

# Introduction to Financial Statements

Income Statement, Balance Sheet, Statement of Cash Flow

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## Abstract

This documents introduces the three main financial statements (income statement, balance sheet and statement of cash flows), their origin, role and objectives.

Keywords: financial statements, income statement, balance sheet, statement of cash flows

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## Learning Objectives

By the end of this module, students should be able to:

- List the most common financial statements
- Understand the relationship between the different financial statements
- Describe a rational method to read and understand the financial statements
- Build pro-forma financial statements from company forecasts
- Assess and explain a company profitability
- Assess and explain a company financing

## Financial statements?

In the same way that a doctor will first make a diagnostic before taking any decision about his patient, it is necessary to get some information about a company before making any (financial) decision.

As it happens, a great deal of the financial information needed is summarized in what are called the financial statements. In the sections below you will learn what are those documents, what they are used for (and by whom), where they come from, what kind of information you can expect to find in each of those, and even how to build simple financial statements.

Actually, this last point is very important, as you will learn how to read and understand financial statements by building those. If you know how to build something, if you built it yourself, then you understand it far better and can probably diagnose and solve a problem far more efficiently than if you simply got that thing from someone else. Think about those people who build their own electronics, houses, bicycle... They really know the nuts and bolts of their creation and understand deeply how they work as a system.

The objective here is not to make you an expert about financial statements, or an accomplished financial analyst. Rather, you should be able to read and understand financial statements in a way which will give you relevant information about the company, and ask suitable questions about it.

But first things first: what are financial statements, actually?

## 1 Financial statements: concepts

### 1.1 The financial statements

The financial statements are reports which are periodically prepared by firms from their accounting system and especially from the bookkeeping data. Public firms have to publish their financial statements regularly, most of the time quarterly and annually. Private firms usually don't have to make their financial statements public, but might be required to communicate those to some third parties like the tax authorities.

#### Why do we need financial statements?

Firms operate in an environment and an economy in which they have to deal with numerous partners<sup>1</sup>:

- Shareholders, directors, managers
- Creditors,
- Employees and organizations representing employees (unions...)

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<sup>1</sup>Technically those partners are called *stakeholders*

- Customers
- Tax administration,
- ...

Of course, they need to (and often **must**) convey information to these partners. The financial statements are the documents through which companies provide accounting and financial information to their partners.

### Which are the main financial statements?

The most common set of financial statements includes:

- The Income Statement (or P&L, profit and loss)
- The Balance Sheet (or statement of financial position/situation)
- The Statement of Cash Flow

These three statements are complementary, and, together, are a good basis to get a rather good idea of the financial health of a firm, provided they are accurate, of course: see [Financial statements quality](#) below about the problem of accuracy.

Additionally, one can find and use the business and operating review, the statement of changes in shareholders' equity and various notes and appendices.

Why do we have different financial statements? Because each of them will provide a different view or different information about the firm. For example, the current situation of the company, and its performance over the last 6 months are related, but are not the same thing.

#### Example 1

Imagine that you have a customer who is supposed to pay you in the end of the month, each month. The table below shows the sales you did with this customer in the last quarter, and how much he paid in the end of each month.

Table 1: Q2 sales with customer

Month	Sales	Payment
April	200	350
May	140	150
June	230	240

Note that when the quarter started, the customer owed you a total of 180.

The total turnover you did last quarter with this customer (570, check this number) is related to the total amount of money he owes you just right now ( $180 + 570 - 740 = 10$ ), but is definitely not the same thing. And the amount of money he owes you and when was the last time he paid you anything are related too, but still different. And all of these information are relevant to understand your relationship with this customer.

### Financial statements quality

Financial Statements must follow *standards* and be *accurate*.

The standards are of course necessary to make sure that the statements and reports are produced following

the same rules, and are thus understandable by anyone. Actually, the financial statements are usually produced by the accounting department. The bookkeeping and accounting principles and rules should be the same for all companies. Nowadays, they use local (GAAP) or international (IFRS) standards.

Another very important quality of the financial statements is accuracy, of course: if the reported information is not true, or wrong, or not precise, it cannot be trusted and the statements are useless (and even dangerous to use). That is the reason why, in most countries, the financial statements should be verified and certified by independent auditors, especially for public (listed) companies.

### Example 2

You probably already heard about some big corporations bankruptcies which made the headlines, because they were unexpected and it had been shown that the reports were wrong and fake. In such cases, the big questions are usually:

- Were did the money come from?
- What did they do with the money?

As we will see soon, the balance sheet provides the exact answer to these questions: the assets side shows what was done with the money, what it was used for, and the liabilities and shareholder equity side shows the origin of the resources, that is, where the money comes from. If the documents had not been rigged, there would be no need to ask those questions in the first place.

### Financial statements availability

Public listed companies have to publish financial statements on a regular basis. They are usually available:

- From the company itself (website, legal publications),
- From financial markets or markets authorities (SEC, ...)
- From financial information services (Reuters, Bloomberg, ...)
- From other information provider: newspapers, databases

It is very important that these documents are made available in a timely manner, and as soon as possible, but also that they stay available as long as possible: as we will see later, the insights we get from the statements are far better when it is possible to compare along the years, and to study the past.

## 1.2 Movements vs. Balances

All financial statements report numbers coming from the company accounting. But some statements list movements (e.g. the income statement) when others list balances (e.g. the balance sheet). It is very important that you understand the difference between movements and balances as soon as possible.

The balance is the position of a given account at a given date.

Movements are the changes that affect a given account over a given period of time.

### Example 3

Imagine that I had \$50 in my wallet just before going out this morning. At 10am I went out and had a coffee, for which I paid \$2.50. I had a quick lunch at noon and paid \$11 for it. Finally, I bought a book for \$7.50 in the afternoon and went back home.

