

# 1. Financial Concepts & Frameworks

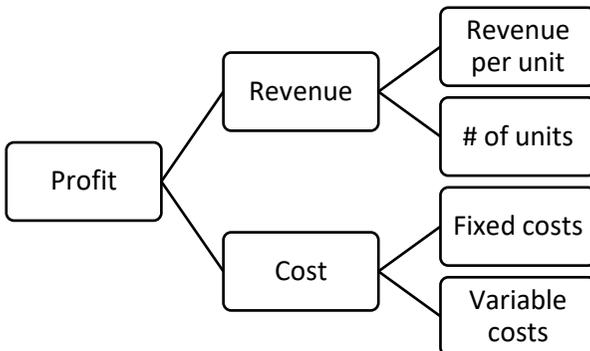
## 1.1. Profitability Framework

In most instances, the goal of “for-profit” companies is to be profitable. Quite often, the profitability framework serves very well as a solid basic framework to start the case; hence you should always keep it in mind. Once you understand what caused the profitability issue from a logical point of view, you need to move on to find out why this profitability issue occurred in reality and chose an appropriate framework for further analysis.

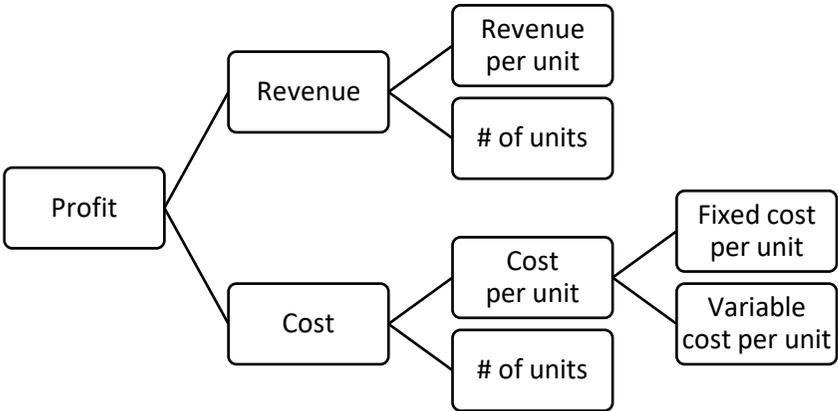
### 1.1.1. Revenue & Cost Overview

For case interview purposes, usually the following chart is used to depict the profitability framework.

- Profit equals revenue minus costs
- Revenue is calculated by revenue per unit times the number of units sold
- Cost consists of the sum of fixed costs and variable costs



Please note that in the chart above, cost is broken down into fixed costs and variable costs. Alternatively, cost can also be broken down into cost per unit times number of units. In this case, cost per unit can be further broken down into fixed cost per unit and variable cost per unit.



As profitability is just a number calculated for a specific point in time, there are three important ways of putting this number into perspective and gaining real insights:

- 1) Always try to segment the numbers you receive from an interviewer. On average, revenue may have been flat, but revenue of business unit A might have gone up by 20% while revenue of business unit B might have fallen by 20%. If you don't segment those numbers, you will miss out on important points.

Typical segmentation patterns are by:

- Business unit
- Geographic region
- Product (groups)
- Customer (groups)
- Sales/distribution channel

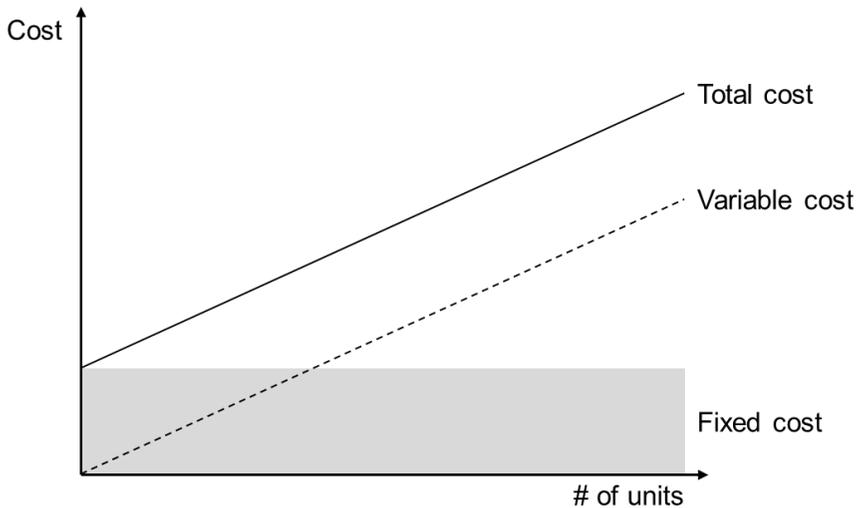
- 2) Try to look at trends over a specific period of time, e.g. the past 3 to 5 years and if possible, also future projections. This will give you a much better impression of how the business was, is and will be performing than one simple profitability number.
  
