# MGT 388 Marginal Costing and Decision Making

# Relevant Accounting Information for Decision Making

Relevant costs and revenues are those costs and revenues that will differ for each option available to the decision maker. In decision making, only relevant costs and revenues need to be considered.

***Sunk costs*** = past costs. As these have already been incurred, they are irrelevant to a decision. For example, you have bought a car for £6,000. If you use it to travel to University, petrol and running costs will amount to £2,000. If you catch the train the season ticket will be £1,500. Purely taking into account financial considerations you should catch the train. The £6,000 you spent on a car is irrelevant to the decision, it is a sunk (past cost).

沉没成本 = 过去成本。由于这些已经发生，因此与决定无关。例如，您以 6,000 英镑的价格购买了一辆汽车。如果您用它来上大学，汽油和运行费用将达到 2,000 英镑。如果您赶上火车，季票将是 1,500 英镑。纯粹考虑到财务考虑，你应该赶上火车。你在汽车上花的 6,000 英镑与决定无关，它是沉没的（过去的成本）。

Future costs and revenues that change under the different options are relevant costs:

* ***Variable costs*** vary in direct proportion with activity (i.e., change in total in proportion to changes in the related level of total activity or volume). RELEVANT

可变成本与活动成正比变化（即，总费用的变化与总活动或交易量的相关水平变化成比例）。相关

* ***Fixed costs*** remain constant over wide ranges of activity (i.e., do not change in total for a given time period despite wide changes in the related level of total activity or volume). NOT RELEVANT

固定成本在广泛的活动中保持不变（即，尽管相关的总活动或数量水平发生了很大变化，但在给定的时间段内，总成本不会发生变化）。不相关

Note that the classification of costs depends on the time period involved. In the short term, some costs are fixed, but, in the long term, all costs are variable.

***Opportunity cost*** is the value of the benefit sacrificed when one course of action is chosen in preference to an alternative.

机会成本是当选择一种行动方案而不是另一种行动方案时所牺牲的收益的价值。 For example, returning to whether to catch the train or drive to University. At first, it was considered financially more prudent to catch the train. However, if you could provide a fellow student with a lift and he/she was prepared to pay you £600, then this is an opportunity cost which should be taken into consideration. So the costs to compare are the rail fare of £1,500 + the benefit foregone £600 = £2,100 and the cost of driving £2,000. The decision now would be to drive to University.

例如，回到是赶火车还是开车去大学。起初，人们认为赶上火车在经济上更为谨慎。但是，如果您可以为同学提供电梯，并且他/她准备向您支付 600 英镑，那么这是应该考虑的机会成本。因此，要比较的成本是 1,500 英镑的火车票价 + 放弃的福利 600 英镑 = 2,100 英镑和驾驶成本 2,000 英镑。现在的决定是开车去大学。

In providing relevant information, a good management accountant would also outline any non-financial information that would be relevant to the decision (environmental, social and ethical)

# Quick Comparison with Absorption Costing

Absorption costing looked at the total cost of a product, including direct costs (these tend to be variable) and overheads (these contain fixed and variable elements). Absorption costing is used in inventory valuation for financial accounting purposes and pricing and production decisions in the longer term (when all costs are variable). Relevant costing looks at short term decision making.

吸收成本核算着眼于产品的总成本，包括直接成本（这些往往是可变的）和间接费用（这些包含固定和可变元素）。吸收成本核算用于存货估价，用于财务会计目的以及长期的定价和生产决策（当所有成本都是可变的时）。相关成本核算着眼于短期决策。

**吸收成本法**：

* 考虑产品总成本，包括直接成本（通常是变动的）和间接成本（包含固定成本和变动成本元素）。
* 用于库存估值、财务会计目的以及长期的定价和生产决策（当所有成本都是变动的时）。

**相关成本法**：

* 看重短期决策制定。

吸收成本法通常用于外部财务报告，如利润表和资产负债表中的库存估值，因为它包括了全部的生产成本，不仅是变动成本，还包括了在生产期间发生的固定费用。这种方法可以反映存货的“完全成本”，并符合一般公认会计原则（GAAP）。

相关成本法则专注于短期的经济决策，它只考虑那些会因决策而改变的成本。这种方法在决定接受特殊订单、定价短期产品或服务、以及做出其他经营决策时特别有用。与吸收成本法不同，相关成本法不包括固定成本，因为这些成本在短期内不会因决策而改变。

We now need to look at how fixed and variable costs work in practice.

