

SPECIFIC-CASE

WORKSHEET 8 OF 9

Choosing Between Two Production Methods

Scenario: you have two options to fulfill the same output. Method A uses a leased machine at \$750/month in fixed cost and \$0.25 per unit in variable cost. Method B uses contract production at \$0 additional fixed cost and \$0.59 per unit in variable cost. Current selling price is \$1.37 per unit and monthly fixed costs before this decision are \$1,875.



Break-Even Analysis Handbook
by Ibrahim Anwar

What This Is For

This worksheet applies the Chapter 10 fixed-vs-variable framework to a specific production method decision. The two methods produce the same output and the same revenue; the question is which cost structure leads to a lower BEP and a more resilient operating position at current volume.

The answer is not always the method with the lower per-unit cost. At low volume, a variable-cost method (Method B) may produce a lower total monthly cost even if the per-unit rate is higher. At high volume, Method A's fixed structure is cheaper per unit. The crossover volume tells you exactly where the two lines cross. Your current average volume places the business on one side. This worksheet does not make the decision for you — it calculates the number the decision should be made from.

Benefits

What you get when you actually run this worksheet on a real situation:

- Calculates BEP under both methods, not just total cost, so the margin-of-safety impact of each choice is visible.
- Identifies the crossover volume — the point where total monthly cost is identical under both methods — so the choice can be tied to a specific volume milestone.
- Exposes the BEP risk of Method A: how many months at historical growth rate before the business reliably covers the higher BEP the leased machine creates?
- Prevents decisions based on per-unit cost comparisons alone, which systematically favor fixed-cost options at projected volumes that may never materialize.
- Produces a comparison the operator can present to a supplier or lender: 'At our current volume, Method B costs \$X less per month. Method A becomes viable at Y units, which is Z months away at our growth rate.'

Framework To Use

— BEP-First Method Comparison

Before comparing per-unit cost, compare BEP. The method with the lower BEP is safer at any volume below the crossover. Above the crossover, reconsider.

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How To Use

Follow these steps in order. Each one builds on the previous.

- 1** Step 1: Write Method A's new monthly fixed cost in column two. This is the installment, lease, or retainer — the exact contracted amount.
- 2** Step 2: Write Method B's additional variable cost per unit in column three. This is the per-unit contract production rate, charged only when units are produced.
- 3** Step 3: Calculate total fixed costs after adoption for each method: current fixed costs + Method A's new fixed cost (column two) or current fixed costs + \$0 (column three).
- 4** Step 4: Calculate total variable cost per unit after adoption: existing VC + \$0 (Method A — machine covers production cost in its fixed monthly fee) or existing VC + Method B rate (column three).
- 5** Step 5: $\text{CM per unit} = \text{Selling Price} - \text{Total Variable Cost per unit}$ for each method. Note that CM differs between methods if Method B adds variable cost.
- 6** Step 6: $\text{CM Ratio} = \text{CM per unit} \div \text{Selling Price}$ for each method.
- 7** Step 7: $\text{BEP Units} = \text{Total Fixed Costs} \div \text{CM per unit}$ for each method.
- 8** Step 8: $\text{BEP Revenue} = \text{Total Fixed Costs} \div \text{CM Ratio}$ for each method.
- 9** Step 9: Calculate the crossover volume: $(\text{Method A Fixed Costs} - \text{Method B Fixed Costs}) \div (\text{Method B Variable Cost per unit} - \text{Method A Variable Cost per unit})$. Write the result in the last row.
- 10** Step 10: Write your current average monthly volume in the prompt section. Is it above or below the crossover?

Example Use

A snack food producer: current fixed costs \$1,875/month, selling price \$1.56/pack, existing variable cost \$0.94/pack, existing BEP 2,419 packs/month, actual volume 3,200 packs/month. Method A: leased machine at \$937/month, reduces variable cost to \$0.75/pack (machine handles packaging). Method B: contract packager at \$0.31/pack added to existing \$0.94, total VC \$1.25/pack.

Method A:

Total fixed costs: $\$1,875 + \$937 = \$2,812/\text{month}$.

Variable cost per unit: $\$0.75$ (machine handles packaging — existing VC drops).

CM per unit: $\$1.56 - \$0.75 = \$0.81$.

CM Ratio: $\$0.81 \div \$1.56 = 51.9\%$.

BEP Units: $\$2,812 \div \$0.81 = 3,471$ packs.

BEP rise: $+1,052$ packs above current BEP of 2,419.

Method B:

Total fixed costs: $\$1,875$ (unchanged).

Variable cost per unit: $\$1.25$.

CM per unit: $\$1.56 - \$1.25 = \$0.31$.

CM Ratio: 19.9% .

BEP Units: $\$1,875 \div \$0.31 = 6,048$ packs.

BEP rise: $+3,629$ packs above current BEP.

Crossover volume:

$(\$2,812 - \$1,875) \div (\$1.25 - \$0.75) = \$937 \div \$0.50 = 1,874$ packs.

Wait — that's below current volume of 3,200. But Method B BEP is far higher.

Check: at 3,200 packs, Method A total cost = $\$2,812 + (3,200 \times \$0.75) = \$5,212$.

Method B total cost = $\$1,875 + (3,200 \times \$1.25) = \$5,875$.

Method A is cheaper at current volume. Method B's higher VC makes it more expensive per month despite lower fixed costs.