Let us see my wallet as an account (it would be the account “cash available in my pocket” or something like that).

The \$50 I have in the wallet before going out is the beginning of period balance of the wallet account: it is the amount of money (“position”) of the account at the beginning of the day.

Each of the 3 times I spent money during the day is a movement on the account. We can then calculate the total movement over the period (total movement of the day) easily. Here, all the movements are in the same direction: I only spent money today. Thus the total movement of the day is a  $2.50 + 11 + 7.5 = 21$  decrease of the amount in the wallet.

Finally, when I come back home, I have  $50 - 21 = 29$  remaining in my wallet: this is the end of period balance of the “wallet account”.

Note that the global movement on an account over a given period is the difference between the end of period and the beginning of period balances of this account.

#### Example 4

Let us take again the example of the customer who pays in the end of the month, example 1 above.

You might notice that in the comments, we calculated the total of the sales of the quarter, which is the movement of the quarter in the sales account. This is a number we usually care about, because it gives us information about the performance of the sales department over the period. This number is actually part of the income statement (which reports movements), and is usually on the first line as it is the origin of the company income.

About the customer payments, we did not calculate the total payments he made over the period, though. Instead, we calculated the customer account position in the end of the period. That is because we usually care first about the total debt of the customer, and maybe secondly about what he paid and when (the details). That is the case for most third parties accounts, which are shown on the balance statement (which, as its name implies, reports balances).

### 1.3 Where do financial statements come from: bookkeeping

Why do all financial statements have two “sides” or columns, like assets/liabilities (balance sheet), profit/loss (P&L), revenues/expenses (income statement) and sources/uses (statement of cash flows)?

It all comes from the bookkeeping basic way of recording operations, known as the double-entry system<sup>2</sup>. In this system, any operation, when recorded, should *balance*, that is, the amount debited from accounts when recording the operation should be equal to the amount credited in other accounts at the same time (in the process of recording the same operation).

In bookkeeping, we use the words *debit* and *credit* to note the directions of the movement. Some people like to think of debit and credit as minus and plus, or subtracting and adding to the account, but beware, it is not always true as it is a mere matter of conventions<sup>3</sup>.

#### Example 5

<sup>2</sup>Search for double entry system on the internet. Who invented it? When? It might be older than you think...

<sup>3</sup>See [https://en.wikipedia.org/w/index.php?title=Double-entry\\_bookkeeping\\_system&oldid=776815278](https://en.wikipedia.org/w/index.php?title=Double-entry_bookkeeping_system&oldid=776815278)

Imagine we have a customer who just bought from us \$500 worth of goods. Following our agreement, the customer did not pay cash, but will pay in the end of the month. How would we record this operation in a double entry system?

For the sake of simplicity, we assume there is no such thing as value added tax below.

To record the operation in a double entry system, we will record movements in two accounts:

- the customer account, to show that he owes us \$500 more
- a sales account, to record that we sold \$500 worth of goods.

The movements will be in opposite directions, thus the global recording will balance: \$500 in one direction and \$500 in the opposite one result in a total of 0.

Finally, we would record the customer operation with the following movements:

- debit the customer account by \$500,
- credit the sales account by \$500 as well.

As we have seen in example 4 above, the customer account balance will be reported in the balance sheet, but the sales account total movements will be the total sales or turnover of the period in the income statement.

Finally, it is convenient to classify the different kind of transactions a company might be involved in. This classification will help us understand why certain accounts are reported in a given financial statement rather than in another one.

A convenient classification is to separate the transactions in:

- operations
- investment
- financing

The operations relate to the day-to-day activity of the company, producing and selling, thus generating expenses and income or revenue. All these are typically reported in the income statement.

Investment is a more involved transaction, that usually will affect the company in the medium to long term, that is, for more than one period. Investment expenses translate in new assets which will be reported in the balance sheet. The investment expense, as it affects the company for more than one period, is not reported in the income statement of the period in which it happened. Instead, a number of successive income statements will be indirectly affected through the depreciation system. One can see the depreciation as a way to spread the expense over several periods (though it certainly cannot be limited to this).

Investment expenses should be financed in a way or another. Financing operations often lead to liabilities: we commit to repay for a loan, for example. These liabilities are of course reported in the balance sheet. A financing operation might also have an indirect impact on the income statement as it may involve financing expenses such as periodic interest payments, for example.

## 2 The main financial statements

### 2.1 Firm Performance: the Income Statement

#### Presentation

The income statement lists the **revenues** and **expenses** of a corporation over a given period of time (usually a quarter or a fiscal year). Thus the income statement lists *movements*, not balances.

The income statement reports about what is called *operations*, the day-to-day activity of the firm. Activities related to *investment* and to *financing* are excluded from the income statement as they usually impact the firm for longer than the single reported period<sup>4</sup>.

The income statements allows to calculate the net earnings or income over the period:

$$\text{earnings} = \text{revenues} - \text{expenses}$$

But it also allows for various other intermediary calculations which can help assessing the financial performance of various departments in the company, such as sales, production, human resources etc.

The income statement is useful for various tasks or objectives:

- calculate the period earnings
- expose the company profitability over the period
- allow calculation of the cash flow from operations over the period
- allow analysis of the operations leading to profitability
- expose how revenues are split between production factors

#### Structure

The income statement is usually structured in 4 parts:

- revenues and expenses from the company general operations (sales, cost of goods sold...)
- revenues and expenses related to financing operations (interests paid...)
- other revenues and expenses (revenues from fixed assets sales...)
- corporate tax

#### Reading and understanding an income statement

First note that, while the income statement reports revenues and expenses, it is usually more like a big subtraction. The reason is that the income is mainly one item only, the net sales of the period, which comes at the top (other sources of income are by-product and often negligible or not significant compared to the sales). Below this income are a long list of expenses which are subtracted from the income to finally yield the net earnings. In the example below, note that all items are expenses, except the very first one (Net sales).

