the specified period, so that it can also be called profit and loss statement. The income statement is divided into two parts: the operating items section and the nonoperating items section.

In the operating items, revenues and expenses coming as a result of the regular business operations are listed, while the revenue and expense information about activities that are not tied directly to a company's regular operations are included in the nonoperating section.

If a car producer sells cars, this is an operating activity that generates operating revenue. In addition, when buying raw material for car construction, the producer incurs an operating expense.

Assume instead that the car seller is selling some of the equipment previously employed for production. In this case the operation is not related to the core business and therefore leads to a nonoperating profit. The same reasoning works for buying and losses (Needles and Crosson 2002).

The income statement is made of many entries that contribute in calculating the profitability of the corporation. What follows is a list of the main entries with an explanation:

Operating incomes can be listed as:

- Revenues: income earned or asset enhancement from delivering or producing goods, rendering services, or other activities that constitute the entity's ongoing major operations, over the period considered. It is net of all discounts and allowances and usually referred to as gross revenue or sales revenue.

- Expenses: any incurrence in liabilities, as cash outflows or using up of assets or incurrence of liabilities from the main activities for production and delivering of goods, in the specified period.
- Cost of goods sold (COGS): all the direct cost related to the production of goods and services, during the specified period, including material, labor, and overhead costs. Operating costs, such as selling, administrative, advertising, or R&D, are excluded.
- Operating expenses or selling, general, and administrative expenses (SG&A or SGA): these include all payroll costs, and it usually represents a large share of total costs for production. The category includes:
 - Selling expenses: these are the costs incurred to sell products and include salaries for sales agents, commissions, shipping, advertising, and depreciation of sales-related assets, during the specified period.
 - General and administrative (G&A) expenses relate to the management of the business, including compensation of executives, professional fees, insurance, utilities, and rent.
- Depreciation and amortization: the ratio of asset value capitalized on the balance sheet for a specific accounting period. It is a systematic and rational allocation of cost rather than the recognition of market value decrement. This section treats the two separately, because normally depreciation refers to tangible assets, while amortization refers to intangible assets. However, please note that in some cases the two terms are considered equivalent in the literature.
- Research and development (R&D) expenses represent expenses included in research and development.

Nonoperating incomes can be listed as:

- Other revenues or gains include the outcomes from activities that are not primary business, like gained rents, income from patents, and goodwill. It also includes unusual or infrequent gains, like the ones coming from sale of securities or from disposal of fixed assets.
- Other expenses or losses are also not related to primary business operations and include, for example, foreign exchange loss.
- Finance costs are the expenses incurred for borrowing from various creditors and include interest paid and bank charges.
- Income tax expense is the sum of the amount of tax payable (or receivable) to (from) tax authorities in the current reporting period and deferred tax liabilities (or assets).

Incomes from irregular assets come from discontinued operations, which are the most common type of irregular items. It refers to a segment of a company's business that has been sold, disposed of, or abandoned. It can range from a certain product line to an entire line of business (Jensen and Meckling 1976).

Table 1.3 A single-step income statement for a hypothetical company ABC

Income statement: single step Company ABC	
Sales	1,015,000 €
Interest earned	15,000
<i>Total revenues</i>	<i>1,030,000</i>
Cost of sales	(500,000)
Depreciation	(40,000)
Amortization	(10,000)
Commissions paid	(40,000)
Office supplies	(8000)
Office equipment	(10,000)
Advertising expenses	(12,000)
Interest paid	(3000)
Other operating expenses	(2000)
Taxes	(100,000)
<i>Total expenses</i>	<i>(725,000)</i>
<i>Net income</i>	<i>305,000 €</i>

First of all, the operating income is calculated as difference between all revenues and net of discounts, minus the expenses related to the production of the revenues. The costs deducted from revenues are typically the cost of goods and the operating expenses.

From the operating income, it is possible to calculate the recurring income by summing up with the other income that is not operative but investment-related. To be included in this category, these items must be recurring in nature.

As mentioned previously, the income statement can be presented in either a single-step (see Table 1.3) form or a multiple-step form (see Table 1.4). Both forms yield the same net income, besides showing different levels of details in the calculation.

Single-step income statement is very common and easy given that it uses only one mathematical passage to calculate net income. The formula is

$$\text{Net Income} = (\text{Revenue} + \text{Gains}) - (\text{Expenses} + \text{Losses})$$

Based on this, and recalling the definitions for the statement entries given above, a single-step income statement looks like

The multi-step statement is an alternative that slightly complicates the accounting of revenues and costs because it uses multiple subtractions in computing the net income shown on the bottom line.

It does by separating the operating revenues and operating expenses from the nonoperating revenues, nonoperating expenses, gains, and losses. Gross profit is also shown as net sales minus the cost of goods sold. Here is a sample income statement in the multiple-step format:

Table 1.4 A multiple-step income statement for a hypothetical company ABC

Income statement: multiple steps Company ABC	
Sales	1,015,000 €
Cost of sales	(500,000)
<i>Gross profit</i>	<i>515,000</i>
Advertising expenses	(12,000)
Commissions paid	(40,000)
<i>Total selling expenses</i>	<i>(52,000)</i>
Office supplies	(8000)
Office equipment	(10,000)
<i>Total administrative expenses</i>	<i>(18,000)</i>
Depreciation	(40,000)
Amortization	(10,000)
Other operating expenses	(2000)
<i>Total operating expenses</i>	<i>(52,000)</i>
<i>Total expenses</i>	<i>(122,000)</i>
<i>Operating income</i>	<i>393,000</i>
Taxes	(100,000)
Interest earned	15,000
Interest paid	(3000)
<i>Total nonoperating expenses</i>	<i>(88,000)</i>
<i>Net income</i>	<i>305,000</i>

The multiple-step income statement entails three fundamental steps for net income calculation. First of all the gross profit is calculated, then operating expenses are subtracted to get to the operating income, and finally the net position on nonoperating items (separately calculated) is added or subtracted in order to get the net income.