- 3) Further it is helpful to get some kind of benchmark for your numbers, e.g. comparing to main competitors or industry averages. It is hard to say if revenue growth of 10% is good, if you don't have a benchmark to compare your numbers to. If all major competitors were growing by 30%, your client's revenue growth does not look as impressive as if your client's growth is 5%, while the industry average was -25%.

## 1.1.2. Cost Analysis

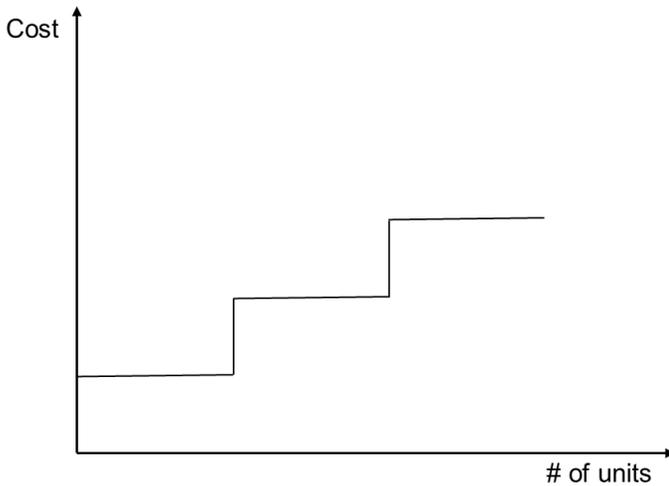
### 1.1.2.1. Fixed Costs vs. Variable Costs vs. Step Costs

Total cost is the sum of both fixed cost and variable cost:

- **Fixed costs** are costs which are independent of the number of units. A typical example is rent for the production facility, which is fixed and not dependent on the number of units produced in a certain period. You will pay the same amount of rent to your landlord producing 1 unit or 1,000,000 units.
- **Variable costs** are therefore costs which depend on the number of units produced. A typical example for variable costs is direct material cost to produce 1 unit. If direct material costs are \$1 for 1 unit, you will have direct material costs of \$2 for 2 units, \$5 for 5 units etc. (slightly disregarding economies of scale and better purchase prices for high volumes), and so those costs increase with each unit produced.



- In addition to the commonly known fixed and variable costs, also **step costs** exist. Step costs are neither fixed, nor variable. A typical example for step costs is cost for capital-intensive production equipment. If you currently have a production capacity of 10,000 units with one production machine but want to produce 11,000 units you need to purchase a second production machine, leading to the so-called step cost. Those step costs do not increase in a linear way with the number of units but increase when certain thresholds shall be exceeded (e.g. 10,000 units of maximum production capacity in the example above) and then stay constant until the next threshold shall be exceeded with a certain number of units to be produced.



Typically, high fixed-cost businesses like telecommunications providers with high infrastructure cost are under constant pressure to bring in a high sales volume, so that the (small) contribution margin of the (high) number of units sold covers the high block of fixed cost. A relatively small change in revenue can therefore lead to dramatic, disproportionate changes in profit. On the other hand, high fixed costs serve as a strong barrier for potential competitors to enter a market, due to the high investment and capital intensity.