#### Example 6

<sup>4</sup>Note that investment and financing operations usually have *indirect* consequences on the income statement: investment will probably impact the revenues (sales increase or cost reduction, depreciation) and new financing might result in additional costs (e.g. interests to be paid).

The table below shows a minimal example of an income statement:

<b>Income Statement</b>	N	N-1
Net sales		
Cost of sales		
<b>Gross profit</b>		
Selling, general & admin expenses		
Wages and other expenses		
<b>EBITDA</b>		
Depreciation		
<b>Operating income</b>		
Other income		
<b>Earnings Before Interest and Taxes</b>		
Interest income (expense)		
<b>Pretax income</b>		
Taxes		
<b>Net income</b>		

The purpose of this introductory document is not to provide a detailed analysis of the income statement. Below are simply important points to remember when reading an income statement.

**Sales and costs of sales** The reported amount of sales over the period in the income statement is the basis of the company income. As was just explained, the income statement is more or less a big subtraction, where we subtract all the expenses from the sales.

It is important to make sure the sales cover the cost of sales (the expenses which are directly related to the sales: cost of producing or purchasing the goods or services sold), otherwise the company would never be profitable.

A very common analysis is to separate the costs of sales in fixed and variable costs: the fixed costs do not depend on the quantity sold or produced. There is thus a minimum level of sales necessary to cover the fixed costs.

Note that costs of sales are sometimes called COGS (cost of goods sold).

### Example 7

Imagine you open a small coffee shop which only sells coffee (for simplification). Each cup of coffee is sold for \$1, and you calculated that it costs you \$0.30 to produce (water, coffee, electricity). In this very simple example, the only other cost is the lease you have to pay for the shop, \$1,400 per month. The lease is your fixed cost, as you have to pay for it even if you don't sale any coffee.

A very good question you should ask yourself is how many coffees you should sell every month to at least cover the lease, making a zero profit. This is technically called "to break even".

As the *variable cost* of a cup of coffee is \$0.30, and it is sold for \$1, that means that we make \$0.70 per cup. Thus, to cover the lease, we need to sell at least  $1,400 / 0.7 = 2,000$  coffees per month. Assuming we have 20 working days per month, you will not make any money if you don't sell at least 100 cups of coffee per day on average.



Remember also that to correctly understand the evolution of sales, it is usually necessary to go beyond the amount of sales in monetary unit (euros, dollars etc.) reported on the income statement, and to have a look at the units sold per product or family of product.

**Cash flows vs. earnings** The earnings reported in the income statement are usually different from the cash inflow generated by the company's operations over the period.

The reasons are:

- most accounting principles (GAAP, IFRS) state that revenues and expenses should be recorded at time of realization (e.g. upon goods delivery) rather than at collection time (e.g. when the customer pays).
- the income statement reports some non cash items, particularly *depreciation*

**EBITDA** The EBITDA (Earnings before interests, taxes, depreciation and amortization) reflects the *potential* cash flow generated by the firms operations. It is potential as again, the income statement has no notion of payment of expenses or collection of revenues.

The EBITDA is important as it tells us the amount available to pay cash expenses which are in the other parts of the income statement (below), especially interest payments and corporate taxes.

The focus is generally on interests payments, which result from the financing policy of the company, rather than on the corporate taxes, which do not really result from a corporate policy, at least theoretically<sup>5</sup>. The *interest coverage* is the ratio of EBITDA to interest expenses. It should consistently be over 2-3 otherwise that means that the company operations cannot generate enough cash to cover the cost of its financing. Of course, if the EBITDA is lower than the interest expenses, the company experiences a loss *and* a cash *outflow* from its activity. The cash outflow will result in a lower cash position, which in turn will probably increase the interest expenses, worsening the situation for the next period. This will result in a vicious circle unless something is done to either improve the EBITDA and/or find a better financing.

## 2.2 Current firm situation: the Balance Sheet

### Presentation

The balance sheet lists the assets and liabilities of a corporation at a given point in time (usually the end of a quarter or a fiscal year).

Thus the balance sheet lists *balances* (as its name implies), not movements.

Finally, the balance sheet also shows the shareholders' equity book value:

$$\text{assets} = \text{liabilities} + \text{shareholders' equity}$$

The balance sheet can serve different objectives:

- Expose the company financial situation
- Show the company's resources origin and uses
- Assess company solvency
- Assess company liquidity
- Estimate company's financing adequacy

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<sup>5</sup>Many big corporations practice what is euphemistically called "tax optimization", though.

## Structure

Assets and liabilities are commonly split in two categories: *current* and *non-current* (see below).

In addition, assets are ordered from the less liquid (high duration) to the most liquid (low or zero duration). In a symmetric way, liabilities are order from the longest due dates (high duration) to the shortest due dates (low or zero duration).

### Example 8

Bank and cash at hand are often on the last line of assets and long-term financial debt is often the first line of liabilities.

Note that by convention, shareholders' equity is listed before liabilities.

### Example 9

Balance sheet structure example

<b>Assets</b>	N	N-1	<b>SE and Liabilities</b>	N	N-1
<b>Non current assets</b>			<b>Shareholders' Equity</b>		
Net plant & equipments			Common stocks, paid-in surplus		
Other non current assets			Retained earnings		
			<b>Non current liabilities</b>		
			Long-term debt		
<b>Current assets</b>			<b>Current liabilities</b>		
Accounts receivable			Accounts payable		
Inventory			Notes payable		
Bank and cash			Cash deficit		
<b>Total</b>			<b>Total</b>		

Some balance sheet presentations reverse the order, with short term assets and liabilities on the top and long term ones on the bottom.

