YALE CASE APRIL 26, 2024

Yale SCHOOL OF MANAGEMENT

A Primer on Breakeven Analysis

Both students and entrepreneurs can benefit from better understanding and using this handy tool

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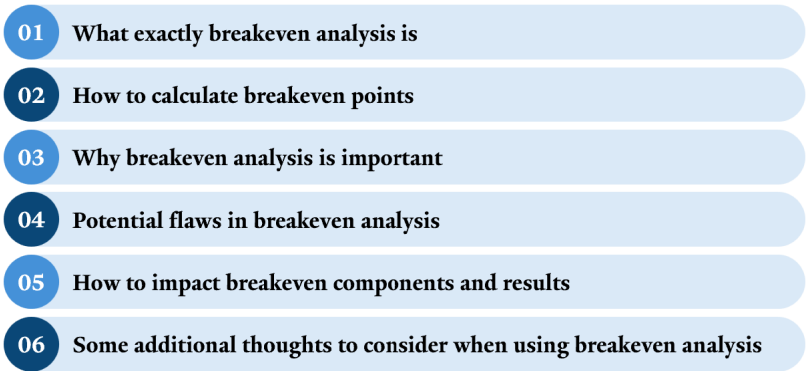
Many MBA students and entrepreneurs enjoy focusing on lofty business topics like strategy, finance, culture, and capital allocation. We, too, enjoy discussing and teaching these glamorous themes. However, even though many down-to-earth and practical commercial tools lack the star power of finance and strategy, they are just as important in the classroom and when leading a company. We believe one of those subjects is breakeven analysis. Despite being a bit pedestrian and wonky, this simple and elegant concept can help students and leaders better understand their businesses and the impact of each of their decisions.

When we teach cases that demand a breakeven computation, we are often surprised that many students struggle with the theory and the math. This perplexes us because the principle is fairly simple, and the calculation is just basic arithmetic. However, we acknowledge that selecting the right numbers for this relatively easy computation can sometimes be vexing, and understanding what the calculation means and what to do with the answer can be arduous. Student struggles aside, we also do not hear sitting CEOs talk about and use breakeven analysis very often when running an organization. We think this is a missed opportunity.

Our aim in this note is to demystify breakeven analysis and illuminate this helpful tool. We want students to feel confident in its meaning and use it, and we think CEOs should embrace this useful lens in their leadership roles. This note will discuss breakeven analysis through six key components (**Figure 1**).

Figure 1: Breakeven analysis topics we will explore



What exactly breakeven analysis is

Breakeven analysis is a straightforward calculation that informs users at what point a firm will earn zero dollars in profit. When discussing breakeven analysis, the concept can be further decomposed into two parts: breakeven revenue and breakeven quantity. Both ideas are meaningful for students and CEOs.

It is useful to think in both dollars and units. One approach reflects a financial mindset, while the other leans toward an operational view. Breakeven sales is the tipping point at which the company will begin to make money, and failing to achieve breakeven revenue will result in the firm generating a loss. Similarly, breakeven quantity reflects the unit level at which a company must operate to discover profit equilibrium. If the firm sells less than the breakeven quantity, it will lose money. If the business sells more than the breakeven amount, it will operate profitably.

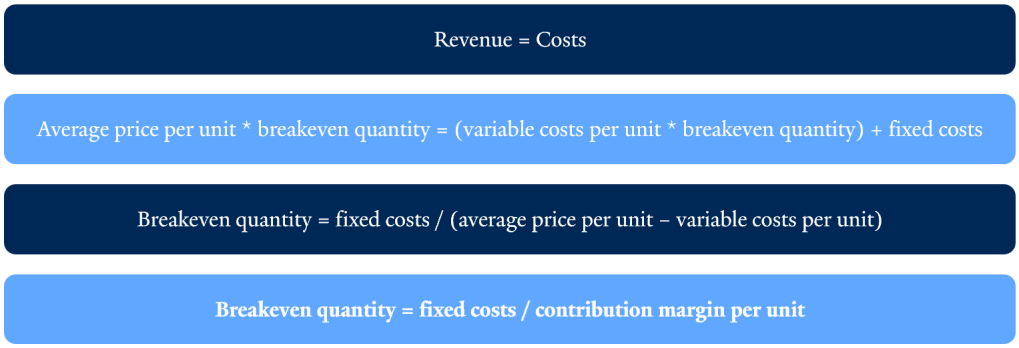
Breakeven analysis is rooted in the relationship between fixed costs and variable costs. Each unit that a company sells has a profit margin. Initially, all of the contribution margin dollars (the price of a good or service less its variable costs) are consumed in an effort to pay for fixed costs. Once the firm generates enough volume in sales or units to cover its fixed costs, the next dollar of revenue or the next unit in volume will push the company into profitability because the contribution margin is no longer going toward fixed costs. Operating below the breakeven revenue or unit level implies that the fixed costs are not yet covered. If the firm is at the breakeven point in unit volume, only variable costs are incurred from that point forward, and each unit's contribution margin flows to the bottom line.