# Cost behaviour patterns

Variable costs vary in direct proportion with the volume of activity, whereas fixed costs remain constant when changes occur to the volume of activity for a specified period.

For example, in the case of a restaurant, the manager’s salary would normally be a fixed cost because it does not depend on the volume of food served. The cost of the unprepared food would be a variable cost, because the higher the number of dishes to serve the higher the cost of food to prepare.

Moreover, a semi-variable cost (also known as mixed cost) is a cost that contains both a fixed and a variable component. For example, telephone charges for landlines have a rental element (that is fixed) plus the cost of calls (that is variable depending on the number of calls).

Finally, a semi-fixed cost can be defined as a cost that remains fixed within specified activity levels for a given period of time, but which eventually increases or decreases by a constant amount at critical activity levels. For example, when the number of customers for a hairdresser shop increases, a point will be reached where the existing premises become inadequate. Larger premises will be needed, which will mean a sharp increase in fixed cost, so a kind of step. The same situation can be repeated in the future, with a further increase in customers and fixed costs. For this reason, they are also called step fixed costs or stepped costs.

可变成本与活动量成正比变化，而固定成本在特定时期内活动量发生变化时保持不变。 例如，在餐厅的情况下，经理的工资通常是固定成本，因为它不取决于提供的食物量。未准备食物的成本将是一个可变成本，因为要提供的菜肴数量越多，准备食物的成本就越高。 此外，半可变成本（也称为混合成本）是同时包含固定和可变组件的成本。例如，固定电话的电话费有一个租赁元素（即固定的）加上通话费用（根据呼叫次数而变化）。 最后，半固定成本可以定义为在给定时间段内在指定活动水平内保持固定，但最终在关键活动水平上以恒定数量增加或减少的成本。例如，当一家美发店的顾客数量增加时，将达到现有场所变得不足的程度。将需要更大的场所，这将意味着固定成本的急剧增加，因此是一种步骤。同样的情况将来可能会重演，客户和固定成本将进一步增加。因此，它们也称为阶梯固定成本或阶梯成本。

## Variable Costs

Royal Bicycles buys a handlebar at £52 for each of its revolutionary bicycles.

The total handlebar cost when 1,000 units are purchased is £52,000. The total handlebar cost when 3,500 units are purchased is £182,000. As the total costs of handlebars has changed, it is a variable cost. Variable costs can be represented as follow:

£ **Total variable costs**

**£182,000**

**£52,000**

**1,000 3,500 Units**

Note the variable cost for the handlebar is fixed at £52 per unit (£52,000/1,000 and £182,000/3,500 = £52), but the total cost is variable depending on the quantity produced.

## Fixed Costs

Assume that Royal Bicycles incurred £94,500 each year for the leasing租赁 of its plant. These costs are unchanged in total regardless of the number of bicycles assembled. As the total cost is uncharged regardless of the quantity produced, lease costs are a fixed cost. Fixed costs can be represented as follows:

£

**£94,500 Total Fixed costs**

**1,000 3,500 Units**

Note the cost of leasing plant is fixed at £94,500 for the period regardless of the number of units produced, but the leasing cost per bicycle will change depending on the number of revolutionary cycles produce:

The leasing (fixed) cost per bicycle when Royal assembles 1,000 cycles is £94,500 ÷ 1,000 = £94.50 The leasing (fixed) cost per bicycle when Royal assembles 3,500 cycles is £94,500 ÷ 3,500 = £27.00.

## Total Costs

Total costs are the fixed costs plus the variable costs. This can be represented as follows:

Cost

Total cost curve

Total variable costs

Total Fixed Costs

Units of production

# Marginal costing for decision making

Marginal cost is the cost of one additional unit of a good or service. Therefore, the marginal cost is the variable cost. Under marginal costing fixed costs are ignored and decisions are based on marginal (variable costs and revenues).

边际成本是商品或服务额外一个单位的成本。因此，边际成本是可变成本。在边际成本核算下，固定成本被忽略，决策基于边际（可变成本和收入）。

Decisions will be made based on whether the action will produce a positive contribution to the business.

