

WERNER SEEBACHER

# CONTROLLING - APPLICATION: THE RATIOS IN THE PROFIT PLAN

*Ratios represent an overview of the profitability and the scope for action of an enterprise in a compressed way. The main ratios that are used in the framework of budget compilation are demonstrated in the following article.*

## 1 Initial Situation

Without concrete support in form of figures and safe-guarding by budgets, no reliable statements on the future development of a company are possible. Based on budget compilation, the effects of modified product prices, sales figures and cost increases eg, must be analysed constantly. The following ratios serve as a basis for assessing results and changes of plans: minimum turnover, volume range and price range. For the calculation of these ratios a simple profit plan is required including a separation of cost types into fixed and variable costs and an allocation of sales and variable costs in order to compile contribution margins.

## 2 Minimum Turnover

The ratio Minimum Turnover specifies the minimum amount of sales a company must have after deducting all fixed and variable costs to achieve a result of zero as to just not make a loss.

The following formula can be used for minimum turnover:

$$\text{Minimum turnover} = \frac{\text{Fixed costs}}{\text{Cover ratio}}$$

The cover ratio is needed as an input value to calculate the minimum turnover and to express the contribution margin in percentage terms of the turnover and is calculated according to the following formula:

$$\text{Cover ratio} = \frac{\text{Contribution margin}}{\text{Planned sales}} \times 100$$

Minimum turnover is also called Break-Even-Point and can be seen in the break-even graph (See table 1)

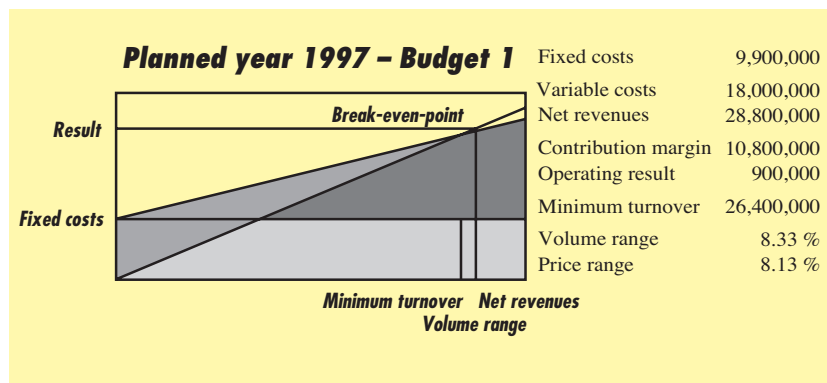


Table 1

## 3 Volume Range

The ratio Volume Range is based on the ratio Minimum Turnover. It specifies by what percentage a company's sales volume may decrease while the minimum turnover will still be attained. If the ratio Volume Range attains a negative result it shows by what percentage a company's sales volume must increase to achieve the minimum turnover.

An accompanying condition for the powerful meaning of the ratio Volume Range is that only the sales volume is modified whereas all other components in the budget remain constant: sales price and variable costs per unit and fixed costs.

Volume range is also called margin of error.

The formula for calculating volume range is shown as a percentage:

$$\text{Volume range} = \frac{[(\text{Planned turnover} - \text{Minimum turnover}) / \text{Planned turnover}] \times 100}{}$$

## 4 Price Range

The ratio Price Range shows by how many percent a company's sales price

per product may decrease when sales volume, variable costs per unit and fixed costs remain constant and still all costs can be covered by sales and a profit or loss of zero can be achieved. If the ratio shows a negative value it specifies by how many percent the sales price per unit must increase not to achieve a loss any more.

Price range when calculated with a slightly modified formula is also called Return on Sales.

Price range is shown as a percentage and is calculated according to the following formula:

$$\text{Price range} = \frac{\text{Result}}{\text{Sales}} \times 100$$

## 5 Example

The meaning and powerful information on the ratios shown above are to be demonstrated based on an example.

Beginning with a base budget the effects of cost or sales increases on the ratios shall be demonstrated.

In this example no differentiation between costs of cost accounting and expenses of financial accounting will be considered. The values equal.