Students and CEOs will better comprehend the implications of their investment and operating decisions when they understand and calculate breakeven analysis. This basic calculation quickly quantifies every single decision in a firm. Any expenditure can be broken down into its implications on unit volumes necessary to cover its cost.

How to calculate breakeven points

We have good news. Breakeven math is just basic arithmetic and not hard to calculate. Sometimes, fishing for the correct numbers to use in the calculation can be tricky, but the math itself is easy. Let's start with the formula for breakeven quantity for a single product or service context, which we have depicted in **Figure 2**.

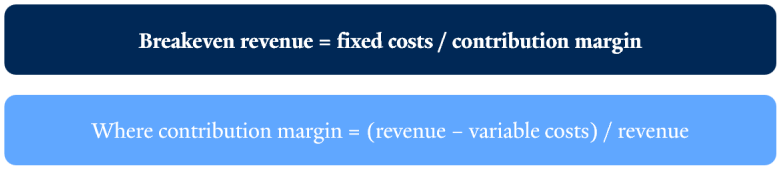
Figure 2: Breakeven quantity formula



Source: Steenburgh, Thomas, and Jill Avery. Marketing Analysis Toolkit: Breakeven Analysis, March 25, 2016. Harvard Business Publishing. 9-510-080.

There are times in a case analysis or an operating company when a student or CEO might not have data available on a per unit basis. In that situation, it might be helpful to calculate breakeven revenue, which assumes the proportions of various products and services is held constant. **Figure 3** displays the breakeven revenue formula.

Figure 3: Breakeven revenue formula



Source: Mimick Richard H., and Neil Campbell. Behavior of Costs, October 4, 2004. Ivey Publishing. 83K042.

Now that we have defined the two breakeven formulas, let's implement the concept with a few sample calculations. Let's imagine that Joao is running a business they recently acquired. Joao knows that in the prior year, the company did $5 million in sales and incurred fixed costs of $1 million and variable costs of $3 million. Joao is interested in calculating the business' breakeven revenue. With the information presented, we can easily compute this figure by first calculating the contribution margin. This is just ($5 million minus $3 million) divided by $5 million – or $2 million divided by $5 million. This is 40%. Now that Joao knows the contribution margin, the breakeven revenue is simply $1 million divided by 40%, which equals $2.5 million. Easy enough. **Figure 4** breaks down the math step by step.

Figure 4: Math steps to calculate breakeven revenue for the example above

Revenue	$5,000,000	A
Fixed costs	$1,000,000	B
Variable costs	$3,000,000	C
Profit	$1,000,000	A – B – C
Contribution dollars	$2,000,000	A – C = D
Contribution margin	40%	D / A = E
Breakeven revenue	$2,500,000	B / E

Let's stay with Joao for a few more minutes. Instead of assuming there are $1 million in fixed costs and $3 million in variable costs, let's assume the inverse: $3 million in fixed costs and $1 million in variable costs. The breakeven revenue is now $3 million divided by ($5 million less $1 million) divided by $5 million. This computation indicates that the breakeven revenue is $3.75 million, compared to $2.5 million in our previous example. Why did the breakeven point jump? In our second example, fixed costs were significantly higher and the variable costs did not decline sufficiently. It will now take longer to climb to the breakeven point because more of the initial activity is consumed in fixed costs. **Figure 5** details the math.

Figure 5: Math steps to calculate breakeven revenue for the example above

Revenue	$5,000,000	A
Fixed costs	$3,000,000	B
Variable costs	$1,000,000	C
Profit	$1,000,000	A − B − C
Contribution dollars	$4,000,000	A − C = D
Contribution margin	80%	D / A = E
Breakeven revenue	$3,750,000	B / E

Now that we have successfully calculated breakeven revenue, let's move on to breakeven quantities. Nicola is an entrepreneur operating a widget manufacturing company. Each widget sells for $10, and the variable costs per widget are $6. Nicola's business has $1.8 million in fixed costs. What is the breakeven widget quantity for Nicola? The contribution margin per unit is $4 ($10 minus $6). So, the breakeven quantity is $1.8 million divided by $4, which is 450,000 widgets. **Figure 6** highlights the math.

Figure 6: Math steps to calculate breakeven unit quantity for the example above

Average selling price per widget	$10	A
Variable costs per widget	$6	B
Contribution dollars per widget	$4	A − B = C
Fixed costs	$1,800,000	D
Breakeven widget quantity	450,000	D / C

Let's look at another example and introduce a bit more complexity. Nicola is performing due diligence on a target company, and the seller does not have great data. Nicola is interested in knowing the breakeven service transaction quantity for the business. The only information Nicola has is that the prior year's revenue was $8 million, fixed costs were $3 million, the firm reported a profit of $1.5 million, and the company provided 3,000 service transactions in Q4.