The use of multiple-step statement implies several benefits. First, it clearly states and isolates the gross profit amount, which is very important due to many investors being interested in the company's gross margin.

The second benefit is that also the subtotal of operating income is separated, which gives an indication of the profit earned by the company on its primary activities. Finally, as the bottom line, the statement reports the net amount for all the items on the income statement. If the net amount is positive, it is labeled as net income. If the net amount is negative, it is labeled as net loss (Williams et al. 2002).

In corporate finance, when it comes to the calculation of cash flows, it is very important to distinguish between expenses related to production and administration and those due to the depreciation of assets and payment of interest.

This distinction is crucial for the right calculation of the free cash flows to the firm and free cash flow to equity, as the basis for discounted cash flow valuation of the company, which is the focus of Chap. 8 of the book. An example of corporate finance income statement is shown in Table 1.5.

Table 1.5 A corporate finance income statement for a hypothetical company ABC

Income statement: Corporate Finance (€ 000s) Company ABC	
Sales	1,015,000
Cost of sales	(500,000)
Advertising expenses	(12,000)
Commissions paid	(40,000)
Office supplies	(8000)
Office equipment	(10,000)
Other operating expenses	(2000)
<i>EBITDA</i>	<i>443,000</i>
Depreciation	(40,000)
Amortization	(10,000)
<i>EBIT</i>	<i>393,000</i>
Interest earned	15,000
Interest paid	(3000)
Taxes paid	(100,000)
<i>Net income</i>	<i>305,000</i>

It is clear from the above statements that EBIT and operating margin are the same, and they are normally used as equivalent, for example, for calculating the profitability ratios associated with them.

A very interesting feature of the combined use of income statement and balance sheet, which is very appreciated by financial analysts, is the possibility it gives to calculate ratios and margins that give a deeper sense of the financial strength of the company.

In terms of importance and usage, profitability ratios are prominent in ratio and investment analysis. These ratios indicate the margins realized by the company on the sales over some specific period (quarter or year).

Bottom line, the profitability ratios give a measure of whether the company is able to generate adequate return for the stakeholders. As for many other ratios, in order to grasp the most of the informative power, they have to be compared with the industry averages.

Margin and ratios in fact normally vary across different industries, with some industries being typically low-margin types of business (easily available commodities, replicable products, and services, among others) and other industries being high-margin types of business (i.e., non-replicable and exclusive products and services, among others).

The gross profit margin (GPM), for example, indicates what profit a company makes on the cost of goods so to uncover how efficiently the various resources (included labor) are used in the production process.

The margin is calculated as

$$\text{Gross Profit Margin} = \frac{(\text{Sales} - \text{Cost of sales})}{\text{Sales}}$$

Example 1.3 Suppose that a company has 1,000,000 € in sales and the cost of its labor and materials amounts to 600,000 €. Its gross margin rate would be

$$\text{Gross Profit Margin} = \frac{(1,000,000 - 600,000)}{1,000,000} = 0.40 = 40\%$$

The GPM indicates how efficiently raw materials, labor force, and production-related fixed assets are used to generate income. A higher margin percentage is a favorable profit indicator.

There are differences in the GPM according to the type of business the company is running and what industry it belongs to. For instance, the airline industry has a gross margin of about 5%, while the software industry has a gross margin of about 90%.

The operating profit margin (OPM) is another interesting metrics, showing how successful a company's management has been at generating income from the operation of the business. It is calculated as

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

Example 1.4 If EBIT amounted to 200,000 € and sales were 1,000,000 €, the operating profit margin would be

$$\text{Operating Profit Margin} = \frac{200,000}{1,000,000} = 0.20 = 20\%$$

Measuring how much EBIT is generated for every euro of sales, the OPM measures roughly what operating leverage the company can achieve by running its core business (operational).

The higher the margin, the better, indicating that sales growth is faster than costs. Moreover, positive and negative trends in this ratio are, for the most part, directly attributable to management decisions.

The net profit margin (NPM) is a measure of the margins generated by the business, when taxes are also taken into account. It compares net income with sales in order to give a measure of how effectively managers run the business.

It is calculated as

$$\text{Net Profit Margin} = \frac{\text{Net income}}{\text{Sales}}$$

Example 1.5 If a company generates after-tax earnings of 100,000 € on its 1,000,000 € of sales, then its net margin amounts to

$$\text{Net Profit Margin} = \frac{100,000}{1,000,000} = 0.10 = 10\%$$

The NPM is the key index for understanding company profitability, so it is widely used in financial management and for investment analysis. It also varies between industries, and by comparing a company's gross and net margins, one can see the non-production and non-direct costs like administration, finance, and marketing costs.

A higher NPM means the company has an advantage compared to its competitors, and it is capable of increasing its market share during hard times, in order to benefit when the upturn is back.

Other ratios based on the profitability of the company (called profitability ratios) are (Table 1.6):

Activity ratios measure the efficiency of usage of the corporate assets, by comparing them (current and fixed assets) to different financial measures, so to describe the overall operational efficiency of the business.

All the activity ratios come in a form of turnover ratio, and they are calculated based on financial entries that are calculated on average over the reference period. All of the activity ratios measure the rate of turnover of the corporate assets and liabilities.

As a number, they can be reinterpreted as the number of times that the reference indicators (inventory, receivables, payables) are replenished over the reference period, in order to cover the other relevant reference financial sales, COGS, etc. (Table 1.7).