### 5.1. BASIC BUDGET: VERSION 1 OF THE BUDGET

The following profit plan serves as a basis for the calculation of the ratios mentioned above. The variable costs equal those of the use of goods, all other costs are incorporated into fixed costs. (See table 2)

The following ratios result from the profit plan (Table 3). Calculation of ratios: (See calculation 1)

### 5.2. EFFECTS OF INCREASES IN FIXED COSTS: VERSION 2 OF THE BUDGET

Consequently, fixed costs rise by 5%. The following new profit plan is compiled and also new values for the ratios. The two budgets with their respective ratios are set against each other (See table 4 and 5)

Calculation of new ratios (See calculation 2)

The scope for action with volume and price went down by 4.58 or 1.72 percentage points resp. The relative decrease amounted to 55% in each case.

The corporate result deteriorated by 495,000 compared to the base budget.

### 5.3. INCREASE IN SALES: VERSION 3 OF THE BUDGET

With a constant relation between sales prices of products and purchasing prices of goods or material, in the next step an increase in the units sold is tried to be achieved, to lead to a better result by an increase of sales.

To achieve the same corporate result as before the increase of fixed costs, a higher contribution margin must be attained. This necessary contribution margin results from the planned profit increased by the fixed costs.

	Revenues (Sales)	28,800,000
–	Variable costs	18,000,000
=	Contribution margin	10,800,000
–	Fixed costs	9,900,000
=	Operating result	900,000

Table 2: Profit plan

Minimum turnover	26,400,000
Volume range	8.33 %
Price range	3.13 %

Table 3: Ratios

$$\text{Minimum turnover} = \text{Fixed costs} / \text{Cover ratio}$$

$$26,400,000 = 9,900,000 / 37.50 \%$$

$$\text{Cover ratio} = (\text{Contribution margin} / \text{Turnover}) \times 100$$

$$37.50 \% = (10,800,000 / 28,800,000) \times 100$$

$$\text{Volume range} = [(\text{Planned turnover} - \text{Minimum turnover}) / \text{Planned turnover}] \times 100$$

$$8.33 \% = [(28,800,000 - 26,400,000) / 28,800,000] \times 100$$

$$\text{Price range} = (\text{Result} / \text{Turnover}) \times 100$$

$$3.13 \% = (900,000 / 28,800,000) \times 100$$

Calculation 1

$$\text{Minimum turnover} = \text{Fixed costs} / \text{Cover ratio}$$

$$27,720,000 = 10,395,000 / 37.50 \%$$

$$\text{Cover ratio} = (\text{Contribution margin} / \text{Turnover}) \times 100$$

$$37.50 \% = (10,800,000 / 28,800,000) \times 100$$

$$\text{Volume range} = [(\text{Planned turnover} - \text{Minimum turnover}) / \text{Planned turnover}] \times 100$$

$$3.75 \% = [(28,800,000 - 27,720,000) / 28,800,000] \times 100$$

$$\text{Price range} = (\text{Result} / \text{Turnover}) \times 100$$

$$1.41 \% = (405,000 / 28,800,000) \times 100$$

Calculation 2

	Budget 1: Basic budget	Budget 2: Increase of fixed costs	Deviation	Percentage
– Revenues (Sales)	28,800,000	28,800,000	0	0 %
– Variable costs	18,000,000	18,000,000	0	0 %
= Contribution margin	10,800,000	10,800,000	0	0 %
– Fixed costs	9,900,000	10,395,000	+ 495,000	+ 5.00 %
= Operating result	900,000	405,000	– 495,000	– 55.00 %

Table 4: Profit plan

	Budget 1: Basic budget	Budget 2: Increase of fixed costs	Deviation	Percentage
Minimum turnover	26,400,000	27,720,000	+ 1,320,000	+ 5.00 %
Volume range	8.33 %	3.75 %	– 4.58 %	– 55.00 %
Price range	3.13 %	1.41 %	– 1.72 %	– 55.00 %

Table 5: Ratios

$$\begin{aligned} \text{Necessary contribution margin} &= \\ &= \text{Planned profit} + \text{Fixed costs} \\ 11,295,000 &= 900,000 + 10,395,000 \end{aligned}$$

The necessary turnover can be calculated through the relation of sales and contribution margin.

