Calculating Margins

This module covers the concepts of margins (currency and percentages), markups, the relationship between selling prices and margins, and calculating margins in multi-level distribution channels.

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Marketing Metrics Reference: Chapter 3

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The goals of this tutorial are:

• Learn how to calculate margins from selling prices and costs and vice versa

• Discover how to “chain” margins and make these same calculations for an entire distribution channel

A Distribution Channel is a “set of interdependent organizations involved in the process of making a product or service available for use or consumption by the consumer or business user.”

(Kotler and Armstrong, Principles of Marketing, 9th Ed., p. 432.)

Example Distribution Channel:

Manufacturer → Distributor → Wholesaler → Retailer → Customer
Calculating Margins

Selling Price = Cost to Produce + Margin

Expressed another way...

Desired Margin ? %
Cost to Produce ? %

= Selling Price (100%)
= Selling Price - Cost (\%)
= Margin (\%)

Margin = Selling Price - Cost to Produce
Calculating Margins

**An Example:** If the selling price (SP) is $10.00 and the cost is $4.00, then the margin is $6.00.

\[
\begin{align*}
\text{SP} &- \text{Cost} = \text{Margin} \\
$10.00 &- $4.00 = $6.00
\end{align*}
\]

Or, in percentage terms, since selling price equals 100%, if cost = 0.40 (40%), then margin equals 0.60 (60%).

\[
\begin{align*}
1.00 &- 0.40 = 0.60 \\
\text{or} \\
100\% &- 40\% = 60\%*
\end{align*}
\]

* Percentages can be converted to decimals by dividing by 100.

Other important variations on this relationship:

- **Margin %** = (Selling Price – Cost) / Selling Price
- **Selling Price** = Cost / (1 - % Margin)
Let’s assume two competitors with equal volumes and selling prices. Whose position would you rather be in?

**Desired Margin 5 %**

- Cost to Produce 95 %

**Desired Margin 75 %**

- Cost to Produce 25 %

**Selling Price 100 %**

Maybe I should go to Business School!

You can’t put percentages in your pockets. What we’re really interested in are dollar margins.
Almost all channel and percentage margins are calculated as a percentage (decimal) of the selling price.

However, in some instances, especially at smaller retailers, the term “markup” will be used instead of “margin.” When expressed in currency (e.g. $5 markup vs. $5 margin), they are exactly the same. However, if percentages or decimals are used, a 20% markup (on cost) is different than a 20% margin (on price).

**Markup Formulas:**

\[
\text{Markup} \% = \frac{\text{Selling Price} - \text{Cost}}{\text{Cost}}
\]

\[
\text{Selling Price} = \text{Cost} \times (1 + \text{Markup} \%)
\]

**Insight**

The important difference to remember between markup and margin is that markup % is applied against the cost, whereas margin % is applied against the selling price.
Adding a Link to the Chain

% Margin = (SP – Cost) / SP
% Margin = $ Margin / SP

Manufacturer
% Margin = $0.40 / $1.00 = 0.40 (40%)
Manuf. Cost $0.60

Reseller
% Margin = $0.50 / $1.50 = 0.33 (33%)
Reseller Cost $1.00

Retailer
% Margin = $0.50 / $2.00 = 0.25 (25%)
Retailer Cost $1.50

Retailer Selling Price ($2.00) = Customer Purchase Price

Mfr. Selling Price ($1.00) = Reseller Purchase Price
Reseller Selling Price ($1.50) = Retailer Purchase Price

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Calculating Selling Prices Across the Channel

Definition

To calculate selling prices across the distribution channel (chaining forward from manufacturer to retail price), the key formula is:

\[
\text{Selling Price (SP)} = \frac{\text{Cost}}{(1 - \% \text{ Margin})}
\]

So, for our sample Distribution Channel of:

Manufacturer → Distributor → Wholesaler → Retailer → Customer

\[
\text{Mfr Cost} = $xx.xx
\]

\[
\text{Mfr Selling Price (MSP)} = \frac{\text{Mfr Cost}}{(1 - \% \text{ Mfr Margin})}
\]

\[
\text{Distrib. Selling Price (DSP)} = \frac{\text{MSP}}{(1 - \% \text{ Distrib. Margin})}
\]

\[
\text{Wholesale Selling Price (WSP)} = \frac{\text{DSP}}{(1 - \% \text{ Wholesale Margin})}
\]

\[
\text{Retail Selling Price} = \frac{\text{WSP}}{(1 - \% \text{ Retailer Margin})}
\]
Calculating Selling Prices Across the Channel

Definition

To calculate selling prices across the distribution channel (chaining backward from retail price), the key formula is:

**Cost (or supplier selling price) = Selling Price * (1 - % Margin)**

So, for our sample Distribution Channel of:

Manufacturer → Distributor → Wholesaler → Retailer → Customer

**Retail Selling Price (RSP) = $xx.xx**

**Wholesale Selling Price (WSP) = RSP * (1 - % Retailer Margin)**

**Distributor Selling Price (DSP) = WSP * (1 - % Wholesaler Margin)**

**Manufacturer Selling Price (MSP) = DSP * (1 - % Distrib. Margin)**

**Manufacturer Cost = MSP * (1 - % Mfr. Margin)**
Suppose a distribution channel for the sale of Peruvian wine includes a manufacturer, an importer, a distributor, and a retailer. The retailer sells the wine to consumers for $18.00 a bottle. If we know the margins for each channel member in the chain, can we calculate the manufacturer’s cost?