## Current Items

Current assets or liabilities are supposed to have a duration shorter than one year.

That means that current assets are expected to be converted in cash shortly (e.g. inventories will be sold, receivables will be received). Similarly, current liabilities are due in less than one year.

Current assets or liabilities are often (but not always) related to day-to-day operations.

## Non-Current Items

Non-current (or long-term) assets or liabilities have a duration longer than one year.

Non current assets are expected to have an economic life of (can be used for) more than one year (e.g. land, factories, machinery) and non-current liabilities are long-term obligations, due in more than one year (e.g. long-term debt).

## Book vs Market Values

Values shown in the balance sheet are *book values* coming from accounting. They might differ substantially from the *market values*, that is the value at which a given asset can be sold on the market.

The discrepancy between book and market value is usually small for current assets, as these have a relatively short life (duration). Conversely, it might be substantial for non current assets and liabilities.

Note that in corporate finance, we often have to use market values for debt and equity, which means that we cannot use the book values from the balance sheet.

If the company is listed on a stock market, the market value of equity is given by the total value of its shares on the market (also known as *market capitalization*). The market value of the debt can be calculated from its expected cash flow and the appropriate market rate.

## 2.3 Explaining the cash position: the Statement of Cash Flows

### Presentation

The statement of cash flows lists the different *sources of cash* and *uses of cash* the company had over a given period of time (usually a fiscal year).

The sources of cash minus the uses of cash give the change in cash over the period (a net increase or decrease). Adding the change in cash to beginning of year (BoY) cash position gives the end of year (EoY) cash position:

$$\text{sources of cash} - \text{uses of cash} = \text{change in cash}$$

$$\text{BoY cash position} + \text{change in cash} = \text{EoY cash position}$$

Note that the new sources or uses of cash over the period are *movements*, not *balances*. Thus the change in cash is a *movement*, and of course BoY and EoY cash positions are *balances*.

### Example 10

Do you remember example 3 with the wallet above?

In that example, the wallet can be seen as the cash account. The amount of money in the wallet in the morning (\$50) is the beginning of period position, there are no new sources of cash during the day, there is a total of \$21 in uses of cash, thus the change in cash is  $0 - 21 = -21$ .

Finally, the end of day cash position (the amount of money in the wallet in the evening) is the beginning of day cash position plus the change in cash of the day. We get  $50 + (-21) = 29$ .

The statement of cash flows allows to:

- Detail the change in cash over the period, and the end of period cash position
- Explain the origin of the changes
- Check that the operations generate a cash flow
- Check the adequacy of the financing activity to the investment and operations

## Structure

The statement of cash flows can be structured in different presentations, according to the way sources and uses of cash are grouped together.

The most common structure groups the cash flows depending on their origin, the kind of transaction they come from: cash from *operating activities*, from *investing activities* and from *financing activities*. Remember that we defined these kind of transactions in section 1.3 above.

### Example 11

Statement of cash flows grouped by nature of activity

Statement of Cash Flows	N	N-1
<b>Operating activities</b>		
Net income		
+ Depreciation		
- Change in Net Working Capital (NWC)		
<b>Investment activity</b>		
Cash flow from divestment		
- Capital expenditures		
<b>Financing activities</b>		
Net new equity raised		
- Dividends paid		
Net new borrowing		
<b>Change in cash</b>		
BoY cash position		
<b>EoY cash position</b>		

Another often used presentation is split in 3 parts as well: first are detailed the *cash flow from assets*, then come the *cash flow to/from creditors* and *cash flow to/from stockholders*.

### Example 12

Statement of cash flows grouped by origin and destination

Statement of Cash Flows	N	N-1
<b>Cash flow from assets</b>		
After tax operating cash flow		
- Net capital spending		
- Change in Net Working Capital (NWC)		
<b>Cash flow to creditors</b>		
Interest paid		
- Net new borrowing		
<b>Cash flow to stockholders</b>		
Dividends paid		
- Net new equity raised		

$$\text{Cash flow from assets} = \text{Cash flow to creditors} + \text{Cash flow to stockholders}$$

Finally, the statement of cash flows might simply be divided in two parts, sources of funds and uses of

funds. This simple version is especially useful for forecasting purposes.

### Example 13

Statement of Cash Flows	N	N-1
<b>Sources of funds</b>		
Cash flow from activity		
Divestment		
New borrowing		
New equity raised		
<b>Uses of funds</b>		
Investment		
Capital repaid		
Dividends paid		
Increase in net working capital		
<b>Change in cash</b>		
BoY cash position		
<b>EoY cash position</b>		

## 3 Building financial statements from forecasts

### 3.1 Activity forecasts

Understanding financial statements is far easier if one can “see” through the statements the various operations that happened over the course of one or more periods of time in the company.

The best way to learn that skill, understanding what happened by reading the financial statements, is to start the other way: build financial statements from what happened in the last period. This is what we will do in this section, with a longer and comprehensive example.

This section is intended as a “hands-on” example: the best way to use it is to build the statements on a spreadsheet yourself as you follow the explanations below. Once you finish the section you should have a working model of the example, ready for whatever improvement or changes you want to make. The full worked out example is available online<sup>6</sup> as a Google Spreadsheet<sup>7</sup> but I strongly suggest that you download it only once you finish your own.

This example is about the Demo company, which expects us to provide pro-forma financial statements for the next 3 years according to the forecasts they prepared. But first things first, let us start with the company current situation, as reported in the latest balance sheet.

### Example: The Demo company - Balance sheet

The Demo company’s balance sheet on 31/12/N is shown below:

<sup>6</sup>Note that you cannot edit directly the spreadsheet online: you should download it and work on your local version.