To calculate variable costs, we simply subtract fixed costs and profit from revenue[*] ($8 million minus $3 million minus $1.5 million which equals $3.5 million). To estimate the total service transactions for the prior year, we annualize the Q4 data point to get 12,000 service transactions. Now, we can tabulate the average revenue, average variable costs, and contribution dollars per service transaction. The average revenue per service transaction is $8 million divided by 12,000, which is $667. The average variable cost per service transaction is $3.5 million divided by 12,000, which is $292.

Furthermore, the average contribution dollars per service transaction is $667 minus $292, which is $375. Finally, the breakeven quantity is $3 million of fixed costs divided by $375 of contribution dollars per

[*] Revenue = variable cost + fixed cost + profit. If three variables are known, the fourth is easy to calculate.

service transaction, which equals 8,000 service transactions required to break even. There is lots of math, and Nicola needs to keep their units straight, but the math is just simple arithmetic. **Figure 7** shows the calculations.

Figure 7: Math steps to calculate breakeven quantity for the example above

Revenue	$8,000,000	A
Fixed costs	$3,000,000	B
Variable costs	$3,500,000	A − B − D = C
Profit	$1,500,000	D
Service transactions in Q4	3,000	E
Annualize service transactions	12,000	E * 4 = F
Average price per service transaction	$667	A / F = G
Average variable cost per service transaction	$292	C / F = H
Contribution dollars per service transaction	$375	G − H = I
Breakeven service transaction quantity	8,000	B / I

When performing a breakeven analysis, displaying the data in a table can be helpful, as we have done in **Figure 8**. This can assist in seeing the range of outcomes based on various unit volume levels. We can easily see that Nicola will lose money for units below 8,000 and will make money above. Additionally, we know what profit will be at different unit volume levels.

Figure 8: Illustrative table detailing profit levels at various unit volumes

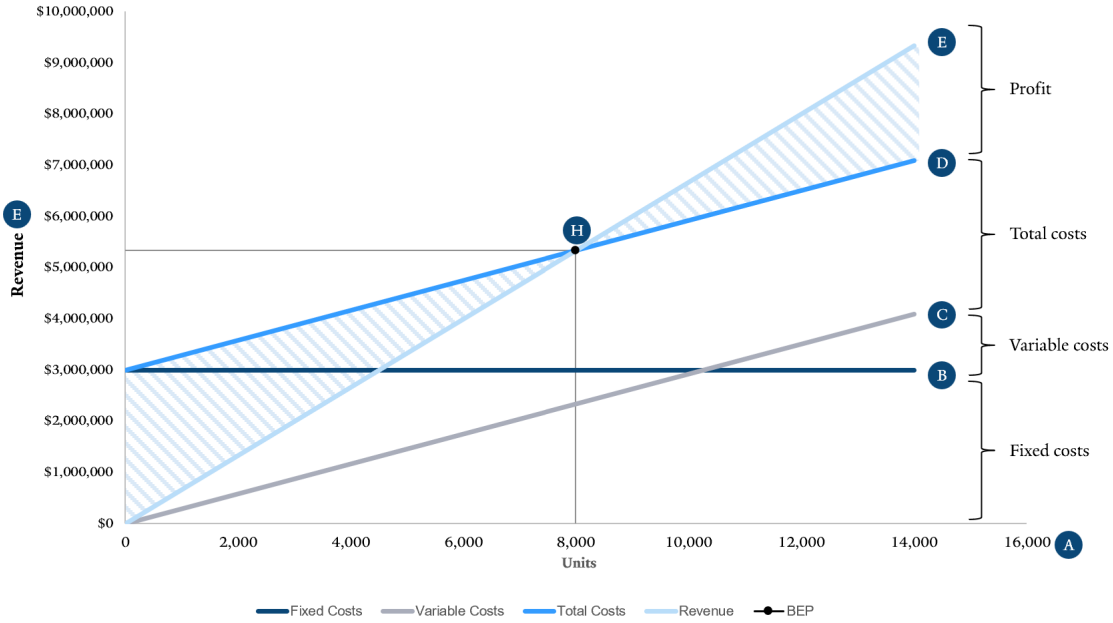
A	B	A ⋆ G = C	B + C = D	A ⋆ F = E	E - D
Units	**Fixed Costs**	**Variable Costs**	**Total Costs**	**Revenue**	**Profit**
0	$3,000,000	$0	$3,000,000	$0	($3,000,000)
1,000	$3,000,000	$292,000	$3,292,000	$667,000	($2,625,000)
2,000	$3,000,000	$584,000	$3,584,000	$1,334,000	($2,250,000)
3,000	$3,000,000	$876,000	$3,876,000	$2,001,000	($1,875,000)
4,000	$3,000,000	$1,168,000	$4,168,000	$2,668,000	($1,500,000)
5,000	$3,000,000	$1,460,000	$4,460,000	$3,335,000	($1,125,000)
6,000	$3,000,000	$1,752,000	$4,752,000	$4,002,000	($750,000)
7,000	$3,000,000	$2,044,000	$5,044,000	$4,669,000	($375,000)
8,000	**$3,000,000**	**$2,336,000**	**$5,336,000**	**$5,336,000**	**$0**
9,000	$3,000,000	$2,628,000	$5,628,000	$6,003,000	$375,000
10,000	$3,000,000	$2,920,000	$5,920,000	$6,670,000	$750,000
11,000	$3,000,000	$3,212,000	$6,212,000	$7,337,000	$1,125,000
12,000	$3,000,000	$3,504,000	$6,504,000	$8,004,000	$1,500,000
13,000	$3,000,000	$3,796,000	$6,796,000	$8,671,000	$1,875,000
14,000	$3,000,000	$4,088,000	$7,088,000	$9,338,000	$2,250,000