Low fixed-cost businesses like consulting services therefore have a lower risk in respect to changes in sales volume as the capacity can be much easier adapted to changing market circumstances but are prone to new competitors entering the market due to a relatively low barrier of entry.

#### 1.1.2.2. Direct Costs vs. Indirect Costs

**Direct costs** can be accurately traced to a specific cost object (like a particular product, project, etc.) whereas indirect costs can only be associated with many cost objects.

Typical examples for direct costs are:

- Raw materials
- Labor
- Specific production equipment, etc.

**Indirect costs** are not directly related to the manufacturing of a specific product or running of a specific project but are necessary to run the business in general and are often a prerequisite to produce a specific cost object.

Typical examples for indirect costs are:

- Utilities
- Office equipment
- Communication technology
- Salaries of administration staff
- Sales and distribution costs, etc.

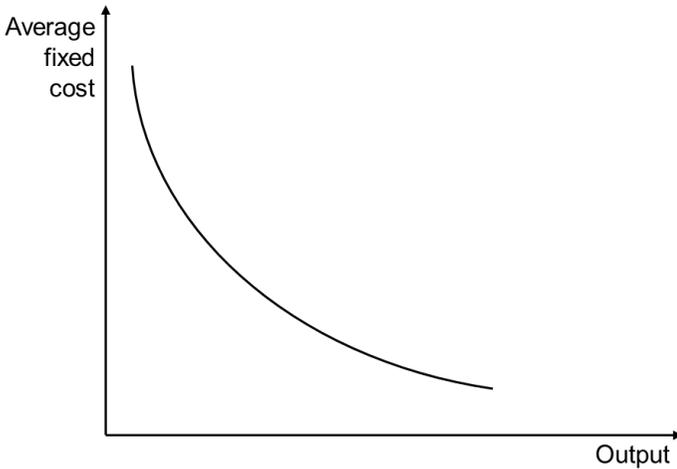
As indirect costs cannot be traced to specific products, projects, etc., indirect cost ratios are built in order to allocate indirect costs to products, projects, etc. The allocation of indirect costs also helps to maintain accountability in the usage of company resources in the indirect cost area.

### 1.1.2.3. Average Cost

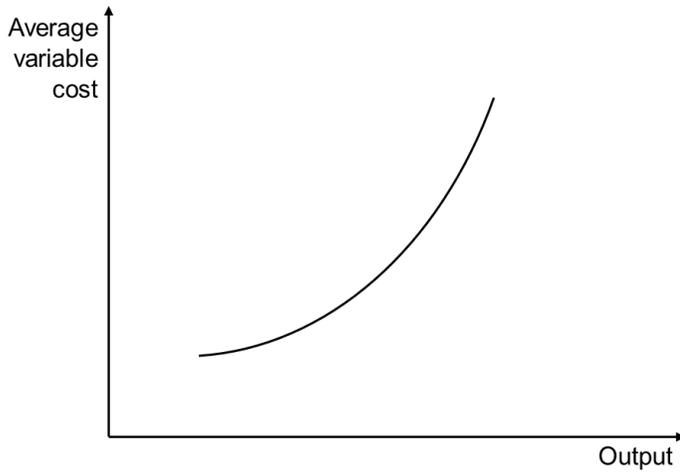
In simple terms, average cost per unit can be calculated by dividing total cost by the number of units produced. At the same time, average cost per unit is the sum of fixed cost per unit + variable cost per unit.

What is surprising for most people though is the curve progression, so let's have a closer look at that.

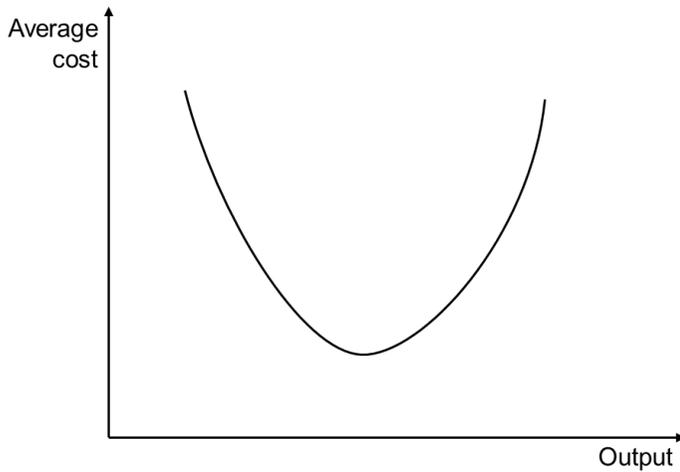
As we already know, average cost contains both fixed and variable cost. Starting with fixed costs, the curve for average fixed costs looks like the following curve. Average fixed costs are decreasing with the number of units produced. The higher the output, the closer average fixed costs will be to zero.