We use the Retail Selling Price (RSP) and the Retail % Margin to calculate the Distributor Selling Price. Then we use the Distributor Selling Price and the Distributor % Margin to calculate the Importer Selling Price, and so on…

Let’s take this one channel member at a time…
### Example of Chaining Backward (continued)

What is the distributor selling price (to the retailer)?

<table>
<thead>
<tr>
<th>% Margin</th>
<th>Manufacturer</th>
<th>Importer</th>
<th>Distributor</th>
<th>Retailer</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.50</td>
<td></td>
<td>0.33</td>
<td>0.25</td>
<td>0.333</td>
</tr>
<tr>
<td>Selling Price</td>
<td>??</td>
<td>??</td>
<td>??</td>
<td>$18.00</td>
</tr>
</tbody>
</table>

**Hint:** Distributor Selling Price is also the Retail Cost

\[
\text{Retail Cost} = \text{RSP} \times (1 - \% \text{Retail Margin})
\]

\[
\text{Retail Cost} = $18.00 \times (1.00 - 0.33) = $12.00 = \text{Distributor Selling Price}
\]

Next link: What is the importer selling price (to the distributor)?
Example of Chaining Backward (continued)

<table>
<thead>
<tr>
<th>% Margin</th>
<th>Manufacturer</th>
<th>Importer</th>
<th>Distributor</th>
<th>Retailer</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.50</td>
<td></td>
<td></td>
<td>0.25</td>
<td>0.333</td>
</tr>
<tr>
<td>Selling Price</td>
<td>??</td>
<td>??</td>
<td>??</td>
<td>$18.00</td>
</tr>
<tr>
<td>Selling Price</td>
<td>??</td>
<td>??</td>
<td>$12.00</td>
<td>$18.00</td>
</tr>
</tbody>
</table>

Importer Selling Price = Distributor Cost
Distributor Cost = Distributor Selling Price \( \times (1 - \% \text{ Distributor Margin}) \)
Distributor Cost = $12.00 \( \times (1.00 - 0.25) \)
Distributor Cost = $12.00 \( \times 0.75 = $9.00 \) = Importer Selling Price

Next link: What is the manufacturer selling price (to the importer)?
Example of Chaining Backward (continued)

<table>
<thead>
<tr>
<th>% Margin =</th>
<th>Manufacturer</th>
<th>Importer</th>
<th>Distributor</th>
<th>Retailer</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.50</td>
<td>0.33</td>
<td>0.25</td>
<td>0.333</td>
<td></td>
</tr>
</tbody>
</table>

Selling Price

$9.00 * (1.00 – 0.33) = $9.00 * 0.66 = $6.00 = Manufacturer Selling Price

Finally: What is the manufacturer’s cost?
## Example of Chaining Backward (continued)

<table>
<thead>
<tr>
<th>% Margin =</th>
<th>Manufacturer</th>
<th>Importer</th>
<th>Distributor</th>
<th>Retailer</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selling Price</td>
<td>$6.00</td>
<td>$9.00</td>
<td>$12.00</td>
<td>$18.00</td>
</tr>
<tr>
<td>Selling Price</td>
<td>$9.00</td>
<td>$12.00</td>
<td>$18.00</td>
<td></td>
</tr>
<tr>
<td>Selling Price</td>
<td>$12.00</td>
<td>$18.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Manufacturer Cost = Manufacturer Selling Price * (1 - % Manufacturer Margin)

Manufacturer Cost = $6.00 * (1.00 – 0.50)

Manufacturer Cost = $6.00 * 0.50 = $3.00

The manufacturer’s cost is $3.00 per bottle. Notice how much the distribution channel adds to the ultimate retail price.
Important Formulas to Remember:

$ Margin = Selling Price - Cost

% Margin = (Selling Price - Cost) / Selling Price
or $ Margin / Selling Price

Selling Price = Cost / (1 - % Margin)

Cost = SP * (1 - % Margin)

Markup % = (Selling Price – Cost) / Cost

Selling Price = Cost * (1 + Markup %)

Continue for a few sample problems…
Calculating Margins: Sample Problems

**Question 1:** A manufacturer sells watches for $20 each. His percentage margin is 25%. What is his cost?

**Answer:**

We know that Cost = Selling Price * (1 - % Margin)

Therefore, substituting in our values:

Cost = $20 * (1 - 25%)
Cost = $20 * (1 - .25)
Cost = $20 * .75
Cost = $15
Question 2: A manufacturer sells electric staplers for $5.00 each to a distributor. The distributor’s dollar margin is $2.00. The distributor sells to a retailer. The retailer’s dollar margin is $3.00. What is the retail sales price to the consumer?

