# MGT388 Finance and Law for Engineers

# Finance Lecture 7 Notes

# Pricing strategy

A proper pricing strategy is needed for an organisation to be profitable. When prices are too low a business will experience sub-optimal level of profitability, increasing the risk of failure in the medium to long term. Conversely, when prices are too high a firm can experience a reduction in sales and, consequently, a decrease in market shares and an increase in the inventory. However, the choice a proper pricing strategy depends on the consideration of the context, in the light of some relevant economic theory.

Market leaders have some discretion in setting selling prices, as well as other organisations that sell highly customised or differentiated products or services. Therefore, in these cases, cost information is very important for pricing decisions.

In other organisations, prices are set by overall market and supply and demand forces. They have little influence over the selling prices of their products and services, but cost information is still of considerable importance in these organisations.

一个组织需要适当的定价策略才能盈利。当价格过低时，企业的盈利能力将低于最佳水平，从而增加中长期失败的风险。相反，当价格过高时，公司可能会经历销售额下降，从而导致市场份额下降和库存增加。然而，选择适当的定价策略取决于对背景的考虑，并根据一些相关的经济理论。

市场领导者在设定销售价格方面有一定的自由裁量权，其他销售高度定制或差异化产品或服务的组织也是如此。因此，在这些情况下，成本信息对于定价决策非常重要。

在其他组织中，价格由整体市场和供求力量决定。他们对其产品和服务的销售价格影响不大，但成本信息在这些组织中仍然相当重要。

# Economic theory

Economic theory explains that the price of products and services is determined in the market. The central feature of the economic model is the assumption that the firm will attempt to set the selling price at a level where profits are maximised.

For monopolistic/ imperfect competition the model assumes that the lower the price, the larger will be the volume of sales. In other terms, demand is dependant on price and for most goods and services, if price goes down demand will increase.

For example, this is the logic of Black Friday and seasonal sales.

经济理论解释说，产品和服务的价格是由市场决定的。经济模型的核心特征是假设公司将尝试将销售价格设定在利润最大化的水平。

对于垄断/不完全竞争，该模型假设价格越低，销售量越大。换句话说，需求取决于价格，对于大多数商品和服务来说，如果价格下降，需求就会增加。 例如，这就是黑色星期五和季节性销售的逻辑。

# Demand curve

A diagram of a price

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A theoretical interaction between quantity and price can be illustrated by an economic model, which is an economist’s representation of reality. This relationship is depicted by the graph of a demand curve. Points A and B represent two of many possible price/quantity combinations. We can observe a movement along the demand curve: at a price P1, the quantity demanded will be Q1, while at the lower price of P2 the quantity demanded will increase to Q2.

数量和价格之间的理论相互作用可以用经济模型来说明，这是经济学家对现实的表示。这种关系由需求曲线图描述。点 A 和 B 表示许多可能的价格/数量组合中的两个。我们可以观察到沿着需求曲线的运动：在价格 P1 时，需求量将是 Q1，而在 P2 的较低价格下，需求量将增加到 Q2。

# Price elasticity of demand

A diagram of a red and yellow graph

Description automatically generatedA diagram of a demand

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The economist describes the sensitivity of demand to changes in price as the price elasticity of demand. Demand is elastic when there are substitutes for a product, or when customers do not value the product very highly; the result is that a small increase/decrease in price causes a large decrease/increase in the quantity demanded.

In other terms, if a change in price leads to a more than proportionate change in quantity demanded then demand is said to be elastic. Snacks are an example of products that can be swapped or substituted for a similar product.

The graph of elastic demand shows that an increase in price from P to P1 results in a large reduction in the quantity demanded (from Q to Q1).

When the demand is elastic, a rise in prices determines a reduction in revenue.

Demand is inelastic when customers place a high value on the product, or when no close substitutes exist. The result is that a small increase/decrease in price causes only a small decrease/increase in the quantity demanded. In other terms, if a change in price leads to a less than proportionate change in quantity demanded, then demand is said to be inelastic. Premium or luxury products and services are the most typical goods with inelastic demand.