Table 1.6 Profitability ratios

Profitability ratios	
Return on asset (ROA)	= $\frac{\text{Net income}}{\text{Total assets}}$
Return on equity (ROE)	= $\frac{\text{Net income}}{\text{Equity}}$

Table 1.7 Activity ratios

Activity ratios	
Inventory turnover	= $\frac{\text{Cost of goods sold}}{\text{Average inventory}}$
Receivables turnover	= $\frac{\text{Net income}}{\text{Average receivables}}$
Payables turnover	= $\frac{\text{Cost of goods sold}}{\text{Average payables}}$
Asset turnover	= $\frac{\text{Net income}}{\text{Total assets}}$

Table 1.8 Liquidity ratios

Liquidity ratios	
Current ratio	$= \frac{\text{Current assets}}{\text{Current liabilities}}$
Quick ratio	$= \frac{\text{Current assets} - \text{Inventory}}{\text{Average receivables}}$
Cash ratio	$= \frac{\text{Cash}}{\text{Current liabilities}}$

Table 1.9 Solvency ratios

Solvency ratios	
Debt to asset ratio	$= \frac{\text{Total liabilities}}{\text{Total assets}}$
Debt to capital ratio	$= \frac{\text{Long-term liabilities}}{\text{Long-term liabilities} + \text{Equity}}$
Cash ratio	$= \frac{\text{Long-term liabilities}}{\text{Equity}}$
Interest coverage ratio	$= \frac{\text{EBIT}}{\text{Interest paid}}$

Liquidity ratios are a reference measure to creditors in that they reveal the level of liquidity generated and saved by the business. Consequently, they measure the ability of the company to meet the short-term obligations and the ability to make payments.

As for other ratios, liquidity ratios give full information when compared to competitors and the industry, in that some types of business normally run on high levels of liquidity, while others are not very liquid in assets. In addition, the dynamics (trend) of the ratios over time are important (Table 1.8).

As oppose as liquidity ratios, solvency ratios measure the company's ability to meet the long-term obligations, by providing information on the corporate capital structure, leverage, and level of cash flows generated.

It is therefore possible to understand, among other things, whether a company is able to repay the interest on debt. Lack of cash flows may hinder the payments, and the company could be at risk of default (Table 1.9).

1.2.3 Cash Flow Statement

The statement of cash flows is a report of the cash flows generated by the company's operations, in terms of operating, investing, and financial activities on cash flows over an accounting period (see Table 1.10).

It is a synthetic method to deduce interesting information about the following issues:

- How the firm obtains and spends cash
- Reasons for differences between net income and cash flows
- If the company generates enough cash from operation to sustain the business
- If the company generates enough cash to pay off existing debts as they mature
- If the company has enough cash to take advantage of new investment opportunities

Table 1.10 A cash flow statement for e hypothetical company XYZ

Cash flow statement (€ 000s) Company XYZ	
Net income	295,000 €
Depreciation	13,500
Adjustments	(7200)
Changes in account receivable	(4300)
Changes in liabilities	2600
Changes in inventories	68,000
Changes in other operating activities	(65,000)
<i>Net cash flow from operating expenses</i>	<i>7600</i>
Capital expenditures	(4500)
Investments	(125,500)
Other cash flows from investing activities	2350
<i>Net cash flow from financing expenses</i>	<i>(127,650)</i>
Dividends paid	(10,250)
Change in shares outstanding	(4750)
Change in debt	63,500
Other cash flows from financing activities	59,900
<i>Net cash flow from financing expenses</i>	<i>108,400</i>
<i>Net change in cash and cash equivalents</i>	<i>(11,650)</i>

The statement of cash flows is made of three sections:

- Operating activities
- Investing activities
- Financing activities

Each section leads to the corresponding free cash flow through calculation. Cash flow from operating activities (CFO) arises from normal operations such as revenues and cash operating expenses net of taxes. Operative activities range from production to sales and payments collected from customers. On the cost side, the list includes production and sales costs, inventory, and advertising.

The cash flows related to production activities therefore can be listed as:

- Income from the sale of goods or services
- Income for the sale of financial assets in a trading portfolio
- Interest received
- Payments to suppliers
- Payments to employees
- Other payments
- Interest payments (can be reported under financing activities depending on the accounting standard)
- Merchandise

In order to go from income to cash flows, it is then important to add (or subtract) back to the income some figures that have been subtracted (or added) previously to the gross income but do not constitute a cash flow. These items are:

- Depreciation
- Deferred tax
- Amortization
- Income or loss from trading noncurrent assets
- Dividends
- Revenue from certain investing activities

Obviously some items are summed up, and others are subtracted as can be described by the following example:

- Cash inflow
 - Income from the sale of goods or services
 - Interest received
 - Dividends
- Cash outflow
 - Payments to suppliers
 - Payments to employees
 - Payments to government
 - Payments to lenders
 - Payments for other expenses

The cash flow from investing activities (CFI) arises from investment activities such as the acquisition or disposition of current and fixed assets:

- Purchase or sale of an asset (land, building, equipment, marketable, etc.)
- Loans made to suppliers or received from customers
- Payments related to mergers and acquisition

Items subtracted as described by the following example:

- Cash inflow
 - Sale of property, plant, and equipment
 - Sale of debt or equity securities (other entities)
 - Collection of principal on loans to other entities
- Cash outflow
 - Purchase of property, plant, and equipment
 - Purchase of debt or equity securities (other entities)
 - Lending to other entities

The cash flow from financing activities (CFF) is built on the changes of cash due to the modification of the company's shares number or through short-term or long-term debt for the company's operations.

Financing activities are those generating inflow of cash from investors and outflow of cash to shareholders, in the form of dividends, as the company generates income. In general, all the activities which impact the long-term liabilities and equity of the company are included, and the most important are:

- Dividends paid
- Sale or repurchase of the company's stock
- Net borrowings
- Payment of dividend tax
- Repayment of debt principal, including capital leases
- Cash inflow
 - Sale of equity securities
 - Issuance of debt securities
- Cash outflow
 - Dividends to shareholders
 - Redemption of long-term debt
 - Redemption of capital stock

1.2.4 Pro Forma Statements

Besides official documents following the international standards, sometimes companies also prepare some statements that are adjusted to take into account the forecasted change in the profitability of the business.