**Contribution is: sales price – variable costs.**

**Profit = Sales Revenue– variable costs– fixed cost Profit = Contribution – fixed costs.**

Fixed costs are not relevant to a decision. As they do not change, we are not interested in them in the short term and we are not interested if an activity is profitable, but only if it makes a positive contribution towards fixed costs and profits.

## Marginal costing and acceptance /rejection of a special order

Star Ltd operates an electronics business. The business is currently making 35,000 switch boxes, but has capacity to manufacture 50,000 switch boxes. Each switch box sells for £40.

The costs based on 35,000 switch boxes are as follows: £

Direct labour (variable) 35,000 @ £12 420,000 Direct Materials (variable) 35,000 @ £10 350,000 Manufacturing overheads (fixed) 280,000 Marketing and distribution costs 105,000 Total costs of production 1,155,000

The sales revenue is 35,000 @ £40 1,400,000

Profit made by Star Ltd £1,400,000 - £1,155,000 245,000

Star Ltd has received a contract to supply 3,000 switch boxes at a sales price of £25.

Should Star Ltd accept this contract?

***Absorption Costing***

Revised costing incorporating contract:

Extra labour 3,000 x £12 £36,000 Extra materials 3,000 x £10 £30,000 Total extra cost £66,000 Above total cost £1,155,000 Revised total cost £1,221,000

Unit of production 35,000 + 3,000 = 38,000.

Under total absorption costing the product cost would be £1,221,000/38,000 = £32.13 and the sales revenue would be £25 per switch box. The contract would be rejected.

***Marginal costing***

Under marginal costing, the contribution the contact makes is the determining factor. Contribution is sales price – variable cost.

Contribution per unit Contract contribution £ £ £ £

Sales price 25 (£25 x 3,000) 75,000 Variable costs - Direct Labour 12 (£12 x 3,000) 36,000 Direct materials 10 (£10 x 3,000) 30,000 Total variable cost 22 66,000 Contribution 3 (£3 x 3,000) 9,000

Under marginal costing the contract will make a positive contribution to fixed costs and profits and should be accepted.

***Marginal costing V Absorption costing***

Which was the correct decision?

The costs based on 38,000 switch boxes are as follows: £

Direct labour (variable) 38,000 @ £12 456,000 Direct Materials (variable) 38,000 @ £10 380,000 Manufacturing overheads (fixed) 280,000 Marketing and distribution costs (fixed) 105,000 Total costs of production 1,221,000

The revenue based on 38,000 switch boxes is as follows:

£

The sales revenue is 35,000 @ £40 1,400,000 Additional contract 3,000 @ £25 75,000 Total revenue 1,475,000

Profit made by Star Ltd £1,475,000 - £1,221,000 £254,000

The profit made by Star Ltd by accepting the contact is greater by £254,000 - £245,000 = £9,000 the contribution.

In situations where there is spare capacity, as long as a contract will make a positive contribution to fixed costs and profits, it should be considered as a one off. But the business managers will need to be assured the sales price of £40 paid by other customers will not be affected. In the long run it would not be profitable to have a price of £25, as the fixed costs are not covered. A one-off order can be considered, if it will utilise unused capacity for only a short period and capacity will then be released for use on more profitable opportunities.

在有闲置产能的情况下，只要合同能对固定成本和利润做出积极贡献，就应视为一次性合同。但业务经理需要确保其他客户支付的 40 英镑的销售价格不会受到影响。从长远来看，25英镑的价格是无利可图的，因为固定成本不包括在内。可以考虑一次性订单，如果它只会在短时间内使用未使用的容量，然后将释放容量用于更有利可图的机会。

## Whether To Drop a Product Line

A company produces three products.

**X Y Z Total**  £000 £000 £000 £000 **Revenue** 32 50 45 127 V**ariable costs**  (24) (26) (22) (72) **Contribution**   8 24 23 55 **Fixed costs** (12) (12) (12) (36) **Profit / (loss)**   (4) 12 11 19

The company’s fixed costs are £36,000 which has been evenly allocated to the three products (i.e., 36,000 / 3 = 12,000 to each product).

**Question: Should product X be dropped?**  If X were dropped, total profit would be reduced by an amount equal to the contribution from product X (=£8,000). It is assumed here that fixed costs do not change when one product is dropped and therefore are not relevant to the decision.