Revenue per transaction	$667 F		Breakeven quantity	8,000 B / (F - G)
Variable cost per transaction	$292 G		Breakeven dollars	$5,336,000 B / ((F - G) / F)

Furthermore, creating a graph, as we have done in **Figure 9,** can help a CEO visualize the table's data. Line B represents fixed costs and does not change (we acknowledge that it is unlikely that fixed costs will be permanently fixed as volumes scale but for pedagogical purposes we will hold fixed costs constant). Line C shows us variable costs in dollars and rises as unit volumes increase. Line D is the sum of B and C and is the total costs in dollars. Finally, line E is revenue in dollars. Point H is the breakeven spot in units and dollars. Interestingly, the loss zone is the area illustrated by the triangle at point H and $0 and $3 million on the Y axis. The profit zone is the area that depicts the triangle at point H and the terminal points of lines D and E.

Although we are positive that our students' Microsoft Excel skills are superior to ours, we share the link to build the table and graphs in **Figures 8 and 9** here.

Figure 9: Breakeven chart



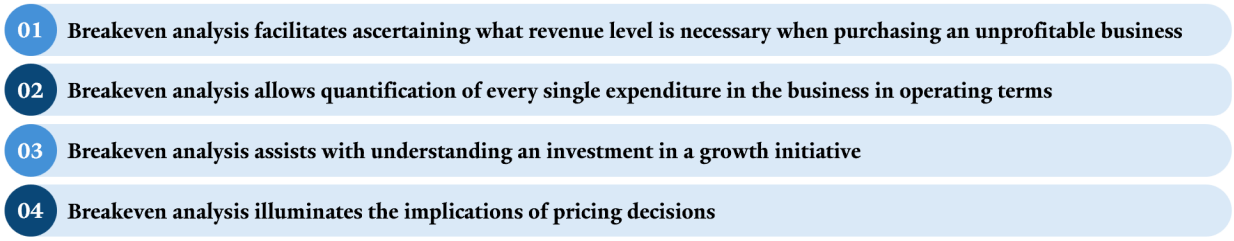
We want to emphasize and acknowledge that the math behind this framework is easy. What often trips up students and CEOs is selecting and identifying the right numbers to manipulate. In particular, discerning what a fixed cost is and what a variable cost is can puzzle some folks. Furthermore, finding the right data in a classroom case or in an operating company is often just plain challenging. The numbers are frequently obfuscated, incomplete, or just messy. That is just the way cases and businesses unfold. Sometimes, students and entrepreneurs will need to dig for the numbers, make assumptions, and settle for a less-than-perfect analysis and picture. That is okay. We encourage users to get the directional math correct and not obsess over the precise math.

Now that we have explored how to calculate breakeven sales volumes and breakeven unit quantities, let's move on and discuss why breakeven analysis is so essential and why both students and entrepreneurs should embrace this lens.

Why breakeven analysis is important

When we teach breakeven analysis in the classroom, students often focus on the math and how to calculate the answer. They falsely think getting the computation correct is the right goal and the last step. We strongly disagree. Doing the math to calculate the breakeven revenue or units is just the first step. The fundamental importance of breakeven work is what a student or CEO does with the number – how it impacts their decision making and choices in analyzing a case or leading a company. Getting the correct number is first-order thinking, and figuring out what the number means and how to use the number is second-order thinking. We will now discuss four reasons why breakeven analysis is so important (**Figure 10**).

Figure 10: Four reasons why breakeven analysis is so important



01 *Breakeven analysis facilitates ascertaining what revenue level is necessary when purchasing an unprofitable business*.