The so-called pro forma statements allow investors to have a clearer picture of the operating results of the company, by setting some scenario under which the financial outcome of the business is rather manipulated.

The core of pro forma calculation of earnings and balance sheet entries is based on the concept of relevant cash flows. Given the variable set to create the desired scenario, only the entries in the statements that are related to that variable are adjusted in the pro forma version.

So onetime expenses are cut from the calculation in that they are normally not included in the accounting of ordinary corporate operations. Onetime items do not contribute to the company's representative valuation.

Pro forma statements are somehow controversial in that the company may choose to exclude selected financial entries in order to improve what is believed to be the correct financial representation of the business, sometimes at the expenses of accuracy.

While historical statements, based on either GAAP or IFRS statements, are an official documentation that should drive the investor's decision toward investing or not in the company, some analysts may find it interesting to read and interpret the forecasts the company gives in a pro forma manner.

Pro forma statements are normally based on the so-called percentage of sales (POS) approach. The rationale of such approach is that, as mentioned above, sales are normally considered to drive most changes in the balance sheet and income statement.

It therefore makes sense to use sales as the key factor to build up the pro forma statements.

By doing this, the accounting identity can be checked on pro forma basis from forecasted assets, liabilities, and equity. When the two sides of the forecasted balance sheet are not even, the external financing needed (EFN) can be calculated as difference.

Normally a plug variable will be chosen, in order to rebalance the statement, by acting on it. For example, an excess of assets compared to liabilities and equity could be addressed by increasing the amount of long-term debt.

One important point is that not all items in the financial statements vary with sales. It is therefore important to learn what financials increase or decrease when transferred to the pro forma statements and what others stay unchanged.

Items that normally vary with sales are:

- Costs generally do change with sales in that the profit margin is supposed to stay constant.
- Current assets generally do vary with sales, assuming that the increased costs are related to additional inventory needed for extra production to support the increase of sales. Same logic works for receivables and cash.
- Net fixed assets vary with sales only if the company is operating at full capacity. If the company is operating below full capacity in fact, the extra assets are considered to be already in place, to support the increase in sales.
- Current liabilities also vary with sales for reasons similar to those applied to current assets.

Items that normally vary with sales are:

- Depreciation does not vary with sales in that it is related to fixed assets.
- Interests paid are also not related in that they represent financial costs.
- Dividends depend on managerial decision. It is therefore opportune to not let them vary with the sales.
- Long-term debt and notes payable do not vary with sales because it relates to the capital structure decision.
- Equity does not vary for the same reasons as long-term debt.

This approach uses the cost of goods sold (COGS) as the overall cost related to production before EBIT is calculated, so that only interest paid and taxes are left out. The subtraction of the latter leads then to the net income.

Example 1.6 Assume company LTD is willing to perform a pro forma analysis on its financials, projecting figures forward by 1 year. The company has the following financial statements:

Company LTD		
Current income statement (€ 000s)		
	Current	% of sales
Sales	25,000	100
COGS	(15,000)	60
Interest paid	(0)	0
EBT	10,000	40
Taxes	(3750)	15
Net income	6250	25
Dividends (payout ratio, 60%)	3750	
Addition to retained earnings	2500	

Company LTD			
Current balance sheet (€ 000s)			
	Current		Current
<i>Assets</i>		<i>Liabilities and equity</i>	
Cash	3000	Accounts payable	2700
Accounts receivable	5300	Notes payable	8000
Inventory	3700	Long-term debt	9200
Other current assets	7500	<i>Total liabilities</i>	<i>19,900</i>
<i>Total current assets</i>	<i>19,500</i>		
Net PPE	22,000	Common stocks	17,300
<i>Net fixed assets</i>	<i>22,000</i>	Retained earnings	4300
		<i>Total equity</i>	<i>21,600</i>
<i>Total assets</i>	<i>41,500</i>	<i>Total liabilities and equity</i>	<i>41,500</i>

Sales are projected to increase by 10% next year, and the company has a current payout ratio of 60%, which the company is planning to keep constant. The pro forma income statement therefore looks like (with figures in dollar amounts and as percentage of sales):

Company LTD				
Pro forma income statement at 10% projected sales growth (€ 000s)				
	Current	% of sales	Pro forma	% of sales
Sales	25,000	100	27,500	100
COGS	(15,000)	60	(16,500)	60
Interest paid	(0)	0	(0)	0
EBT	10,000	40	11,000	40
Taxes	(3750)	15	(4125)	15
Net income	6250	25	6875	25
Dividends (payout ratio, 60%)	3750		4125	
Addition to retained earnings	2500		2750	

It is also possible to build the pro forma balance sheet in case the company is operating at full capacity. As already mentioned, some items vary, and some others do not. Pro forma retained earnings are obtained by summing up to the current retained earnings, the additional retained earnings, the latter being calculated as the product of the retention ratio (1 minus payout ratio) and the projected net income, as from the pro forma income statement.

$$\text{Retained earnings}_{\text{Pro-Forma}} = \text{Retained earnings}_{\text{Current}} + \text{Retained earnings}_{\text{Projected Addition}}$$

The current and pro forma balance sheets then look like:

Company LTD					
Pro forma balance sheet (full capacity) at 10% projected sales growth (€ 000s)					
	Current	Pro forma		Current	Pro forma
<i>Assets</i>			<i>Liabilities and equity</i>		
Cash	3000	3300	Accounts payable	2700	2920
Accounts receivable	5300	5830	Notes payable	8000	8000
Inventory	7500	8250	Long-term debt	9200	9200
Other current assets	3700	4070	<i>Total liabilities</i>	<i>19,900</i>	<i>20,120</i>
<i>Total current assets</i>	<i>19,500</i>	<i>21,450</i>			
Net PPE	22,000	24,200	Common stocks	17,300	17,300
<i>Net fixed assets</i>	<i>22,000</i>	<i>24,200</i>	Retained earnings	4300	7050
			<i>Total equity</i>	<i>21,600</i>	<i>24,350</i>
<i>Total assets</i>	<i>41,500</i>	<i>45,650</i>	<i>Total L and E</i>	<i>41,500</i>	<i>44,470</i>

According to the pro forma balance sheet, the external financing needed is

$$\text{EFN} = 45,650,000 - 44,470,000 = 1,180,000 \text{ €}$$

meaning that the company will have to increase the right-hand side of the balance sheet by an amount of 1,180,000 €. This could be done by increasing the long-term debt or issuing more shares to increase the equity. Alternatively, the amount of planned retained earnings could be increased by reducing the payout ratio.