Decision: Method A produces a BEP of 3,471 — above current volume of 3,200 by 271 packs (a 7.8% gap). Method A is cheaper per month at current volume, but the business is currently below Method A's BEP. At historical growth of 50 packs/month, Method A BEP is covered in about 5.5 months. If cash reserves can sustain the deficit during that ramp, Method A is the better long-term choice.

The Worksheet

Tear this out, copy it onto a fresh sheet, or fill it in directly.

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METRIC	METHOD A (LEASED MACHINE)	METHOD B (CONTRACT PRODUCTION)
Additional fixed cost per month (\$)		\$0
Variable cost per unit — this method only (\$)		
Total fixed costs after adoption (\$)		
Total variable cost per unit after adoption (\$)		
CM per unit (Selling Price - Total Variable Cost)		
CM Ratio (%)		
BEP Units (Total Fixed ÷ CM per unit)		
BEP Revenue (\$)		
Crossover volume — units where total cost is equal across methods		
At your avg monthly volume, total cost per unit — this method (\$)		

Reflection Prompts

After filling in the worksheet on the previous page, work through these.

1. Calculate the crossover volume: set total cost of Method A equal to total cost of Method B and solve for units. Below that volume, which method produces lower total cost? Above that volume, which is cheaper per unit?
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2. Your current average monthly volume sits on which side of the crossover point? By how many units? If demand is seasonal, does it cross the threshold in peak months?
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3. Method A raises BEP by how many units? At your historical growth rate, how many months before volume reliably covers the higher BEP? If cash reserves cannot sustain that runway, Method B may be the lower-risk path even if it costs more per unit at scale.
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Tips and Traps

TIPS

- Always check both BEP and crossover volume before deciding. A method with lower BEP may have a higher crossover — meaning it is only cost-effective at low volume. A method with higher BEP may cross under the other line at a volume the business is close to reaching.
- If both methods produce a BEP above current volume, the question is not which method to choose but which ramp is shorter. Compare the months-to-BEP figure for each and choose the faster one, assuming cash reserves can sustain either.
- Model the crossover at your peak-season volume, not only your average volume. A business with strong seasonal peaks may be above the crossover for three months per year — enough to justify the fixed-cost method if cash reserves can carry the off-season deficit.

TRAPS

- Comparing per-unit production cost directly between methods without first converting to total monthly cost at actual volume. A \$0.59 contract rate looks cheaper than a \$0.75 machine-assisted rate per unit, but the machine's fixed cost structures the entire break-even differently.
- Treating the crossover volume as a permanent feature. As volume grows, both total-cost lines change if Method B's volume-based rate changes at tier thresholds. Recalculate the crossover if the contract rate changes.
- Committing to Method A's lease before confirming cash reserves can sustain the months between signing and reaching the new BEP. The gap in units is calculable; the months to cover it at historical growth is calculable. If that figure is 18 months and cash reserves support 9, Method A is a problem regardless of its long-run cost advantage.

Appendixes

Appendix A – Crossover Volume Derivation

At the crossover volume Q , total monthly cost is equal under both methods.

$$\text{Method A total monthly cost} = FC_A + (VC_A \times Q)$$

$$\text{Method B total monthly cost} = FC_B + (VC_B \times Q)$$

Set equal and solve:

$$FC_A + VC_A \times Q = FC_B + VC_B \times Q$$

$$FC_A - FC_B = (VC_B - VC_A) \times Q$$

$$Q_{\text{crossover}} = (FC_A - FC_B) \div (VC_B - VC_A)$$

Required: $VC_B > VC_A$ (variable alternative must cost more per unit than fixed alternative per unit – which is the typical case).

Interpretation:

$Q < Q_{\text{crossover}} \rightarrow$ Method B costs less total per month

$Q > Q_{\text{crossover}} \rightarrow$ Method A costs less total per month

$Q = Q_{\text{crossover}} \rightarrow$ both cost the same; choose based on BEP risk

Example:

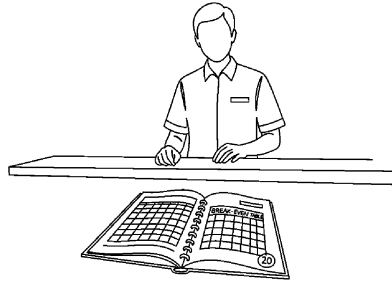
$$FC_A = \$2,812, FC_B = \$1,875$$

$$VC_A = \$0.75, VC_B = \$1.25$$

$$Q = (\$2,812 - \$1,875) \div (\$1.25 - \$0.75) = \$937 \div \$0.50 = 1,874 \text{ units}$$

At volumes above 1,874 packs/month, Method A costs less.

Current volume of 3,200 is above 1,874 \rightarrow Method A is cheaper per month.



WHERE THIS WORKSHEET COMES FROM

Break-Even Analysis Handbook

Calculate How Many Units Must Sell Before This Business Turns a Profit

by Ibrahim Anwar

This worksheet is one of nine in the *Break-Even Analysis Handbook* companion worksheet pack. The full pack is grouped into three categories: high-volume worksheets you can run weekly, niche-search worksheets for rare but high-value situations, and specific-case worksheets that walk you through a single concrete scenario.

Every framework, decision filter, and figure used in these worksheets is drawn from the chapters of the source book. The book sets the diagnosis, the worksheets give you the form to act on it.

Available on Google Play Books

play.google.com/store/books

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