Some entrepreneurs purchase unprofitable businesses with the anticipation of making them profitable. Breakeven analysis allows such entrepreneurs to know what level of revenue will be required to begin operating profitably. Imagine a search fund entrepreneur, Adasia, who is operating a SaaS business that generates $1.25 million in annual revenue and has 2,500 subscribers. The fixed costs in the business are high at $1.0 million, and the variable costs are $0.75 million. We can quickly calculate that the company is losing money by subtracting expenses from revenue ($1.25 million less $1.0 million less $0.75 million equals -$.50 million). Many SaaS companies intentionally operate at a loss and focus on growth. But what if Adasia wants to know what level of sales is required to operate at breakeven? Well, that math is easy enough. Contribution margin is 40% ($1.25 million minus $0.75 million divided by $1.25 million). Breakeven revenue is $1.0 million in fixed costs divided by the 40% contribution margin, which is $2.5 million. If Adasia wants to operate at breakeven, they need to grow the business from $1.25 million to $2.50 million – a 100% increase in size. That might seem like a tall order. Adasia had better have a crackerjack sales program in place to get breakeven revenue and the financing to blunt the operating losses incurred until they achieve breakeven. This math is also predicated on believing that fixed costs do not change at all despite a doubling of the business. We think that might be unlikely and then breakeven would be higher than reflected here. Alternatively, Adasia might decide doubling the business is too big a mountain to climb and that they should pass on the acquisition. Regardless, the breakeven analysis informs Adasia how to think about the business and when it will be able to crawl out of a cash hole.

Adasia can also look at their situation more granularly and think about breakeven unit volumes. Once again, the math is easy enough. The revenue per subscriber is $500 per year ($1.25 million divided by 2,500 subscribers). The variable cost per subscriber is $300 ($0.75 million in variable costs divided by 2,500 subscribers). The contribution margin per subscriber is $200 ($500 revenue per subscriber minus $300 in variable costs). Finally, the breakeven number of subscribers is 5,000 ($1 million in fixed costs divided by $200 in contribution margin per subscriber). If Adasia needs an additional 2,500 subscribers, they can now estimate how many salespeople they might need and how long it might take to add that number of additional subscribers. Adasia is making decisions with robust data and information and not through intuition.

02 *Breakeven analysis allows quantification of every single expenditure in the business in operating terms*.

CEOs are bombarded with endless expenditure requests from their staff. Sponsoring the local baseball team, supersizing the holiday party this year, and engaging in a fresh marketing campaign are all examples we have heard. Of course, CEOs can make whatever decision they choose, but we suggest they at least include breakeven math in their process. This quantifies what each expenditure will require in unit volume to recoup its cost. For example, if Adasia has a marketing professional who wants to invest in a new

customer acquisition campaign that costs $100,000, Adasia can quickly know that they need to win at least 500 new subscribers for the campaign to be worthwhile ($100,000 divided by $200 in contribution margin per subscriber). If Adasia does not believe the campaign will generate at least 500 new subscribers, there is no financial reason to engage in the program.[†] Although there might be qualitative reasons (our students love qualitative reasons to make illogical financial decisions), it is hard to argue for engaging in a program that fails to cover its variable costs. Breakeven analysis allows Adasia to avoid making a quantitative decision qualitatively or emotionally. The math is irrefutable, even if passionate, emotional, and persuasive marketing professionals disagree. Please observe that we are focused on the fixed cost of a project initiative in this scenario and not the fixed costs of the entire firm. The logic and math still apply, but the fixed cost notion is more nuanced and focused.

03 *Breakeven analysis assists with understanding an investment in a growth initiative*.

Many entrepreneurs enthusiastically pursue new growth tracks and expansion opportunities. Perhaps a CEO plans to launch a new manufacturing facility or an HVAC operator wants to add a vehicle and establish a new service route. These choices can be analyzed from many angles, but one that should always be considered is breakeven analysis. For example, if Rebecca is the CEO of a manufacturing facility and plans on opening a new plant in an adjacent market, they might want to know the breakeven volume in their analysis. If Rebecca estimates the new plant will have $2.0 million in fixed costs and each widget will have a contribution margin of $17, Rebecca knows that they will need 117,647 units ($2.0 million divided by $17) to break even in the new facility. This might be realistic or totally untenable – that is for Rebecca to decide. However, they are armed with the data to make an informed decision.

04 *Breakeven analysis illuminates the implications of pricing decisions*.