As mentioned before, in case the company is not operating at full capacity, the current and forecasted sales are based on partial usage of the potential of the corporate assets. It is therefore opportune to not grow them in the pro forma balance sheet in that the company is ready to face increase in production and sales without additional fixed assets required.

Example 1.7 Assume company LTD is operating below at full capacity. The pro forma balance sheet will then look as follows:

Company LTD					
Pro forma balance sheet below full capacity (€ 000s)					
	Current	Pro forma		Current	Pro forma
<i>Assets</i>			<i>Liabilities and equity</i>		
Cash	3000	3300	Accounts payable	2700	2920
Accounts	5300	5830	Notes payable	8000	8000
Receivable	3700	4070	Long-term debt	9200	9200
Inventory	7500	8250	<i>Total liabilities</i>	<i>19,900</i>	<i>20,620</i>
<i>Total current assets</i>	<i>19,500</i>	<i>21,450</i>			
Net PPE	22,000	22,000	Common stocks	17,300	17,300
<i>Net fixed assets</i>	<i>22,000</i>	<i>22,000</i>	Retained earnings	4300	7050
			<i>Total equity</i>	<i>21,600</i>	<i>24,350</i>
<i>Total assets</i>	<i>41,500</i>	<i>43,450</i>	<i>Total L and E</i>	<i>41,500</i>	<i>44,470</i>

As can be noted, things change due to the invariance of the net fixed assets, and the EFN becomes negative

$$\text{EFN} = 43,450,000 - 44,470,000 = -1,020,000 \text{ €}$$

meaning that in this case the management should try to reduce the liabilities and equity by, for example, repaying back some of the debt or repurchasing some shares. Another way to do it is to increase the payout ratio so to reduce the amount of additional retained earnings.

Compared to GAAP and IFRS strict rules on reporting earnings, the pro forma approach allows the freedom to guess hypothetical figures, obtained following an estimation of the sales growth and adjusting the financial figures accordingly.

The pro forma earnings calculation is therefore something that is up to the standards and criteria of the company and may not include all costs that by default must be included when calculating current (effective) earnings as per accounting standards.

The pro forma analysis of financial statements contributes to the thorough understanding of the potential of the company and by the investors. Depending on the industry of relevance, sometimes pro forma statement may end up being more significant to the investors than current (official) ones.

Some of the ways a pro forma statement can differ from a standard one are the absence of noncash expenses, thus giving an idea of the cash profitability of the company and the absence of extraordinary expenses, when deemed irrelevant to the potential future earnings power of the company.

After important operations like mergers and acquisitions, abnormal onetime expenses are normally registered, but they do not affect the ordinary daily process of the business, thus pushing down the figures of profitability compared to those that can be recorded when the business runs smoothly.

One should also consider that pro forma statements, even if not publicly accepted and valid, are very often used as explanatory internal documents. They can be used by the management of the company and other stakeholders to assess the quality of the business and the potential future developments.

Analysts should pay attention when comparing pro forma statements of different companies, from the same or different sectors. It is very possible in fact that the discretion of the standards for compiling them can mislead the reader about the actual comparison between different companies.

1.3 Arbitrage

Learning Outcomes

- Learn the law of one price and how to describe it.
- Describe the various forms of arbitrage.
- Give examples of arbitrage and deviations from equilibrium.

1.3.1 The Law of One Price

The law of one price (LOP) states that the same good or service must have the same price, when traded in different markets, if it has the same features. In case of price disparity in fact, one could take advantage of the mispricing.

Usually the price disparity would not last because people would start buying on the cheaper market, and the prices on both markets would then adjust to match supply and demand, causing the convergence of prices.

The structure imposed on prices by economic incentives is the same in financial markets. Securities are the “same” if they produce the same outcomes in terms of combination of returns and risk (Schachermayer 2008).

Similarly, equivalent combinations of assets providing the same outcomes should sell for the same price, provided risk is taken into consideration. Therefore, the equivalence among financial securities involves the comparability of expected returns and risk.

If there is a mispricing for some asset sold on different markets, the LOP is violated, and investors will exploit the price disparity through arbitrage. Thus, the LOP imposes structure on asset prices through the discipline of the profit motive. The LOP is also violated when assets with the same risk profile have different expected returns.

For the LOP to hold, several assumptions must be made, about investors’ behavior and preferences, according to given constraints. Specifically, the analysis of LOP assumes the following hold:

- The agents are utility maximizing and prefer more wealth, which considers potential returns, risk, and constraints.

- The agents chose their investment based on dominance, meaning the investment with best outcomes would be chosen.
- An investment generating the same outcome in all possible future states of the world is riskless and should therefore not earn more than the risk-free rate.
- Strategies that produce riskless returns but exceed the risk-free return on a common benchmark, such as risk-free government bonds of some kind, must involve mispriced investments.

In efficient financial markets, deviations from the LOP should not be persistent but very rare and so small as to not be worth the transactions costs involved in exploiting them.

If arbitrage opportunities show up, they will be exploited only by those traders with very little transaction costs for whom the strategy is profitable. The LOP is roughly a synonymous with equilibrium, which balances the forces of supply and demand.

It is possible to give a formal presentation of the LOP by introducing some straightforward math.