The graph of inelastic demand shows that an increase in price (from P to P1) results in only a small reduction in the quantity demanded (from Q to Q1).

When the demand is inelastic a rise in prices determines an increase in revenue.

经济学家将需求对价格变化的敏感性描述为需求的价格弹性。当产品有替代品时，或者当客户对产品评价不高时，需求是有弹性的;其结果是，价格的小幅上涨/下跌会导致需求量的大幅减少/增加。

换句话说，如果价格的变化导致需求量的变化超过比例，那么需求就被称为弹性的。零食是可以交换或替代类似产品的产品的一个例子。 也就是价格的变化比例小于需求的比例

弹性需求图显示，价格从 P 到 P1 的上涨导致需求量大幅减少（从 Q 到 Q1）。

当需求具有弹性时，价格上涨决定了收入的减少。

当客户对产品给予很高的评价时，或者当没有接近的替代品存在时，需求是没有弹性的。结果是，价格的小幅上涨/下跌只会导致需求量的小幅减少/增加。换句话说，如果价格的变化导致需求量的变化不成比例，那么需求就被称为没有弹性的。高端或奢侈品产品和服务是最典型的商品，需求缺乏弹性。

非弹性需求图显示，价格上涨（从 P 到 P1）只会导致需求量的小幅减少（从 Q 到 Q1）。

当需求缺乏弹性时，价格的上涨决定了收入的增加。

# Supply curve

A diagram of a supply curve

Description automatically generated

The supply of products and services is dependant on price as well. For most goods and services, the higher the price the greater the supply. When prices are high, current suppliers seek to increase production and sales and new suppliers enter the market.

This relationship is depicted by the graph of a supply curve. We can observe a movement along the supply curve: a decrease in price from P1 to P2 results in a decrease in the quantity supplied (from Q1 to Q2).

产品和服务的供应也取决于价格。对于大多数商品和服务，价格越高，供应量就越大。当价格高企时，现有供应商寻求增加生产和销售，新的供应商进入市场。

这种关系由供应曲线图描述。我们可以观察到沿着供应曲线的移动：价格从 P1 到 P2 的下降导致供应量的减少（从 Q1 到 Q2）。

# Market price

A diagram of a supply line

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Finally, market price is the [current price](https://www.investopedia.com/terms/c/currentprice.asp) at which a product or service can be bought or sold. Market price is determined by the forces of supply and demand, being the price at which quantity supplied equals quantity demanded.

In this graph, you can see the curves of supply and demand. The point where they cross, defines market price (MP) and market quantity (MQ). For a higher price, quantity supplied (QS) is higher than quantity demanded (QD).

For a lower price, quantity supplied (QS) is lower than quantity demanded (QD).

However, this economic model only considers two variables (price and quantity), while reality is much more complex and in practice several factors have an impact on prices and some of them interact. Among the main factors we may mention the effect of advertising, the novelty of a product or service, its fashion content and company reputation.

Moreover, there are some concrete difficulties in measuring the effect of a change in demand on prices, especially when the product range is wide and large numbers of products are concerned.

最后，市场价格是可以购买或出售产品或服务的当前价格。市场价格是由供求力量决定的，即供给量等于需求量的价格。

在此图中，您可以看到供需曲线。它们交叉的点定义了市场价格 （MP） 和市场数量 （MQ）。

对于较高的价格，供应数量 （QS） 高于需求数量 （QD）。 对于较低的价格，供应数量 （QS） 低于需求数量 （QD）。

然而，这种经济模型只考虑了两个变量（价格和数量），而现实要复杂得多，在实践中，有几个因素对价格有影响，其中一些因素相互作用。在主要因素中，我们可能会提到广告的效果、产品或服务的新颖性、时尚内容和公司声誉。

此外，在衡量需求变化对价格的影响方面存在一些具体困难，特别是当产品范围广泛且涉及大量产品时。

# Price takers and price setters

In some firms, prices are set by overall market supply and demand forces and the firm has little or no influence over the selling prices of its products or services. These firms are called price takers. This situation is likely to occur where there are many firms in an industry and there is little to distinguish their products from each other. For example, in commodity markets such as wheat, coffee, rice and sugar. Also, in competitive markets with many buyers and sellers with similar products, such as chips, or when small firms operate in an industry where prices are set by the dominant market leaders.