The relation between turnover (budget version 3) and contribution margin (budget version 3) must equal the relation between turnover (budget version 2) and contribution margin (budget version 2). As the values of turnover and contribution margin of budget version 2 are available and the contribution margin of budget version 3 equals the necessary contribution margin which has been calculated recently this must result in the turnover for budget version 3.

$$\begin{aligned} \text{TO budget 3/CM budget 3} &= \\ &= \text{TO budget 2/CM budget 2} \\ 30,120,000/11,295,000 &= \\ 28,800,000/10,800,000 & \end{aligned}$$

The variable costs result from the difference between the necessary

planned turnover and the necessary contribution margin.

$$\begin{aligned} \text{Variable costs} &= \\ &= \text{Planned sales} - \text{Necessary CM} \\ 18,825,000 &= 30,120,000 - 11,295,000 \end{aligned}$$

The budget and the ratios change like this: (See table 6 and 7)

The calculation of the new ratios: (See calculation 3)

The corporate result has reached the same size as before the increase of fixed costs, sales and variable costs. The scope for action is, however, smaller than in the base budget as the results can only be achieved by increased sales. The minimum turnover

that is to be achieved is higher than in the base budget. The differences can be seen in comparison of the base budget and budget version 3 which has been modified by increases in fixed costs and sales. (See table 8)

## 6 Summary

The profit ratios Minimum Turnover, Volume Range and Price Range inform about planned and actual profitability and scopes for action of a company in the framework of budget compilation, comparison of planned and actual data and forecast. Volume and price range indicate by how many percent the sales volume or sales price resp of products based

$$\begin{aligned} \text{Minimum Turnover} &= \text{Fixed Costs/Cover Ratio} \\ 27,720,000 &= 10,395,000/37.50 \% \\ \text{Cover Ratio} &= (\text{Contribution Margin/Turnover}) \times 100 \\ 37.50 \% &= (11,295,000/30,120,000) \times 100 \\ \text{Volume Range} &= [(\text{Planned Turnover} - \text{Minimum Turnover})/\text{Planned Turnover}] \times 100 \\ 7.97 \% &= [(30,120,000 - 27,720,000)/30,120,000] \times 100 \\ \text{Price Range} &= (\text{Result/Turnover}) \times 100 \\ 2.99 \% &= (900,000/30,120,000) \times 100 \end{aligned}$$

### Calculation 3

	Budget 2: Increase of fixed costs	Budget 3: Increase of turnover	Deviation	Percentage
Revenues (Sales)	28,800,000	30,120,000	+ 1,320,000	+ 4.58 %
- Variable costs	18,000,000	18,825,000	+ 825,000	+ 4.58 %
= Contribution margin	10,800,000	11,295,000	+ 495,000	+ 4.58 %
- Fixed costs	10,395,000	10,395,000	0	0 %
= Operating result	405,000	900,000	+ 495,000	+ 122,22 %

Table 6: Profit plan

	Budget 2: Increase of fixed costs	Budget 3: Increase of turnover	Deviation	Percentage
Minimum turnover	27,720,000	27,720,000	0	0 %
Volume range	3.75 %	7.97 %	+ 4.22 %	+ 112.50 %
Price range	1.41 %	2.99 %	+ 1.58 %	+ 112.50 %

Table 7: Ratios

	Budget 1: Basic budget	Budget 3: Increase of turnover	Deviation	Percentage
Minimum turnover	26,400,000	27,720,000	+ 1,320,000	+ 5.00 %
Volume range	8.33 %	7.97 %	- 0.36 %	- 4.40 %
Price range	3.13 %	2.99 %	- 0.14 %	- 4.40 %

Table 8: Ratios

on the planned value, may drop, before a negative result is achieved. The ratios must be seen as a scope for action of an enterprise which might mean reacting to increases in fixed costs or carrying out price reductions which could lead to an increased sales volume. The amount of the necessary sales increase as a result of price reduction or increase in fixed costs can be planned exactly by way of ratios. **RWZ**

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