Consider an asset traded on two different markets (A and B):

- Transaction and transport costs from one market to another are observable.
- Prices are expressed in the same currency.

The equilibrium determined by the LOP with transaction and transport costs can be formally expressed as

$$P_A = P_B + c_T \quad \Rightarrow \quad \frac{P_A}{P_B + c_T} = 1$$

where:

P_A is the price in market A.

P_B is the price in market B.

c_T is the transaction and transportation costs.

The law of one price adjusted for transport and transaction therefore implies a specific equilibrium, usually named the fundamental law of one price identity (LPI).

The LPI is equal to one in absence of transaction costs, when the prices in the two markets are identical. In case there are transaction and transport costs, the LPI will be always lower than one.

If the difference of prices in the two markets is much lower than transaction and transport costs, then it is not optimal to transfer the good, and the two economies are both self-sufficient in wheat.

The analysis can be extended to the case of multiple markets, other than just two. In this case, markets which do not trade with each other must be analyzed in terms of common markets they trade with.

The price difference between each pair of two markets that do not trade with each other can be determined as the minimum difference in transport and transaction costs between the two markets to a market with which they both trade (Schachermayer 2008).

Long distances make two markets more unlikely to trade with each other and more likely to need a common intermediate market. It is then often argued that the difference between prices of a commodity in two markets increases monotonically with distance.

Sometimes the LPI differs from one, making the market being not free of arbitrage opportunities. As mentioned above, these differentials rapidly drop to zero, setting the market back to equilibrium.

Therefore, the LOP is not a permanent state, but rather an evolving system, where market forces act in order to restore equilibrium, when it has been subject to whatsoever shock.

Perfectly efficient markets will allow for only sporadic and very short violations of the LOP, depending on how strong the local shocks are and how fast the information is diffused to other markets, including distortions (Bjork 2009).

The LOP can be conveniently analyzed from an econometric point of view, with an error correction model, in which model equilibrium is estimated. If markets are not well integrated, there is no immediate LPI but a long-run equilibrium. A violation of the equilibrium between markets is called an innovation or shock and needs to be corrected in order for the equilibrium price difference to be restored.

Assume at time t the prices for market A and B are initially in equilibrium, and the LOP holds. Consider a shock hitting market A, so that the price in the market plus transport and transaction gets higher than in market B.

The demand shifts to the market where the price is lower, and that will cause the price at time $t + 1$ to increase in market B and decrease in market A, due to the shift of demand.

To summarize, the logic behind the error correction model is that prices in both markets will react if the price differential is larger or smaller than transport and transaction costs. In this case, the prices will adjust such that the deviation from equilibrium is decreasing. The error correction model is usually expressed in differences of log prices, and it is given by:

$$\Delta P_{A,t+1} = \alpha_A \ln \left(\frac{P_{A,t}}{P_{B,t} + c_{T,t}} \right) + \varepsilon_{A,t}$$

$$\Delta P_{B,t+1} = \alpha_B \ln \left(\frac{P_{A,t}}{P_{B,t} + c_{T,t}} \right) + \varepsilon_{B,t}$$

where:

$\Delta P_{A, t+1}$ is the change of price in market A, from time t to $t+1$ due to the shock. α_A indicates the speed at what price in market A is adjusted. $\varepsilon_{A, t}$ is a standardized normally distributed error.

The market efficiency is indicated by the magnitude of the model parameters; the higher they are, the faster will the LPI be restored and the more efficient markets are, if the absolute values of the sum of the parameters should not exceed one.

As long as markets get more efficient, the magnitude of shocks tends to decrease, so the adjustments have to be smaller, and in the last centuries, the speeds of adjustments for markets like commodities decreased dramatically.

1.3.2 Forms of Arbitrage

As mentioned in the previous section, when the LOP is violated, arbitrage opportunities arise, giving investors the chance to achieve positive outcomes without any risk. Arbitrage can be therefore defined as the process of exploiting differences in the price of an asset by simultaneously buying and selling it on different markets and making a risk-free return out of it.

Example 1.8 Assume company WIZ's stock trades on the market at \$25.00 per share on the NYSE and an equivalent of \$25.40 on the LSE. An arbitrageur can purchase the stock in the NYSE and sell it on the LSE profiting of a positive payoff of \$0.40.

In the example of equities, the price should be the same on both exchanges all the time, but if they are not, arbitrage opportunities arise. Arbitrage is a riskless activity because traders are simply buying and selling the same amount of the same asset at the same time, and it is often referred to as "riskless profit."

Another example of arbitrage opportunity is given by mergers and acquisitions. When the market is favorable to that, they buy the shares of companies that are targeted by acquisition, with the objective to cash the money coming from the difference between trading price and the cash payment resulting from the merger.

Technically, such a strategy slightly differs from proper arbitrage in that it carries a small risk that the actual merger will not happen after all, leaving the investor with an amount of shares to be then sold back to the market, without any guarantee on the selling price.

In practice, arbitrage opportunities are very small and quick at disappearing, and only the very large institutional investors and hedge funds can fully exploit them, given their high endowment.

They are capable of taking advantage of arbitrage opportunities because they are able to trade large blocks of shares. Their investment scale is so big that they can gain huge profits even if the spread between two security prices is very small.

At the scale of the individual investor with limited resources, trading fees would neutralize any possible profit, making it impossible to benefit from the very small differences (usually just few cents) between prices that constitute arbitrage.

In the past arbitrage, opportunities were mainly created by the lack of real-time price update in different markets. Nowadays, the introduction of modern technology has decreased the number of arbitrage opportunities from that perspective.

There are several possible arbitrage strategies, depending on the type of activity and the type of financial asset involved in the transaction. Recall that in its purest form, arbitrage contains no element of risk (Schachermayer 2008).

Besides the standard, true form of arbitrage, which is unavailable to most traders, there are other forms of advantage that can be achieved by appropriately trading on assets to exploit riskless profit opportunities.