<sup>7</sup><https://docs.google.com/spreadsheets/d/1uT6XAnD54TLvgJwVFrmTVSgmtqJG96uPS9tiZIWducU/>

Assets	N	SE and Liabilities	N
<b>Non current assets</b>		<b>Shareholders' Equity</b>	
Net plant & equipments	1,200	Common stocks	800
Other non current assets		Retained earnings	458
		<b>Non current liabilities</b>	
		Long-term debt	500
<b>Current assets</b>		<b>Current liabilities</b>	
Accounts receivable	349	Accounts payable	192
Inventories	165	Notes payable	
Bank and cash	236	Cash deficit	
<b>Total</b>	1,950	<b>Total</b>	1,950

The fixed assets (net plant and equipment) are depreciated by 200 per year. The long term debt is a 10 years loan which was signed on 1/01/N-2. It is repaid by yearly repayment, 100 in the end of each year. The interest rate is 5% and interests are calculated on the beginning of period balance.

This balance sheet is the starting point, it provides us with the beginning of period balances for the first year of forecasts.

The first thing to do is to input all this information in the spreadsheet, so we can use it later when we need it. At this stage, we simply mimic the presentation of the example, and add the calculation of the totals, for checking we input the numbers correctly. You can see mine in fig. 1.

	A	B	C	D	E
1	<b>Demo company example</b>				
2					
3	<b>Balance sheet end of year N</b>				
4					
5	<b>Assets</b>		<b>SE and Liabilities</b>		
6	<b>Non current assets</b>		<b>Shareholder's equity</b>		
7	Net plant & equipments	1,200	Common stocks	800	
8	Other non current assets		Retained earnings	458	
9			<b>Non current liabilities</b>		
10			Long term debt	500	
11	<b>Current assets</b>		<b>Current liabilities</b>		
12	Accounts receivables	349	Accounts payable	192	
13	Inventories	165	Notes payable		
14	Bank and cash	236	Cash deficit		
15					
16	<b>Total</b>	1,950		1,950	
17					

Figure 1: Balance sheet 31/12/N

Later with the forecasts, we will stick closer to the "spreadsheet way" of organizing the table, and will have the years in columns, and all items in the rows. Thus, for the pro-forma balance sheet, for example, the assets and liabilities will not be side by side but stacked.

A word about the loan interests: we are told that interests are calculated on the beginning of period balance,

also known as unpaid balance. This is actually *always* the case, as you pay interest on the money you owe: why would you pay interest on some capital you repaid already? The interests are commonly postpaid (paid in the end of the period), but might also be prepaid (paid in the beginning of the period), though this method is seldom used, or for very special cases only.

Next, we need the movements that will affect the company in the next 3 periods. These movements will be provided as forecasted facts (transactions, operations) that we will have to translate into the financial statements.

#### Example: The Demo company - Activity forecasts

The sales in year N+1 are estimated to 4,500 and expected to grow by 8% per year. The COGS represent 250 (fixed part) plus 45% of the sales.

Administrative expenses are 900 per year, and the wages and other expenses are 100 plus 10% of sales.

To sustain its development, the Demo company will invest 400 in new equipment on 1/01/N+2. These new assets will be depreciated on a straight line basis over 5 years, starting in the end of N+2.

About the net working capital, no details are given about its components (receivables and inventories minus payables), but the overall value should be around 8% of the sales.

Finally, the tax rate is 1/3.

As you might have noticed, we have information about the regular operations (day to day activities, that is sales and related operations), and also about investment. It seems that no financing operations are expected so far.

To build pro-forma or forecasted financial statements, we have to follow this sequence:

1. income statement
2. statement of cash flows
3. balance sheet

We cannot start with the statement of cash flows, for example. This is because the statement of cash flows reports the cash flow from operations, that will be calculated from the income statement. And in turn, the balance sheet depends on the statement of cash flows, for the end of period cash position, and on the income statement, for the period net earnings.

## 3.2 Income statement

The income statement is built starting with the sales for each year, and building the “big subtraction” logically from the simple model provided in [the income statement structure](#) section and the activity forecasts.

#### Example: The Demo company - Income Statement

In the Demo company case, we have information about the sales, the costs of sales (COGS), some administrative expenses and the wages.

We should remember to use the depreciation on existing assets, and the one on the new assets starting in N+2. Then come the interests on the loan in the balance sheet, and finally the corporate

	A	B	C	D	E	F	G	H	I
1	<b>Demo company example</b>								
2	<b>Years</b>	N	N+1	N+2	N+3		Data		
3									
17	<b>Income statement</b>								
18									
19	Sales		4,500	4,860	5,249		8%	increase per year	
20	Costs of sales (fixed)		250	250	250		250	per year	
21	Costs of sales (var)		2,025	2,187	2,362		45%	of sales	
22	<b>Gross margin</b>		2,225	2,423	2,637				
23	Admin expenses		900	900	900		900	per year	
24	Wages (fixed)		100	100	100		100	per year	
25	Wages (var)		450	486	525		10%	of sales	
26	<b>EBITDA</b>		775	937	1,112				

Figure 2: EBITDA

tax.

Let us start with the calculations up to the EBITDA. The resulting table is shown in fig. 2.

The gross margin is simply the sales minus the total of costs of sales, fixed plus variable. As you can see in the formula in D26, the EBITDA is the gross margin minus the expenses below it: administrative expenses and wages.

To get the depreciation and the interests on the loan, we need to do some preliminary calculations. These are shown in fig. 3.

As the new assets resulting from the N+2 investment are depreciated on a straight line basis over 5 years, we simply divide the investment value by 5. We are told that the first year of depreciation for these new assets is N+2.