Average variable costs may even be decreasing in the beginning (due to more efficient production), but they will be increasing again from a certain point. This is because if fixed factors are involved in the production process (e.g. capacity restraints of the production facilities, etc.) they start limiting the production process at specific output quantity, thus leading to an increase of average variable costs again.



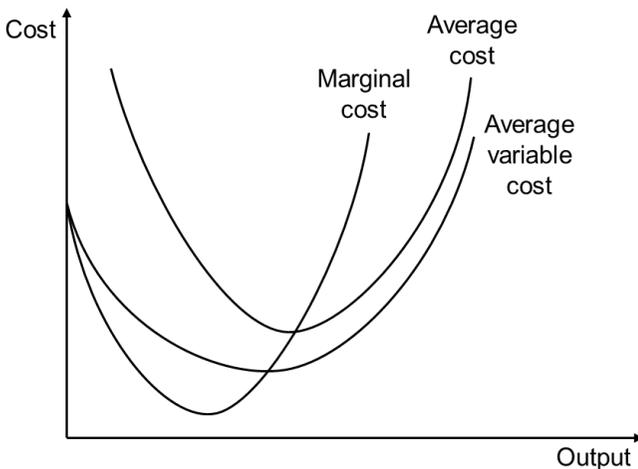
The average cost curve in total is the combination of both the average fixed and average variable cost curve, leading to a “U” shaped curve. In the beginning, average costs are decreasing due to decreasing fixed costs per unit. If output is increasing further, average costs are increasing again due to increasing average variable costs per unit (e.g. due to increased complexity costs for large-scale production efforts).



#### 1.1.2.4. Marginal Cost

Marginal cost is the change in cost for producing one more unit. If there is a production facility with a production capacity of 1,000 units, but production quantity should be 1,001 units, a new production facility would need to be build, thus leading to very high marginal costs to produce 1 more unit (from 1,000 to 1,001 units).

The concept of marginal cost is related to the average cost concept. If average variable costs are decreasing, marginal costs must be smaller than average variable costs (in general an average is decreasing, when smaller numbers are added than the average). On the contrary, when average variable costs are increasing, marginal costs must be higher than average costs (in general an average is increasing, when larger numbers are added than the average). Therefore, the marginal cost curve needs to intersect both the average cost and average variable cost curve at its lower point.



#### 1.1.2.5. Opportunity Cost

Generally spoken, opportunity cost is the cost of missing another opportunity (your best alternative to the action taken), assuming limited resources so

that you cannot pursue both alternatives at the same time. Opportunity cost always refers to the next best alternative (and it is not the sum of all available alternatives).

A simple example for opportunity costs are investments. If you have \$1,000 to invest, you might have 2 options:

1. Investing your \$1,000 into a risk-free government bond, yielding 2% p.a.
2. Investing your \$1,000 into a riskier corporate bond, compared to a government bond, yielding an expected 3% p.a.

As we assume limited resources (\$1,000), you cannot invest \$1,000 in both a government bond and a corporate bond. If you chose to invest into the risk-free government bond yielding 2%, you give up the opportunity to invest \$1,000 into the 3% corporate bond. Your opportunity cost is therefore 1% (3% - 2%).