The profit obtained by the company without product X **£000**  Contribution Y 24 Contribution Z 23 Total contribution 47 Less fixed costs 36 Profit 11

The profit for the company with three products was £19,000 and that when just Y and Z are produced is £11,000. The difference being the contribution of £8,000 made by X towards fixed costs and profits. The general rule is that if an activity makes a contribution to fixed costs, then it is worth continuing production.

Would the decision change if the facilities that produced Product X could be rented out for £13,000?

The £13,000 is a relevant cost as it differs under the alternative. It is the opportunity cost of producing X and should be included in the calculation. The relevant costs of producing X are the variable costs of £24,000 and the opportunity cost of £13,000 = £37,000. The contribution from X is now £32,000 - £37,000 = (£5,000).

The production of product X should be discontinued and the facilities rented out. The profit from producing just products Y and Z was £11,000 and the rent is £13,000 giving a total profit of £24,000, which is higher than the £19,000 achieved when producing X.

The decision to discontinue product lines should not just be confined to past results, but must consider other business opportunities and look at the future revenue streams.

公司生产三种产品X、Y和Z。固定成本总额为£36,000，平均分配到这三种产品上，每种产品分担£12,000。现在的问题是，公司是否应该停止生产产品X。

首先，我们看不考虑产品X时公司的利润情况。如果停止生产X，公司的总利润会减少产品X的边际贡献，即£8,000。因为假设固定成本在停产一个产品后不变，所以在决策中固定成本是不相关的。只有产品Y和Z的情况下：

* 产品Y的贡献为£24,000
* 产品Z的贡献为£23,000
* 总贡献为£47,000
* 减去固定成本£36,000
* 则利润为£11,000

当生产三种产品时，公司的利润为£19,000。如果只生产Y和Z，利润为£11,000。这个差额£8,000正是产品X对固定成本和利润的贡献。

根据一般规则，如果一个活动对固定成本有贡献，那么继续生产是有价值的。因此，基于当前信息，产品X应该继续生产，因为它为公司贡献了£8,000。

然而，如果停止生产X后，可以将生产X的设施出租，每年获得£13,000的租金，情况就会不同。这£13,000是相关成本，因为它是在替代情况下发生的机会成本。现在，生产X的相关成本是变动成本£24,000加上机会成本£13,000，共计£37,000。产品X现在的边际贡献是£32,000 - £37,000 = -£5,000。

考虑到机会成本，如果停止生产产品X，并将设施出租，那么公司的利润会是：

* 仅生产Y和Z的利润是£11,000
* 加上租金收入£13,000
* 总利润为£24,000

这比生产产品X时的£19,000要高。因此，公司应该停止生产产品X，转而出租设施。

## Outsourcing decisions

A firm has developed a new product requiring a component that it could either manufacture or outsource.

The following represents the cost of making the component in house:

£ Materials (variable) 2.50 Labour (variable) 1.25 Variable overhead 1.75 Share of fixed overhead 3.50 \* TOTAL COST 9.00 per unit

\*No increase is expected in fixed costs of the company, as the factory has spare capacity to undertake the manufacture of the component.

The component can be bought in for £7.75.

In making the decision to make the component or buy in it would be wrong to compare the total production cost (Absorption costing) of £9 with the purchase price of £7.75. The total production cost includes allocated fixed overheads, which will have to be paid regardless of the decision. As there is spare production capacity, the relevant costs are the variable or marginal cost. The variable cost of £5.50 (materials, labour and variable overhead) should be compared with the cost of buying in the component of £7.75. It would therefore be more profitable to manufacture the component.

General Rule: *If the variable cost is lower than the outsourcing price, then it is more profitable to manufacture in-house.*

But what if the factory was operating at full capacity and machine time would have to be diverted from other production?

Assume the alternative product would provide a contribution £5 per unit to the business. In this case, the cost of producing the component has another relevant cost: the opportunity cost of the alternative production. The relevant cost of manufacturing the component is: £ Variable cost 5.50 Opportunity cost 5.00 Relevant cost 10.50

The relevant cost of £10.50 should be compared with the outsourcing price of £7.75 and now it is more profitable for the business to buy than produce in-house.