About the loan repayment, the table is a classic one. The unpaid balance in the beginning of N+1 is the loan value in the balance sheet on 31/12/N. Interests are calculated on the BoY balance with the given rate (5%). We are told that the repayments (capital repaid) will be 100 per year. The end of year balance is the beginning of year balance minus the capital repaid (beware not to include the interests, which are paid to the bank but do not impact the capital repaid).

The final income statement is shown on fig. 4.

### 3.3 Statement of cash flows

As we work in a forecasting framework, we adopt the “sources and uses” presentation of the statement of cash flows.

#### Example: The Demo company - Statement of Cash Flows

Again, it is necessary to do preliminary calculation for the statement of cash flows.

First, we need to calculate the after tax cash flow from activity, as it results from the income statement. I usually prefer a “top-down” calculation and thus, I started from the EBITDA, and subtracted the cash outflows which follow: interest expense and taxes in this case.

Then we need the net working capital increase for each year. The NWC for N+1 to N+3 is calculated



fx		=E12-E14								
	A	B	C	D	E	F	G	H	I	
1	<b>Demo company example</b>									
2	<b>Years</b>	N	N+1	N+2	N+3		Data			
3										
4	<b>Preliminary work and data</b>									
5	Investments			400						
6	Depreciation									
7	on existing assets		200	200	200		200 per year			
8	on N+2 investment			80	80		depreciated over 5 years			
9	Total depreciation		200	280	280					
10										
11	Loan repayment						5% interests per year			
12	BoY balance		500	400	300		100 repayment per year			
13	Interests		25	20	15					
14	Capital repaid		100	100	100					
15	EoY balance		400	300	200					
16										

Figure 3: Preliminary work

fx		=E30-E31								
	A	B	C	D	E	F	G	H	I	
1	<b>Demo company example</b>									
2	<b>Years</b>	N	N+1	N+2	N+3		Data			
3										
17	<b>Income statement</b>									
18										
19	Sales		4,500	4,860	5,249		8% increase per year			
20	Costs of sales (fixed)		250	250	250		250 per year			
21	Costs of sales (var)		2,025	2,187	2,362		45% of sales			
22	<b>Gross margin</b>		2,225	2,423	2,637					
23	Admin expenses		900	900	900		900 per year			
24	Wages (fixed)		100	100	100		100 per year			
25	Wages (var)		450	486	525		10% of sales			
26	<b>EBITDA</b>		775	937	1,112					
27	Depreciation		200	280	280					
28	<b>Operating income</b>		575	657	832					
29	Interest expense		25	20	15					
30	<b>Pretax income</b>		550	637	817					
31	Taxes		183	212	272		1/3			
32	<b>Net income</b>		367	425	545					

Figure 4: Income statement

fx		=C36-(Data!B12+Data!B13-Data!D12)								
	A	B	C	D	E	F	G	H	I	
1	<b>Demo company example</b>									
2	<b>Years</b>	N	N+1	N+2	N+3		Data			
3										
26	<b>EBITDA</b>		775	937	1,112					
27	Depreciation		200	280	280					
28	<b>Operating income</b>		575	657	832					
29	Interest expense		25	20	15					
30	<b>Pretax income</b>		550	637	817					
31	Taxes		183	212	272		1/3			
32	<b>Net income</b>		367	425	545					
33										
34	<b>Cash flow from activity</b>		567	705	825					
35										
36	Net working capital		360	389	420		8% of sales			
37	NWC increase		38	29	31					

Figure 5: Statement of CF preparation

with the information we have: it is expected to be 8% of the sales each year. To calculate the NWC in the end of year N we use the balance sheet, adding receivables and inventories and subtracting payables from the total. The increase is then calculated for each year by difference with the previous one.

The cash flow from activity and NWC increase calculation are shown in fig. 5. Note the formula for the NWC increase in N+1, referring to the "Data" sheet, which is the one with the 31/12/N balance sheet.

We are now ready to build the statement of cash flows.

The sources of funds part is quite simple in this case, as the only item we have is the cash flow from activity: there are no divestment, new borrowing or equity capital raised in the forecasts.

On the uses side, we have one investment in N+2, the yearly loan repayments and the increase in the NWC. Nothing difficult here, just gather the information and make the total.

The last part makes the difference between the sources and the uses of funds in the "change in cash position" line. And again, the BoY cash position plus the year change yields the EoY cash position. Note that the BoY cash position for N+1 is the cash reported in the 31/12/N balance sheet.

The complete statements of cash flows are shown in fig. 6.

	A	B	C	D	E	F
1	<b>Demo company example</b>					
2	<b>Years</b>	N	N+1	N+2	N+3	
3						
39	<b>Statement of Cash Flows</b>					
40						
41	<b>Sources of funds</b>					
42	Cash flow from activity		567	705	825	
43	Divestment					
44	New borrowing					
45	New equity capital raised					
46	<b>Total sources of funds</b>		567	705	825	
47						
48	<b>Uses of funds</b>					
49	Investment			400		
50	Loan repayments		100	100	100	
51	Dividends paid					
52	NWC increase		38	29	31	
53	<b>Total uses of funds</b>		138	529	131	
54						
55	<b>Change in cash position</b>		429	176	694	
56	BoY cash position		236	665	841	
57	<b>EoY cash position</b>		665	841	1,534	
58						

Figure 6: Statement of cash flows

### 3.4 Balance sheet

As we know already, the balance sheets report end of period balances, which are given by the beginning of period balance to which we add the movement of the period. This means that a *given balance sheet is built by referring to the previous one*.

#### Example: The Demo company - Balance sheet

Thus, we need the balance sheet in the end of N to build the one in the end of N+1. The 31/12/N balance sheet is available already as it was given from the beginning. We only have to insert a column for it in our spreadsheet, and report the amounts we already input in the “Data” sheet.