In contrast, firms selling products or services that are unique, highly customised or differentiated from each other by special features, or firms who are market leaders, have some discretion in setting prices. These firms are called price setters.

Some examples are luxury items or premium products, a monopoly or a company with few competitors, or a firm with a high brand reputation.

A price setter may have to set its own price, as a function of product cost.

Since sales revenues must cover costs for a firm to make a profit, many companies use product costs as an input to establish selling prices.

在一些公司中，价格是由整体市场供求力量决定的，公司对其产品或服务的销售价格影响很小或没有影响。这些公司被称为价格接受者。这种情况很可能发生在一个行业中有许多公司并且他们的产品彼此之间几乎没有区别的地方。例如，在小麦、咖啡、大米和糖等商品市场。此外，在竞争激烈的市场中，有许多买家和卖家拥有类似的产品，例如芯片，或者当小公司在价格由主导市场领导者设定的行业中运营时。

相比之下，销售独特、高度定制或通过特殊功能相互区分的产品或服务的公司，或作为市场领导者的公司，在定价方面有一定的自由裁量权。这些公司被称为价格制定者。

一些例子是奢侈品或优质产品、垄断企业或竞争对手很少的公司，或品牌声誉高的公司。

价格制定者可能必须根据产品成本设定自己的价格。

由于销售收入必须涵盖公司盈利的成本，因此许多公司使用产品成本作为确定销售价格的输入。

# Cost-plus pricing成本加成定价

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A white paper with black text and numbers

Description automatically generatedA list of sales

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Product costs are calculated, and a desired profit margin is added to determine the selling price. In determining the proper mark-up, a company must cover non-manufacturing overheads and consider the desired return, under its specified competitive and market conditions. Cost plus mark-up equals selling price. This approach is called cost-plus pricing.

This approach is quite easy to apply but has some disadvantages. First, it focuses on firms and may fail to consider demand and market conditions properly.

Second, when the market is highly competitive, even a small price differential could result in large fluctuation in sales, which could result in significant misallocation of fixed costs. In other terms, cost-plus pricing fails in considering that fixed costs per unit decrease with an increase in sales volume and increase with a decrease in sales volume.

Third, absorption costing may not give a particularly accurate estimate of the overhead costs related to a product. Allocation and apportionment of costs can be quite arbitrary and may, therefore, lead to incorrect decisions. In practice, it is possible that some products have been over costed and others under costed, so cost-plus pricing may lead to prices out of line with the market.

Fourth, when a price is too high, it may lead to surplus inventory. When it is too low, it may lead to a lower return than required.

Finally, in industries where cost-plus pricing is widely used, inefficiency may be rewarded because the higher the cost, the higher the profit margin.

计算产品成本，并添加所需的利润率以确定销售价格。在确定适当的加价时，公司必须支付非制造间接费用，并考虑在其指定的竞争和市场条件下的预期回报。成本加价等于销售价格。这种方法称为成本加成定价。

这种方法很容易应用，但有一些缺点。

首先，它侧重于企业，可能无法正确考虑需求和市场状况。

其次，当市场竞争激烈时，即使是很小的价格差异也可能导致销售的大幅波动，从而导致固定成本的严重错误分配。换言之，成本加成定价没有考虑到每单位固定成本随着销量的增加而降低，而随着销量的减少而增加。

第三，吸收成本计算可能无法特别准确地估计与产品相关的间接费用。成本的分配和分摊可能非常武断，因此可能导致错误的决策。在实践中，有些产品可能成本过高，而另一些产品成本过低，因此成本加成定价可能导致价格与市场不符。

第四，当价格过高时，可能会导致库存过剩。当它太低时，它可能导致低于要求的回报。

最后，在广泛使用成本加成定价的行业中，效率低下可能会得到回报，因为成本越高，利润率就越高。

# Variable cost pricing

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Variable cost pricing is based on variable cost instead of full cost.