Opportunity costs can be separated into explicit and implicit opportunity costs:

- **Explicit opportunity cost** usually refers to direct cash flow. A company can decide to either purchase a new production facility for the price of \$1,000, or keep the money in cash. The explicit opportunity cost for purchasing the new production facility is not having the \$1,000 in cash for spending on other purposes.
- **Implicit opportunity cost** usually refers to opportunity cost which is not directly related to cash flows but refers to the best alternative of resource usage. If a company has raw material stock value and a production machine to produce a specific product, the implicit opportunity cost of producing this product is not selling the raw material to potential customers and not selling or renting the production machine to potential customers.

### 1.1.2.6. ABC Analysis

Even though the ABC analysis can be used in various contexts, it is often used in the context of cost analysis and therefore mentioned in this section (even though the original historic background dating back to General Electric in 1951 was referring to product revenue).

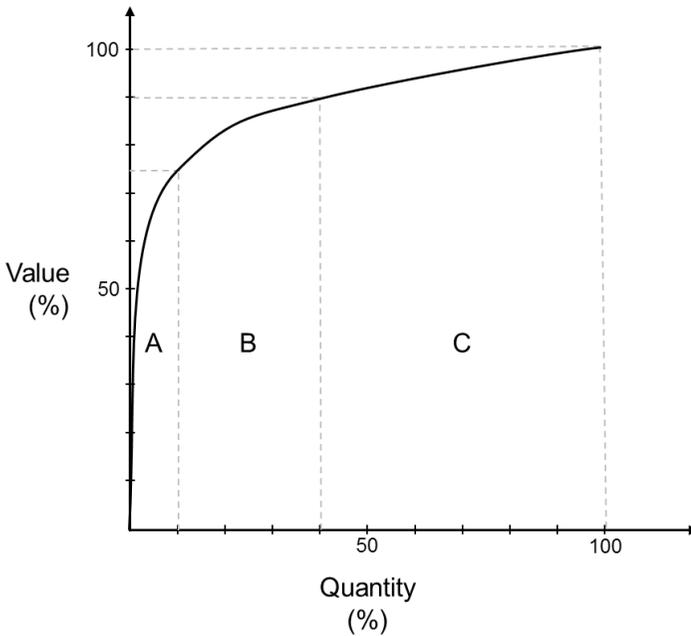
Somehow similar to the 80/20 rule, the ABC analysis is based on the assumption that the ratio of very important, important and unimportant issues is constant. It is therefore used in general to prioritize and focus on those areas which have the highest impact. Apart from focusing on cost issues, the ABC analysis can also be used for products, customers, geographic markets, quality inspection, warehouse layout planning, etc.

Looking at material warehouse stock of a production company, typically 70% of stock value comes from 10% of stock quantity. Conversely, 70% of the stock quantity often accounts for only 10% of stock value. The following 3 categories are involved in the ABC analysis.

Category	Characteristic	Value (%)	Quantity (%)
A	High value	60-85%	5-15%
B	Medium value	10-25%	20-40%
C	Low value	5-15%	50-75%

- **Category A:** High importance and therefore a strong ongoing focus on this category; prerequisite for planning is a high degree of accuracy and/or possibility of just-in-time or near-time sourcing.
- **Category B:** Medium importance with regular monitoring; prerequisite for planning is a basic degree of accuracy, focusing on optimal purchase order quantities.
- **Category C:** Low importance, only occasional monitoring; this category usually goes along with a low degree of accuracy, focusing on optimal purchase order quantities, buying ahead and having a safety stock available (warehouse capacity permitting).

Shown in a typical ABC diagram, the three categories look like this (also known as “Lorenz curve”).



The ABC analysis is easy to understand and easy to use and serves as a good basis to optimize those areas which have the highest value impact. However, it needs to be taken into consideration that the disadvantages of optimization can by far outweigh the advantages. Especially when using the ABC-Analysis to drastically reduce warehouse stock of category “A”, the risk of running out of stock needs to be considered, which can potentially have a high cost impact if a production facility needs to be shut down due to missing of critical category “A” warehouse stock.

Once the area for application is defined there are several steps to put the ABC analysis into practice

1. Putting together quantity and value data to compute cumulative quantity and value percentages
2. Defining limits between categories A, B and C
3. Classifying the objects into categories A, B and C

4. Most important of all, deriving clear decisions on how to handle objects in the different categories