Again, we change the layout a bit, as for convenience, each year balance sheet is displayed in one column, assets first, then shareholders equity and liabilities. Another small change is related to the net working capital components: as we don't have any details for future years (N+1 to N+3), remember we calculated the NWC globally in the previous section. Thus, we chose to “hide” the components of the NWC (receivables, inventories and payables) and replace those with only one row, “Net working capital”. Given the calculation (receivables and inventories on the assets side, minus payables on the liabilities side), the NWC row appears on the assets side.

Fig. 7 shows the balance sheet for 31/12/N in the new layout. Notice that we did not input any number, we just “picked up” the ones available in the “Data” sheet: see the formula in B62 for example.

	A	B
1	<b>Demo company example</b>	
2	<b>Years</b>	N
3		
59	<b>Balance Sheet</b>	
60		
61	<b>Assets</b>	
62	Fixed assets (net plant, equipm	1,200
63	NWC	322
64	Bank and cash	236
65	<b>Total assets</b>	<b>1,758</b>
66		
67	<b>SE and liabilities</b>	
68	Common stocks	800
69	Retained earnings	458
70	Long term debt	500
71	Cash deficit	
72	<b>Total SE and liabilities</b>	<b>1,758</b>

Figure 7: Balance sheet 31/12/N

#### Example: The Demo company - Balance sheet (continued)

Now that we have the basis, the end of N balance sheet, we can build the forecasted ones. We explain the calculation item by item below.

## Assets

- fixed assets: the net fixed assets decrease by the amount of the depreciation each year, increases with investments and decreases with divestment (no divestment in this example)
- net working capital: was calculated before as a percentage of sales
- bank and cash: this is the EoY cash position, when it is positive

## SE and liabilities

- common stocks: this changes only if the company raises new equity, which never happens in this example
- retained earnings: here we accumulate the net earnings of the company, from which are subtracted the dividends to be paid, if any
- long term debt: this is the end of year balance of the loan, that we calculated in the preliminary calculations to the income statement
- cash deficit: the EoY cash position, when negative.

The balance sheets for years N+1 to N+3 are shown on fig. 8.

Note that the balance sheets balance “naturally”: we don’t have to do anything special to make them balance, provided we were consistent with the data and forecasts all along the tables.

fx		=C69+D32			
	A	B	C	D	E
1	<b>Demo company example</b>				
2	<b>Years</b>	N	N+1	N+2	N+3
3					
59	<b>Balance Sheet</b>				
60					
61	<b>Assets</b>				
62	Fixed assets (net plant, equipm	1,200	1,000	1,120	840
63	NWC	322	360	389	420
64	Bank and cash	236	665	841	1,534
65	<b>Total assets</b>	1,758	2,025	2,349	2,794
66					
67	<b>SE and liabilities</b>				
68	Common stocks	800	800	800	800
69	Retained earnings	458	825	1,249	1,794
70	Long term debt	500	400	300	200
71	Cash deficit		0	0	0
72	<b>Total SE and liabilities</b>	1,758	2,025	2,349	2,794
73					

Figure 8: Forecasted balance sheets

I strongly suggest you study the example in details, try to do it again yourself from scratch without any help, and finally “play” with it, adding new elements to the forecasts, or changing values, to see their effect and check that everything still balances.

## 4 Financial statements analysis

Financial statements analysis is a huge topic which goes far beyond the objectives of this document. The information below is only intended to provide you with the basic ideas and a bit of structure about it.

### 4.1 Framework

The way to conduct a financial statements analysis depends on the objectives and position of the analyst. Nonetheless, it is possible to propose a general framework with the different steps to follow:

1. Define objectives (why are you analyzing?) and context (what is your position regarding the analyzed firm? are there any special circumstances?)
2. Get the data (additional data besides the financial statements make interpretation easier: general information about economy, industry and sector, specific information about the company, its products, market, technology etc.)
3. Process the data (clean the data, calculate balances and ratios, prepare graphs)
4. Analyze the data
5. Write your report/analysis, keeping in mind the objectives you defined at step 1

### 4.2 Best practices

Experience is really important when analyzing financial statements. Like a doctor looking at an X-ray image, you will improve by practicing, and learn how to avoid common traps. Some common advises and pitfalls are listed below:

- Always get 2-3 years of data to make comparison
- Beware of numbers: compare volumes and values, take inflation into account
- Beware of ratios (1) : a ratio can increase because the numerator increased, or the denominator decreased, or both
- Beware of ratios (2): literally hundreds of ratios exist, only use a few, those you know well and can interpret
- Don't *describe* ("the sales increased by 3%"), *explain* ("the launch of the new product is visible in the 14% growth of sales")

### 4.3 How to structure the analysis?

A good analysis should be well structured, address all important concerns and focus on the main problem at stake – that is, the reason why you are conducting an analysis on this company.

The most important concerns<sup>8</sup> you should address are:

- activity (no company can live without selling anything)
- profitability (sales should generate a sustainable profit)
- financing (the company financing should be suitable and allow to finance opportunities rather than being a burden)
- investment and dividends policy (there should be a clear policy regarding the cash flows generated)

Note that activity and profitability are best analyzed through the income statement, and financing, investment and dividends policies through the balance sheet and statement of cash flows.

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<sup>8</sup>Other concerns are equally important, such as the corporate governance, but are difficult to discuss through examination of the financial statements only.

Finally, the questions below follow closely the four main concerns we just detailed, and can be seen as a convenient checklist to make sure you do not forget anything essential when analyzing a company:

- Is the company profitable?
- Do the company earnings generate a cash inflow?
- Can the company fulfill its obligations towards its creditors?
- How is the company financed?
- Does the company financing fit its strategy and activity?