Costs can be classified according to how they behave in relation to changes in the volume of activity, which is the number of units (products, services, customers, etc).

Costs that vary according to the volume of activity are called variable costs. Costs that remain constant when changes occur to the volume of activity are called fixed costs.

For example, in a hairdressing business, lotions, sprays and other materials, as well as laundry cost are variable costs because they vary according to the number of customers. Conversely, rent, insurance, cleaning cost and staff salaries are fixed costs which remain constant when changes occur to the number of customers.

The classification by nature of cost that distinguishes between direct and indirect costs is at the basis of absorption costing, also known as full costing. The classification by behaviour of cost distinguishing between variable and fixed cost is at the basis of marginal costing, also known as variable costing. If we cross these two classifications of costs, we can say that all direct costs are variable costs, whereas indirect costs (overheads) can be either variable or fixed costs. For example, the power cost for machining is a variable cost because the higher is the number of products the higher will be the machine hours and the power cost. However, this cost will be a direct cost, if electricity meters are installed in all machines, otherwise it will be an indirect cost to be allocated to a production department and later absorbed by different products using a suitable absorption base.

In variable cost pricing, companies calculate the variable cost of a product or service, as the sum of all variable costs, and apply a suitable mark-up. In this case, the mark-up should cover all the variable costs and allow for a profit. In practice, in the short term it is financially viable to price a product just to cover variable costs.

This approach has also some advantages and disadvantages.

The main advantage is to simplify things, avoiding the problem of uncertain cost information related to fixed-cost-per-unit computations. Variable cost pricing avoids the unreliability of absorption costing, adding a higher mark-up to the variable elements of cost only, such as direct materials and direct labour.

Moreover, it is particularly helpful in pricing special orders or when excess capacity exists.

The main disadvantage is that managers may set the price too low and fail to cover fixed costs, so reducing profitability or exposing the firm to a risk of loss.

可变成本定价基于可变成本，而不是全部成本。

成本可以根据它们与活动量变化的关系进行分类，活动量是单位（产品、服务、客户等）的数量。

根据活动量而变化的成本称为可变成本。当活动量发生变化时保持不变的成本称为固定成本。

例如，在美发业务中，乳液、喷雾剂和其他材料以及洗衣成本是可变成本，因为它们根据客户数量而变化。相反，租金、保险、清洁费用和员工工资是固定成本，当客户数量发生变化时，这些成本保持不变。

区分直接成本和间接成本的成本性质分类是吸收成本法的基础，也称为全部成本法。按行为对可变成本和固定成本进行分类是边际成本法（也称为可变成本法）的基础。如果我们跨越这两种成本分类，我们可以说所有直接成本都是可变成本，而间接成本（间接费用）可以是可变成本或固定成本。例如，加工的电力成本是可变成本，因为产品数量越多，机器工时和电力成本就越高。但是，如果所有机器都安装了电表，则该成本将是直接成本，否则将分配给生产部门，然后由使用合适的吸收基座的不同产品吸收，这将是间接成本。

在可变成本定价中，公司将产品或服务的可变成本计算为所有可变成本的总和，并应用适当的加价。在这种情况下，加价应涵盖所有可变成本并允许获利。在实践中，在短期内，仅仅为了支付可变成本而对产品进行定价在财务上是可行的。 这种方法也有一些优点和缺点。

主要优点是简化了事情，避免了与固定单位成本计算相关的不确定成本信息的问题。可变成本定价避免了吸收成本核算的不可靠性，仅对成本的可变要素（如直接材料和直接人工）增加了更高的加价。

此外，它在为特殊订单定价或存在产能过剩时特别有用。

主要缺点是经理人可能将价格定得太低，无法支付固定成本，从而降低盈利能力或使公司面临亏损风险。

# Target costing

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This approach is applied by price takers, when products cannot be easily differentiated from competitor goods, prices are not set by the company, and the laws of supply and demand significantly affect product price. With target costing the starting point is the determination of the target selling price. Next a standard or desired profit margin is deducted to get a target cost for the product.