CEOs often examine pricing opportunities for their products and services. Additionally, they are frequently pestered by salespeople about why prices are too high and should be lowered. Obviously, pricing is a potent tool for entrepreneurs to deploy, but it is only with breakeven analysis that CEOs can understand and internalize its implications. For example, if Himanshu is the CEO of a firm and is considering lowering prices for a new market, they can see what this means for breaking even. Imagine Himanshu's fixed costs in the new market will be $2.0 million, and the company sells a service with an average revenue of $500 per user per year and average costs of $100. The contribution per service is $400 ($500 minus $100), and the breakeven number of services is 5,000 ($2.0 million divided by $400). If Himanshu lowers the price to $450, the contribution margin drops to $350 ($450 minus $100), and the breakeven number of services now sits at 5,714 ($2.0 million divided by $350), a stark increase demanding more time and work. Conversely, if Himanshu raises the price, breakeven service units will drop.

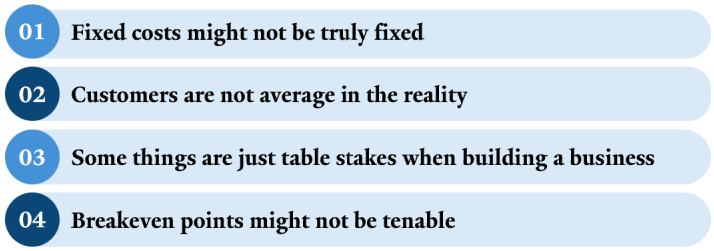
Breakeven analysis allows CEOs to understand the revenue and unit volume levels necessary when contemplating opening a new location, purchasing a money-losing acquisition, launching a new product or service, and spending money on anything. All of these choices can be easily quantified with the breakeven framework. Despite its elegance and simplicity, we do not observe sitting CEOs discussing or using breakeven analysis nearly enough. We encourage them to do so because it is a tool that quickly dissects many decisions into their mathematical components and can easily be communicated to employees. Perhaps CEOs do not embrace breakeven analysis because they are fearful it loses some relevance when making very long-term decisions (especially ones where fixed costs turn out to be not so fixed).

[†] In this simple example, we are assuming that all the new customers are one-time customers and do not repeat as customers in future periods. If Adasia believes the new customers will churn at a rate that is less than 100%, they would use a customer lifetime value analysis.

Potential flaws in breakeven analysis

Although we are enthusiastic fans of breakeven analysis, it is not a perfect or precise framework. For example, when calculating breakeven quantities there is an implicit assumption that the firm only has a single product or service (which may not hold). Additionally, when computing breakeven revenue, it is implied that the proportionate revenue from various products and services is held constant (which might be unlikely). Furthermore, there are a handful of flaws (**Figure 11**) that are worth at least highlighting for students and CEOs. Despite these potential drawbacks, we still encourage students and CEOs to use breakeven analysis, but with a dose of skepticism and the cognizance that the math is directional at best.

Figure 11: Four potential flaws in breakeven analysis



01 *Fixed costs might not be truly fixed*.

When operating a business, CEOs sometimes falsely get seduced into thinking fixed costs are indeed fixed. They almost never are in the long term. Sometimes, they are just temporarily fixed and will creep up in the future. For example, operators often believe that shared services becomes a fixed cost at a certain point. The last accounting professional or human resources person was it, and shared services will not grow again. We are guilty of getting caught in that trap and can assure readers that shared services is never truly fixed. It might move in plateaus or grow at decreasing rates, but it rarely never grows.

02 *Customers are not average in the reality*.

We typically use average customer revenue and contribution when calculating breakeven unit volume data. While these numbers might be mathematically accurate, customers are idiosyncratic and do not behave as averages. In many businesses, customer pricing and revenue are not standardized, and focusing on unit volumes can mask the economic underpinnings of the individual customer. For example, adding unit volume with below-average pricing will not be as accretive to breakeven volumes as adding that with average or above-average pricing. Additionally, individual customer cost structures can vary, too. Proximate customers in a route-based business might be more profitable than disparate accounts. Once again, the variable costs might impact the unique contribution margin, affecting unit volume calculations.

03 *Some things are just table stakes when building a business*.

Periodically, breakeven analysis can dissuade students and CEOs from embarking on various initiatives and projects. While we are rigorously mathematically oriented, there are times when an overly quantitative approach belies the context at hand. For example, if a CEO considers new office space and conducts a breakeven analysis on the incremental expense, they might be deterred. However, if part of the new office space initiative is to recruit new, different, and superior team members and attract more and better customers, breakeven analysis might fail to account for qualitative dynamics. Similarly, a new ERP system might be hard to justify mathematically alone, but it is really an entry requirement when contemplating a

growing, bigger, and more professionalized firm. Sometimes, investments in a business are just table stakes, and math alone cannot rationalize the decisions. Of course, CEOs can and should take a swipe at calculating the impact of all their investment decisions, even if the analysis is a best estimation and not perfectly reliable.

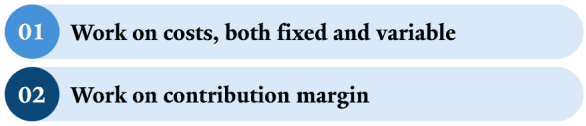
04 *Breakeven points might not be tenable*.