Answer:

We know that \( \text{Margin} = \text{SP} - \text{Cost} \) and also that that the distributor’s cost is equal to the manufacturer’s selling price, or $5.00.

The distributor’s Margin is given as $2.00, so the distributor’s selling price = $5.00 + $2.00 = $7.00. The distributor’s selling price of $7.00 is also the cost to the retailer.

Therefore, the retailer’s selling price to the consumer is the retailer’s cost plus the retailer’s Margin, or $7.00 + $3.00, or $10.00.
Question 3: A retailer sells gourmet pickles for $8 a jar. The retailer’s percentage margin is 25%. The wholesaler’s percentage margin is 33%. The manufacturer’s percentage margin is 50%. What is the manufacturer’s cost?

Answer:

Backward chain the margins using the formula $\text{Cost} = \text{SP} \times (1 - \% \text{ Margin})$

Retail Cost = Retail Price * (1 – Retail Margin)
= $8 \times (1 - .25) = $6, Retail Cost (or Wholesale SP) = $6.

Wholesale Cost = Wholesale Price * (1 – Wholesale Margin)
= $6 \times (1 - .33) = $4, Wholesale Cost (or Manufacturer SP) = $4.

Manufacturer Cost = Manufacturer SP * (1 - Manufacturer Margin)
= $4 \times (1 - .50) = $2, Manufacturer Cost = $2
Question 4: A distribution chain for hotel room art includes the artist, a wholesaler, the hotel chain, and the individual hotel franchise owner. The artist sells each painting to the wholesaler for $80, realizing a percentage margin on the selling price of 75%. The wholesaler sells the art to the hotel chain for a percentage margin of 50%. The hotel chain then sells the art to its individual hotel franchise owners, and earns a percentage margin of 20%.

If the cost for the artist to produce each painting doubles due to a shortage in canvas, what is the new cost to the hotel franchise owner if every member of the distribution chain maintains the same DOLLAR margin?
Answer:

To solve this problem, we will need to calculate every channel member’s dollar margins and then calculate how the increase in the artist’s costs will affect the prices throughout the distribution channel.

First, calculate the artist’s cost using the formula \( \text{Cost} = \text{SP} \times (1 - \% \text{Margin}) \)

Since the artist sells paintings for $80 and earns a % margin of 75%, we substitute the values…

\[
\text{Cost} = \$80 \times (1 - 0.75) \\
\text{Cost} = \$80 \times 0.25 = \$20
\]

The artist’s dollar margin would be \( \text{Margin} = \text{SP} - \text{Cost} \)

\[
\text{Margin} = \$80 - \$20 = \$60
\]

So the artist’s cost is $20 and the artist’s margin is $60.
Next, calculate the wholesaler margin and selling price. We know the wholesaler’s cost = the artist’s selling price, or $80, and the % margin is 50%.

Use **Selling Price = Cost / (1 - % Margin)** to calculate the wholesaler’s selling price.

Substituting, the wholesaler’s SP = $80 / (1 - 0.5) = $160.

The wholesaler’s $ Margin = % Margin x SP or 0.50 x $160 = $80.

That means the hotel chain’s cost equals the wholesaler’s selling price of $160, and the % margin is given as 20%.

Again, use **Selling Price = Cost / (1 - % Margin)** to calculate the hotel chain’s selling price.

Thus, the hotel chain’s SP = $160 / (1 – 0.2) = $200.

The hotel chain’s $ Margin = % Margin x SP, or 0.20 x $200 = $40.

The cost to the hotel franchise owner is therefore $200.
Now that we have all of the dollar margins, we can begin the second part of the problem. The problem asks “If the cost to the artist doubles due to a shortage in canvas, what is the new cost to the hotel franchise owner if every member of the distribution chain maintains the same DOLLAR margin?”

The artist’s cost was calculated earlier as $20. If the cost doubles due to a shortage in canvas, then the new cost is $40.

All of the members of the distribution channel keep the same $ margins. Recall, the artist’s is $60, the wholesaler’s is $80, and the hotel chain’s is $40.

Therefore, the new selling price to the wholesaler is $40 + $60, or $100. The new selling price to the hotel chain is $100 + $80, or $180. **The new selling price to the individual hotel franchise owner then is $180 + $40, or $220.**

Note: As a shortcut, you could also recognize that the $20 increase is passed on throughout the distribution channel and therefore the price to the franchiser will also go up by $20. However, the shortcut would not work with %s.
Calculating Margins - Further Reference


- And -

Breakeven and Profit Dynamics (core MBTN modules). These modules builds on margins to further explain costs, breakeven, and volume – price interactions and their impact on profits.