The aim is to ensure that the future cost will not be higher than the target cost. In other terms, to earn a profit, companies must focus on controlling costs.

First, firms need to determine the target price that customers will be prepared to pay for the product. This stage requires market research to identify the customers’ perceived value of the product, its differentiation value relative to competing products and the price of competing products.

Second, they need to deduct a target profit margin from the target price to determine the target cost. The target profit margin depends on the planned return on investment for the organisation as a whole and profit as a percentage of sales. Then, this is decomposed into a target profit for each product that is deducted from the target price to give the target cost.

Third, the target cost is compared with the predicted actual cost.

Forth, if the predicted actual cost is above the target cost, some intensive efforts are made to close the gap. The firm investigates some possible ways of driving down the actual cost to the target cost. Usually, on the one hand, product designers focus on modifying the design of the product so that it becomes cheaper to produce. On the other hand, manufacturing engineers concentrate on methods of improving production processes and efficiencies.

当产品不容易与竞争对手的商品区分开来时，价格不是由公司设定的，供求规律对产品价格有重大影响，这种方法被价格接受者采用。对于目标成本核算，起点是确定目标销售价格。接下来，扣除标准或期望的利润率以获得产品的目标成本。

目的是确保未来成本不会高于目标成本。换句话说，为了赚取利润，公司必须专注于控制成本。

首先，公司需要确定客户准备为产品支付的目标价格。这个阶段需要市场调查来确定客户对产品的感知价值、其相对于竞争产品的差异化价值以及竞争产品的价格。

其次，他们需要从目标价格中扣除目标利润率来确定目标成本。目标利润率取决于整个组织的计划投资回报和利润占销售额的百分比。然后，将其分解为从目标价格中扣除的每个产品的目标利润，以给出目标成本。

第三，将目标成本与预测的实际成本进行比较。

第四，如果预测的实际成本高于目标成本，则要做出一些密集的努力来缩小差距。该公司研究了将实际成本降低到目标成本的一些可能方法。通常，一方面，产品设计师专注于修改产品的设计，使其生产成本更低。另一方面，制造工程师专注于改进生产流程和效率的方法。

# Cost reduction

First, the firm can start a cost reduction programme to decrease costs. For example, value engineering (also known as value analysis) is a systematic examination of factors affecting the cost of a product or service in order to devise a means of achieving the specified purpose at the required standard of quality and reliability at the target cost.

Second, the firm can decide re-engineering a product or a process. Business process re-engineering involves examining business processes and redesigning how work is done through the activities that are linked together in each business process to achieve a specific objective. The aim of business process re-engineering, which can be applied to all kinds of processes (such as productive, administrative and strategic processes) is to improve the key business processes in an organisation by focusing on simplification, cost reduction, improved quality and enhanced customer satisfaction.

Third, the company can increase the volume of activity to reduce unit cost.

Finally, in some cases firms reduce quality or specification to decrease production costs.

首先，公司可以启动成本削减计划以降低成本。例如，价值工程（也称为价值分析）是对影响产品或服务成本的因素进行系统检查，以便设计一种以目标成本以所需的质量和可靠性标准实现特定目的的方法。

其次，公司可以决定重新设计产品或流程。业务流程再造涉及检查业务流程，并重新设计如何通过每个业务流程中链接在一起的活动来完成工作，以实现特定目标。业务流程再造可应用于各种流程（如生产、行政和战略流程），其目的是通过专注于简化、降低成本、提高质量和提高客户满意度来改进组织中的关键业务流程。

第三，公司可以增加活动量以降低单位成本。 最后，在某些情况下，公司会降低质量或规格以降低生产成本。

# Life-cycle analysis and costing

# A graph of sales and profit Description automatically generated

Life-cycle analysis and costing identifies and monitors the costs incurred during the different stages of the life cycle of a project, a product, or a company. This technique enables management to understand and manage the total costs incurred and to spot those areas in which cost reduction can be more effective. The main stages are birth, research, development, launch, growth, maturity, saturation, decline and death.