Calculating breakeven points does not imply those revenue or unit volumes are tenable. Despite the math being accurate, it is the CEO's burden to read the market and assess whether the calculations are indeed feasible – or not. This is the art of interpreting the breakeven math, regardless of how accurate it is. For example, if a breakeven assessment indicates that to open a new factory the company needs to sell 1,000 units, the CEO must determine if that is realistic. If the question at hand involves 1,000 small-ticket-item widgets, the answer might be affirmative; if the project requires 1,000 high-ticket widgets and 1,000 items represent the entire existing market, the CEO might proceed judiciously.

How to impact breakeven components and results

Every CEO should aspire to lower breakeven sales and unit points. Doing so decreases a company's risk profile and shortens the runway to profitability. This leads to the question of how entrepreneurs can lower breakeven points (**Figure 12**).

Figure 12: How entrepreneurs can impact and lower breakeven points



01 *Work on costs, both fixed and variable*.

Compressing fixed and variable costs is an excellent way to diminish breakeven thresholds. There is a perfect positive correlation between decreasing costs and decreasing breakeven points. Consider a company with $1.0 million in fixed costs and a 25% contribution margin. Breakeven revenue is $4.0 million ($1.0 million divided by 25%). The same company would enjoy a $3.8 million breakeven sales figure if the CEO could shrink fixed costs to $0.95 million ($0.95 million divided by 25%). How can a CEO reduce fixed costs if they are fixed? We are not sure fixed costs are as fixed as we think – and it is worth a hard look. The same is true with variable costs. If a firm has variable costs per unit of $1 and average revenue per unit of $3, the contribution margin is $2 ($3 minus $1). If fixed costs are $500,000, the company requires 250,000 units to break even ($500,000 divided by $2). If variable costs wane to $0.75 and the contribution margin is now $2.25 ($3 minus $0.75), breakeven volume is now 222,222 units ($500,000 divided by $2.25). Economists might argue that rational CEOs have already harvested all possible cost reductions. We are not so sure. We always observe complacency and distraction, and costs need fresh scrutiny periodically. Work on costs – it pays to do so and lowers breakeven points.

02 *Work on contribution margin*.

Increasing contribution margin decreases breakeven metrics. A perfect negative correlation exists between amplifying margin and attenuating breakeven sales and unit volumes. There are many ways to increase margin. It could involve attracting and selecting customers who are easier to serve – maybe they are more proximate or larger with fewer shipping or administrative costs. Customers who grow without incremental

sales expense might also have higher contributions. Another way to increase margin is to focus on pricing and resist the temptation to offer pricing discounts as bait for new customers; a CEO can also amplify pricing on current and future accounts. Playing with price is always risky but might be tenable. Let's look at a quick example. If a firm has a contribution margin of 25% and fixed costs of $2.0 million, breakeven sales are $8.0 million ($2.0 million divided by 25%). If the contribution margin grows to 30%, breakeven revenue drops to $6.6 million ($2.0 million divided by 30%).

While raising prices, lowering costs, and increasing profits are tenable ways to lower breakeven points, a CEO can also embrace a lower operating leverage model (where fixed costs are less) to achieve a suppressed breakeven point. This needs to be considered in context because a firm might be in a superior position with higher breakeven points if the CEO believes they can consistently operate at elevated volumes. In other words, holding operating leverage constant, lower breakeven is better if it is generated by higher selling prices and lower costs. However, lower breakeven may not at all be better if the CEO is choosing between different operating leverage models.

Some additional thoughts to consider when using breakeven analysis

Before we wrap up this note, we want to share a few additional thoughts on some topics related to breakeven analysis. Specifically, we will address the concept of operating leverage, the limitation of using breakeven analysis for major decisions, and how fixed and variable costs behave in the long run.

Operating leverage

Breakeven analysis is closely related to the concept of operating leverage, which refers to the process of changing operations such that variable costs are replaced by fixed costs. For example, firms could purchase their main product from a contract manufacturer for a variable cost or manufacture inhouse, which implies a mix of fixed costs (for the manufacturing facility) and variable costs (for raw materials and labor). In other words, breakeven analysis illuminates when operating leverage kicks in and a company enjoys the benefits of increasing volume levels and expanding profits. High operating leverage implies that variable costs are somewhat low, and low operating leverage suggests variable costs tend to be high.

Operating leverage is akin to financial leverage, which reflects the level of debt financing versus equity financing. Interest service on debt is a fixed cost, and higher levels of debt imply higher financial leverage. As with financial leverage, higher levels of operating leverage increase risk, reflected as more volatile profits. And as with financial leverage, higher risk typically comes with higher return. Once the fixed costs are covered, higher operating leverage adds more contribution margin for each sales dollar.