A popular form of arbitrage widely used in banking is the so-called inward arbitrage. It consists in borrowing from the interbank market, usually characterized by very low rates, and depositing the proceedings on a local currency deposit account at a higher interest rate.

In this case, the profit is given by the spread (difference) between the low interbank borrowing rate, and the much higher deposit rate, that is gained by the bank, following the application of the strategy.

Outward arbitrage, on the other hand, involves depositing local currency in a deposit account of some Eurobank. As oppose as inward arbitrage, the strategy works when the interest rate will be higher in the interbank market, which will enable the bank to earn more on the interest it receives for the use of its cash. It is also an efficient way for the bank to optimize its use of the cash, by investing it abroad, rather than in the local market, when more remunerative.

Example 1.9 Assume an American bank lends at the Eurodollar rate in the inter-bank market. The money will be then transferred from the parent bank in the United States to a foreign branch. The bank will earn revenues on the spread between the two interest rates. The larger the spread, the more will be made.

Triangular arbitrage involves three currencies and consists in converting one currency to another and then converting the resulting amount to a third currency for final conversion back to the original currency.

If market conditions are favorable, the final amount of original currency obtained could be higher than the initial amount in the same currency, making it possible to benefit from a risk-free and easy profit.

Mismatches in currency exchange rates give the opportunity for such an arbitrage to take place, but this does not happen very often, and opportunities only last for a few seconds on the markets.

Example 1.10 Assume the following exchange rates are currently quoted on the market: $\text{EUR/USD} = 0.85$, $\text{EUR/GBP} = 1.35$, and $\text{USD/GBP} = 1.64$. An arbitrage opportunity would involve:

- Sell \$1,000,000 for EUR: $1,000,000 \times 0.85 = 850,000$ €
- Sell 850,000 € for GBP: $\frac{850,000}{1.35} = \text{£}629,629.30$
- Sell £629,629.30 for USD: $629,629.30 \times 1.64 = \text{\$}1,032,592.59$

These transactions yield an arbitrage profit of \$32,592.59 (assuming no transaction costs or taxes).

Risk arbitrage is a form of speculation but still considered also a form of arbitrage due to its features. The definition is controversial because there is some degree of risk involved in the strategy, which is then not completely risk-free and true arbitrage.

The most common type of risk arbitrage is the so-called takeover and merger arbitrage, which takes place when there is an undervalued business that has been targeted by another corporation for a takeover bid (Bjork 2009).

Usually the takeover bid raises the value of the share in the market, because it is common for a buying company to offer a buying price, which is higher than current market price, in order to give incentive to shareholders to sell their shares.

Therefore, once the takeover is announced, the market price rises to a level, which is close to the offered takeover price. Arbitrageurs can identify a company targeted for takeover and buy the stock at the pre-takeover price, to sell them after the takeover has been completed.

In case the merger is successful in fact, the investors that bought the stock at the pre-takeover price will benefit from significant profits, dependent on the post-takeover price level, and the number of shares held.

In order for the strategy to be successful, timing is very important, and usually traders entering this type of strategy benefit of access to streaming market news. Within seconds of an announcement, they can act before regular retail traders.

The early trade, immediately after takeover bid announcement, raises the price to an intermediate level, which is the starting level for the risk arbitrage to take place. Trading at this price allows the investor to then wait for the final price to be reached and close the position in order to benefit from the price differential.

Statistical arbitrage is a form of arbitrage that attempts at profiting from price inefficiencies identified through analytical models. The investor attempts to profit from the likelihood that prices will trend toward a historical norm.

The relative-value arbitrage is an uncommon type of arbitrage, which relies on a strong correlation between two different securities. The strategy is to find pairs of asset that are historically strongly correlated and invest on them in times of divergence (temporary lower correlation).

If the strategy is successful, the correlation between the two assets will statistically be likely to turn back to a high level, and the pair will converge again to the same performance, so that the investor can benefit from the change in correlation.

Liquidation arbitrage consists in identifying companies in liquidation process, whose liquidation value is higher than market price. If this is the case, after liquidation the market price of shares will converge toward the higher liquidation (book) value.

Fixed income arbitrage is about identification of violations of the historical patterns for credit spreads, as well as deviations from the term structure relationships, with the belief of a future reestablishment of convergence.

Another case is when on the markets, there is overcompensation for credit risk or liquidity risk, creating another situation of potential profits after adjustments. Central bank intervention in the markets often creates abnormalities that can be exploited.

As other weak forms of arbitrage, fixed income arbitrage is not totally risk-free, and even when duration neutral strategies are adopted, still there is exposure to various other market risks, including term structure shifts and foreign exchange risk.

A special form of arbitrage involves convertible bonds. As will be more clearly explained in Chap. 5 about bond valuation, convertible bonds are issued with the option to be returned by the investor to the issuing company in exchange for a predetermined number of shares in the company.

The structure of a convertible bond is quite complicated in that it embeds a call option on the stock. Therefore, arbitrageurs often rely on sophisticated quantitative models in order to identify bonds that are trading cheap versus their theoretical value.

The three major factors affecting the price of a convertible bond are:

- Interest rate: when rates increase, the bond value of the convertible moves down and the opposite for the embedded option (aggregate movement is lower).
- Stock price: the price of the bond rises when the underlying stock price increases as well.
- Credit spread: when solvability of the issuer deteriorates, credit spread increases leading the bond price to decrease, while the option part moves higher.

As described by Bjork in 2004, the convertible arbitrage consists of buying a convertible bond and hedging (neutralizing) two of the three factors in order to gain exposure to the third factor at a very attractive price (Bjork 2009).

As mentioned above, modern arbitrage is made of very rare and elusive opportunities lasting the time of an eye beat. The price adjustment due to the shift of demand from the more expensive to the cheaper market closes the opportunity almost in real time.

The price convergence will be instant in a perfect market while taking a while in a market with imperfections. The principle behind arbitrage applies to financial instruments, which appear different but result in the same set of cash flows.