Both sales and profits start at the launch stage and increase at the growth stage. Typically, sales tend to remain stable during maturity and start declining during saturation, to further decrease during decline and finish with death.

Frequently, profit reaches a peak during growth, then it tends to decline more rapidly than sales.

For products with a dynamic environment cost-plus pricing is not relevant.

Life-cycle analysis supports the application of target costing that focuses on managing costs during a product’s planning and design phase.

Before a product is launched, a company invests in research and development and these costs as well as costs of production need to be recouped.

At the beginning of the life cycle of a product, both production costs and advertising and marketing costs will be high. Production costs includes staff training, new methods of manufacture, and new processes.

Sales price will initially be high for new products with no competition.

Competitors will enter the market unless the product or process can be protected.

In the following stages, price will fall because more of the product will be supplied or similar products will be offered by competitors and eventually innovation will be overtaken.

Pricing should be based on accurate forecasts of sales and cost over the product’s life.

生命周期分析和成本核算可识别和监控项目、产品或公司生命周期不同阶段产生的成本。这种技术使管理层能够了解和管理产生的总成本，并发现那些可以更有效地降低成本的领域。主要阶段是诞生、研究、开发、发射、成长、成熟、饱和、衰落和死亡。

销售和利润都从启动阶段开始，在成长阶段增加。通常，销售额往往在到期时保持稳定，在饱和时开始下降，在下降时进一步下降，最后以死亡告终。

通常，利润在增长过程中达到顶峰，然后下降速度往往比销售额快。 对于具有动态环境的产品，成本加成定价无关紧要。

生命周期分析支持目标成本核算的应用，该成本核算侧重于在产品规划和设计阶段管理成本。

在产品推出之前，公司需要投资于研发，这些成本以及生产成本都需要收回。

在产品生命周期的开始阶段，生产成本和广告营销成本都会很高。生产成本包括员工培训、新制造方法和新工艺。

对于没有竞争的新产品，销售价格最初会很高。

除非产品或工艺可以得到保护，否则竞争对手将进入市场。

在接下来的阶段，价格将下降，因为将提供更多的产品或竞争对手将提供类似的产品，最终创新将被超越。

定价应基于对产品生命周期内销售和成本的准确预测。

# Personalised pricing

Some companies apply personalised pricing. For example, Uber operates via a smartphone app and the fare a customer pays depends on demand and supply at that point.

When demand is high and inelastic, they charge a higher fare. This should encourage more drivers to operate.

Another use of surge pricing is to charge higher prices from taking someone to expensive areas or destinations. The application of this tool contributes to an increase in profitability.

一些公司采用个性化定价。例如，优步通过智能手机应用程序运营，客户支付的票价取决于当时的供求关系。 当需求高且缺乏弹性时，他们会收取更高的票价。这应该会鼓励更多的司机驾驶。 激增定价的另一个用途是通过将某人带到昂贵的地区或目的地来收取更高的价格。该工具的应用有助于提高盈利能力。

# Discounting

Finally, a reduction in prices, called discounting, can be applied either at the beginning of sales to attract initial customers or at the end to ensure all products are sold and do not remain in the inventory.

Some companies, such as airlines and railways, sell cheaper tickets for earlier booking.

Other companies, such as banks and energy companies, make introductory offers to acquire new customers.

最后，可以在销售开始时应用降价（称为折扣）以吸引初始客户，也可以在销售结束时应用，以确保所有产品都已售出并且不会留在库存中。 一些公司，如航空公司和铁路公司，出售更便宜的机票，以便提前预订。 其他公司，如银行和能源公司，会提出介绍性报价来获取新客户。