## Summary

- Financial statements report either movements (over a period) or balances (at a given date) of accounts.
- Financial statements are generated from the bookkeeping information.
- The three main financial statements are the income statement, the statement of cash flows, and the balance sheet.
- The income statement reports the movements which affected revenues and expenses accounts over a given period.
- The statement of cash flows reports the cash inflows or outflows (thus, movements) which affected the company over a given period.
- The balance sheet reports the list of assets and liabilities of the company, as well as the shareholder equity. It might be seen as the list of the uses and origin of company resources.
- Building proforma financial statements from forecasts should be done in the following sequence: income statement, then statement of cash flows, and finally balance sheet.
- The main topics to address when analyzing financial statements are activity, profitability, financing, investment and dividend policies.

## Exercises

- Imagine you are the owner of a shop selling snacks and beverages. When you open the shop today, there is \$100 in the cashier drawer. The operations of the day are:
  - in the morning, you sell 43 coffees at \$1 each, 18 fresh orange juices at \$1.80 and 22 breakfasts at \$4.
  - one of the morning customers forgot his wallet and said he will pay tomorrow. He had a breakfast.
  - at lunch time, you sell 53 hot dogs at \$2.50, 40 bottles of mineral water at \$2 and 41 additional coffees
  - among the customers at lunch time were 16 employees of a nearby company. They pay by tickets that the company repays to you in the end of the month. One ticket pays for one hot dog and a bottle of mineral water.
  - in the afternoon you sold 11 more orange juices and 12 bottles of mineral water.
  - finally you paid \$80 to the delivery man of your sausage provider when he passed with sausages and bread in the end of the afternoon.

Questions:

- what is the amount of sales you did today (assume there is no VAT)
  - what is the total movement of cash for the day?
  - what is the end of day cash position (amount of cash in the drawer)?
- A company borrows \$100,000 over 5 years at a 6% yearly rate. The loan will be repaid by 5 repayments of \$20,000, one in the end of each year. Build the loan repayment table, showing for each year:
    - BoY balance
    - Year interests
    - Year capital repayment
    - EoY balance
  - You are given the forecasts below for the first year of activity of a startup company:
    - the sales are expected to be 40,000 units at \$5.00 per unit
    - the company will pay \$7,500 interests on a long term loan
    - the production cost of a unit is \$1.80
    - the fixed costs related to production are \$25,000
    - depreciation of fixed assets will be \$12,000
    - wages are 15% of sales plus \$10,000
    - administrative costs will be \$9,000
    - the corporate tax rate is 25%

Build the income statement for the first year. What is the amount of the cash flow from the activity?

- In the Demo example in section 3 above, what is the minimum amount of sales to get a positive EBITDA?

## Exercises answers

### 1. Sales of the day:

- (43 + 41) coffees at \$1 each: \$84.00
- (18 + 11) orange juices at \$1.80 each: \$52.20
- 22 breakfasts at \$4 each: \$88.00
- 53 hot dogs at \$2.50 each: \$132.50
- (40 + 12) bottles of mineral water at \$2 each: \$104.00

The total is \$460.70

### Movement of cash:

- cash inflow is the sales minus what was not paid in cash: the breakfast of the customer who forgot his wallet and the 16 tickets used by the nearby company staff:  $460.70 - 4 - 16 * (2.5 + 2) = 384.70$
- the only cash outflow is the \$80 payment to the provider delivery guy
- the final cash movement of the day is thus  $384.70 - 80 = 304.70$

End of day cash position:  $100 + 304.70 = 404.70$

### 2. Loan repayment table

Year	1	2	3	4	5
BoY balance	100,000	80,000	60,000	40,000	20,000
Interests	6,000	4,800	3,600	2,400	1,200
Repayment	20,000	20,000	20,000	20,000	20,000
EoY balance	80,000	60,000	40,000	20,000	0

### 3. Income statement

Net sales	200,000
Cost of sales (variable)	72,000
Cost of sales (fixed)	25,000
<b>Gross profit</b>	<b>103,000</b>
Selling, general & admin expenses	9,000
Wages (variable)	30,000
Wages (fixed)	10,000
<b>EBITDA</b>	<b>54,000</b>
Depreciation	12,000
<b>Earnings Before Interest and Taxes</b>	<b>42,000</b>
Interest expense	7,500
<b>Pretax income</b>	<b>34,500</b>
Taxes	8,625
<b>Net income</b>	<b>25,875</b>

### 4. Amount of sales to get a positive EBITDA



The fixed expenses in the EBITDA are 250 (fixed costs of sales), 900 (admin expenses) and 100 (fixed wages), thus the total is 1,250.

We need an amount of sales which would cover the total fixed expenses, 1,250, and the variables costs of these sales, which amount to 55% (variables costs of sales and variables wages). We need S (sales) such as:

$$S \times (1 - 55\%) = 1,250$$

$$S = \frac{1,250}{0.45} = 2,778$$

## Appendix

### Bibliography


- Berk, De Marzo, **Corporate Finance, Global Edition**, 3rd ed., Pearson, 2013, ISBN-13: 978-0273792024, see *Chapter 2*
- Ross, Westerfield, Jordan, **Fundamentals of Corporate Finance**, 10th ed., 2012, ISBN-13: 978-0077479459, see *Chapters 2 to 4*
- Vernimmen, Quiry, LeFur *et al.*, **Corporate Finance: Theory and Practice**, 4th ed., John Wiley & Sons, 2014, ISBN-13: 978-1118849330, see *Section 1*

Note: The books listed above are generally the latest editions. You can however use any older edition without any problem. Similarly, most of these books have so-called "International", "Standard", "Extended" editions. Again, this does not matter for the purpose of the topic under study.

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The sources of this document are available on <https://gitlab.com/jcbagneris/finance-sources>.

The latest version can be downloaded from <https://files.bagneris.net/>.

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