In essence, operating leverage is neither a positive nor a negative attribute. Relatedly, having a lower breakeven point is not necessarily better. The focus is on total profits, and firms that operate at volumes above breakeven levels select the operating leverage that maximizes profits. Optimal levels of operating leverage are often a function of the business a firm operates. For example, some software companies have high operating leverage in that once their upfront costs to develop software are incurred, the variable costs to service one additional customer are frequently very low. Conversely, human capital–intensive businesses, like a commercial landscaping service, tend to have low operating leverage because variable costs run high since the company will need more people nearly proportionally as the company scales.

Breakeven analysis is simple and easy to communicate but may not be appropriate for major decisions

Breakeven analysis is not suited for major decisions with long-term impact, which should properly be analyzed by a comprehensive consideration of financial projections that reflect the effects of the decision. Net present value (NPV) and internal rate of return (IRR) rules rely on projections of incremental future free cash flows associated with investment decisions. These formal analyses take into account the timing of cash flows, taxes paid, and the relevant cost of capital, which includes both the cost of debt (interest) and the cost of equity.

One partial solution is to adapt the breakeven analyses to make them more comprehensive. Whereas breakeven analyses typically focus on revenues and operating costs, they can be expanded to include interest, taxes, and the cost of equity. While it is not immediately obvious, the cost of equity is relevant for breakeven because investors need to be compensated for those costs before value is created. Suppose the cost of equity is 10% and investors provide the firm with $100 in fresh equity. If the firm earns 10% on that equity over the next year, it reports a profit of $10 and increases the wealth of equity investors by $10 to $110. But the present value of $110 paid a year from now is just $100. In other words, managers need to earn a profit that covers the cost of equity each year just to break even.

The implication is that breakeven is not achieved when revenues merely cover operating costs. Rather, breakeven requires revenues sufficient to cover operating costs, interest, taxes, and a net income amount equal to the cost of equity multiplied by the equity investment in the firm (which is reflected on the balance sheet as owners' equity). For the purposes of breakeven analyses, these additional costs – interest, taxes, and minimum required net income – are fixed costs.

Fixed and variable costs over the long term

Breakeven analyses assume that fixed costs remain fixed as the scale of operation increases. This assumption merits careful consideration. When separating costs into fixed and variable categories, it may appear that many costs belong in the fixed category. It is hard to discern that they vary because they tend to increase in a lumpy way. Viewing a cost as fixed, when it is in fact, partially variable (or in many cases fully variable) over the longer term, understates costs and overstates profits for volumes past the breakeven point.

Not only is there a potential for variable costs to be misclassified as fixed costs, but these costs are also often excluded from both the variable and fixed categories because they are viewed as not relevant for many incremental decisions, such as adding a new product or a new customer. This error understates costs and overstates profitability across all activity levels.

Conclusion

Breakeven analysis is a handy tool that students and entrepreneurs should more readily embrace and utilize. It is a quick method to ascertain how much revenue is required before a firm flips to profitability or how many units are necessary to cover the company's fixed costs and move into the profit zone. Thinking about breakeven illuminates the relationship between fixed and variable costs and will help CEOs and students better understand this dynamic.

Breakeven is an elegant and simple way to quantify many financial and operational decisions in a business. Despite at times being irritating, the math is not hard, and once it is computed, it is a neat way to communicate with various constituents in the company. Breakeven analysis is important for many reasons, but it is not a perfect tool, and its limitations must be respected. Finally, CEOs are not passively subject to

breakeven results – they can impact the conditions by working on the component inputs that drive breakeven outputs.

Whether you are a student or a CEO, we hope you regularly reach for the breakeven tool and make it a frequent part of your diagnostic screen to better understand a business opportunity or challenge. It is a powerful and instrumental lens to assist in making rational leadership decisions. We wish you good luck and fulfillment in your journey – and hope you always live in a world that is *above* breakeven!

Exhibit 1: Additional Resources

- Break Even Analysis in Excel (Calculations and Template) (exceldemy.com)
- Corey, E. Raymond. *Note on Breakeven Analysis in Marketing*, January 5, 1998. Harvard Business Publishing. 9-578-072.
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- Hawkins, David F., and Jacob Cohen. *Costing Alternative Choices*, October 4, 2004. Harvard Business Publishing. 9-105-035.
- Mimick, Richard H., and Neil Campbell. *Behavior of Costs*, October 4, 2004. Ivey Publishing. 83K042.
- Ormazabal, Gaizka, and Eduardo Soler Vila. *Accounting for Decision Making*, June 2014. IESE Publishing. IES468.
- Steenburgh, Thomas, and Jill Avery. *Marketing Analysis Toolkit: Breakeven Analysis*, March 25, 2016. Harvard Business Publishing. 9-510-080.

Endnotes

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