In summary, in order for a market to be free of arbitrage, none of the following conditions must be violated:

- The same asset must trade at the same price on all markets.
- Two assets with identical cash flows must trade at the same price.
- The price today of an asset is equal to its future value (if known) discounted at the risk-free rate.

The transactions of buying in the cheapest market to sell in the most expensive must happen simultaneously in order to avoid the market risk due to a sudden change of prices in both markets before the whole strategy is completed.

Given that statement, it is important to stress again how, in practical terms, this is almost impossible or only possible with securities and financial products which can be traded electronically. Such risk-free trading is not available to everyone.

1.4 Summary

A company can take one of the several corporate forms available to start a business. From the simple sole proprietorship to the more complex corporation, organizational forms can accommodate all sizes of business.

The corporate objective is an important element that defines every business and communicates to the outside world what the nature of a firm's business is. Properly identifying the corporate objective as the value maximization is the right start.

The life cycle of a company is an interesting topic involving the displacement of the corporate activities from the early stage to the end of business. It is made of several steps that constitute a cycle of alternate fast growth and steady state.

The financial statement of a corporation is the mirror of the financial outcome of its activities. The balance sheet displays the assets of the firm on one side, opposing it to the liabilities and equity on the other side of the book, with the two sides equating.

While the balance sheet is a picture of the company at the time it is observed, the income statement registers the results of the yearly activity of the firm, separating revenues from expenses.

The cash flow statement is a record of the inflows and outflows involved in the corporate operations. Cash flows must in fact be distinguished from corresponding income statement operations in that they are not always synchronized to them.

Pro forma financial statements allow the company to report forecasts on revenues based on selected figures that would not normally suffice for accounting standards. In this way, the company can illustrate to the reader the relevant financial figures that build up a forecast on future profitability. The percentage of sales approach is normally used by projecting forward the numbers in the financial statements, based on their connection with the sales growth (or decrease).

Arbitrage is a key concept in finance, which defines the conditions under which a market is considered normal and efficient. The law of one price is at the basis of the concept and allows the investors to define the conditions under which arbitrage holds.

Arbitrage can take many forms, depending on the financial instrument involved in the strategy or the type of market involved. Triangular arbitrage and currency arbitrage are among the most common forms.

The understanding of market inefficiencies is crucial in order to define the boundaries of efficiency of the most popular financial theories, including those touching the field of corporate finance.

Problems

- Explain the difference between unlimited liability and limited liability and how it affects the wealth of the firm and its owners.
- Explain the main differences between a sole proprietorship and a general partnership.
- What is a corporation? In what does it differ from a LLC?
- What is the structure of a balance sheet? How are the various entries reported based on the source and employability of capital?
- List and explain the most important current assets in the balance sheet of a firm. Do the same for the long-term assets.
- List and explain the most important current liabilities in the balance sheet of a firm. Do the same for the long-term liabilities.
- Define the process of net income calculation through a multi-step income statement. How does it differ from the single-step case?
- Suppose that a company has 1,300,000 € in sales and the cost of its labor and materials amounts to 750,000 €. What is the gross income margin?
- Assume a company has an EBIT amount of 1,200,000 € and sales were 2,100,000 €. What is the operating profit margin?
- Calculate all ratios explained in the chapter, for company AAA, as from the financial statements presented in the text.
- What is the net profit margin for the company in Exercise 8, if it generates after-tax earnings of 300,000 €.
- Assume the following exchange rates are currently quoted on the market: EUR/USD = 0.87, EUR/GBP = 1.33, and USD/GBP = 1.56. Is there an arbitrage opportunity? How can it be exploited?
- True arbitrage opportunities are rare. When they are discovered, they do not last long. So why is it important to explore arbitrage in detail?

Case Study: Pro Forma Statements

Projectcast Ltd

The Case

Nancy is a finance graduate, with specialization in finance. Last year she applied for a job position in the finance team of Projectcast Ltd, a company active in the production and sale of cooling systems for cars.

After going through several interviews, Nancy recently got hired by the company, with a position in the team taking care of forecast and financial planning. Upon hiring, Nancy is immediately faced with a forecasting task for a client company.

The task focuses on the analysis of the projected balance sheet of the company, over 1 year, in view of some future increase of sales to be forecasted as well.

Basically the case involves the analysis of the company's financials, the possible future state of the world, and actions to be taken to restore potential imbalances in the

Table 1.11 Income statement of Projectcast Ltd.

Income statement	
Sales	5,000,000
COGS	2,500,000
Taxes	40%
Payout ratio	30%

Table 1.12 Balance sheet of Projectcast Ltd.

Balance sheet			
<i>Assets</i>		<i>Liabilities and equity</i>	
Cash	1,200,000	Accounts payable	1,000,000
Accounts receivable	3,000,000	Long-term debt	5,500,000
Inventory	2,500,000	Common stocks	6,500,000
Net PPE	8,500,000	Retained earnings	2,200,000

projected balance sheet. Nancy knows that she can apply the percentage of sales approach to the analysis.

She also knows that the future state of the economy and the consequences on the projected increase/decrease of sales can be described as follows:

- Booming with a probability of 10%, with sales increasing by 20%
- Growing slow with a probability of 25%, with sales increasing by 10%
- Steady with a probability of 40%, with sales increasing by 5%
- In moderate recession with a probability of 20%, with sales remaining unchanged
- In a severe crisis with a probability of 5%, with sales decreasing by 10%

After analyzing the sales growth rate, Nancy is ready to forecast the pro forma balance sheet starting from the historical financial statements that look like in Tables 1.11 and 1.12.

The company is currently operating below full capacity, and the payout policy will remain unchanged in the next year.

Questions

- How would you calculate the internal growth rate of the company?
- How would you calculate the sustainable growth rate of the company?
- Determine the amount of external financing needed, according to the POS approach.
- What recommendations would you then give to the client company, based on your analysis?

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