

LET'S GET TECHNICAL

I got very confused recently when I compared my last two mobile phone bills. The number of minutes I had used from one month to the next had exactly doubled from 100 minutes to 200 minutes, yet the cost of the bill had only increased from £100 to £120. This didn't seem to make sense. Had they made an error of some sort?

In fact, what I needed to consider was the cost behaviour of the mobile phone bill. Cost behaviour refers to the way that costs are affected by changes in production volume (or in the case of my mobile phone bill, the number of minutes I use).

There are a variety of different cost behaviours that you should be aware of for your studies.

Variable Costs

Variable costs change (or 'vary') exactly in line with changes in volume. So if my mobile phone bill was variable a doubling of the number of minutes I use would exactly double the cost from £100 to £200. This was not what happened so it is not a variable cost.

A good way to test whether a cost is variable is to work out the cost per unit at different volumes. If the mobile phone bill had actually doubled from £100 to £200 then we could work out the cost per unit (or per minute) as:

- In the first month $\text{£}100/100 \text{ minutes} = \text{£}1 \text{ per minute}$.
- In the second month $\text{£}200/200 \text{ minutes} = \text{£}1 \text{ per minute}$.

If the cost per unit stays the same at different volumes then this tells you that the cost is a

variable cost.

In a production environment direct materials would be a variable cost as a doubling of the volume of units being made would require twice as much material which would double the cost incurred.

Fixed Costs

Fixed costs are not affected by volume, so even if I use more minutes on my phone the bill would stay as £100. This was not what happened so it is not a fixed cost. It is normally fairly easy to spot a fixed cost. If the total cost stays the same at different volumes then the cost is a fixed cost.

In a production environment an overhead like factory rent would be a fixed cost as your landlord probably doesn't care about the volume of units produced in the factory, they just charge the same rent for the month.

Mixed Costs

A lot of utility bills such as electricity, water charges and telephone bills are actually made up of both a variable and a fixed element; this makes them a mixed cost, also sometimes called a semi-variable cost. Telephone bills, for instance, tend to have a fixed line rental charge (so even if you don't use your phone you still pay something each month) plus a variable cost for call charges (so as you use more minutes the cost will increase).

If we work out the costs per unit for my two mobile phone bills we get:

- In the first month $\text{£}100/100 \text{ minutes} = \text{£}1 \text{ per minute}$
- In the second month $\text{£}120/200 \text{ minutes} = \text{£}0.60 \text{ per minute}$

The fact that the cost per unit is falling tells us that this is a mixed cost.

If we identify that we have a mixed cost it is useful to be able to split out the variable and fixed elements.

Splitting a Mixed Cost

To split a mixed cost we use the 'high-low' method. This is a key management accounting technique.

Step 1

Based on the 'high pair' and the 'low pair' of data we work out the differences in the volume

figures and the cost figures as follows:

	Volume (minutes)	Cost (£)
High pair	200	120
Low pair	100	100
Difference	100	20

This tells us that an increase in the volume of calls by 100 minutes has led to an increase in cost of £20.

Step 2

We can now work out the variable cost per unit as $(\text{difference in cost})/(\text{difference in volume})$,

which in this example gives us $\text{£}20/100 \text{ minutes} = \text{£}0.20 \text{ per minute}$ for the variable cost.

Step 3

Once we know the variable cost per unit we can establish the fixed cost using our knowledge of how a mixed cost is made up:


Total mixed cost = fixed cost + (variable cost per unit x volume)

This is saying that the total value of the mixed cost is made up of two elements:

1. A fixed cost which is the same no matter what the volume is.

2. A variable cost which will 'vary' with volume.

Using the figures from the 'high pair' (you can use either pair to get the same results) we get:

$£120 = \text{fixed cost} + (£0.20 \text{ per minute} \times 200 \text{ minutes})$
giving $£120 = \text{fixed cost} + £40$. This means that the fixed cost must be the total mixed cost of £120 less the variable cost of £40 giving £80. So we have split the mixed cost giving a variable cost of £0.20 per minute and a fixed cost of £80. 

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Over the past three months a business has recorded the following production volumes and

total costs:

	Volume (units)	Cost (£)
Month 1	500	1,400
Month 2	600	1,600
Month 3	450	1,300

Task: split the cost into variable and fixed elements.

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