E-ISSN: 2962-6110
P-ISSN: 2964-7843
JSRET
jsret.knpub.com
Journal of Scientific Research, Education, and Technology
Interdisciplinary science, open access, and peer-reviewed journal that disseminates research findings from lecturers, researchers, teachers, and scientists in a variety of scientific and technological fields. This is an open-access article distributed under the terms of the Creative Commons Attribution-ShareAlike 4.0 International License (https://creativecommons.org/licenses/by-sa/4.0/)

Cost-Volume-Profit Analysis for Managerial Decisions at Ayam Penyet Surakarta in Medan

Angelica Grace Amelia Panjaitan, Manha Sanika Zarin Damanik, Betty Sinaga, Iskandar Muda
Universitas Sumatera Utara, Medan, Indonesia

ABSTRACT

Small food businesses often set prices and targets by estimation, not systematic cost analysis. This descriptive quantitative case study applies cost-volume-profit (CVP) analysis to Ayam Penyet Surakarta, a five-item eatery in Medan, to estimate its break-even point, margin of safety, and operating leverage, and to test four operating scenarios and chicken price changes. Data came from an interview with the supervisor and two weekdays of direct observation (Monday–Tuesday, 5–6 October 2026). Monthly figures are extrapolated from the supervisor's reported daily average over 28 operating days; they are not measured totals. Sales of IDR 68,880,000 yield a contribution margin of IDR 30,846,000 (44.8%) and operating income of IDR 14,923,708. Break-even is 4,915 units per month (about 176 per day) against assumed sales of 340 per day, giving a margin of safety of 48.4% and operating leverage of 2.07. A target profit of IDR 20,000,000 requires 11,087 units per month. Raising the *nasi ayam penyet* price gives the largest scenario gain, and each 10% change in chicken price shifts monthly profit by IDR 1,489,600. The business appears safe, but profit depends on one dish and the chicken price. Findings reflect one business, one month, one informant, and two observed days.

Keywords: *cost-volume-profit analysis, break-even point, contribution margin, margin of safety, sales mix, MSME*

Corresponding author
Name: Manha Sanika Zarin Damanik
Email: manhasanika@students.usu.ac.id

INTRODUCTION

Running a small food business means making operating decisions constantly on thin margins: how many portions to cook, what price to put on the menu, whether a slow week can pass without a loss. Restaurants matter to the Indonesian economy, but the sector is crowded, and operators compete on products, service, and price (Oktaviyah et al., 2025). Owners of micro, small, and medium enterprises (MSMEs) often decide alone, and many have no structured financial plan, which Agista et al. (2025) call the main MSME weakness because it hampers cost control and profit planning. Safry Saing et al. (2026) described small traders in Medan who set prices by instinct or by copying the market instead of calculating margins, and Oktaviyah et al. (2025) found a restaurant that did the same, relying on past results and intuition before using formal analysis. The pattern is not limited to Medan. A qualitative study of MSMEs in Serang City reported that most owners kept only simple

financial records and decided on intuition rather than data, whereas owners who applied management accounting more systematically handled costs and prices better (Afiah et al., 2026). A survey of 124 small and medium enterprises in Yogyakarta likewise found that traditional techniques such as budgeting and costing dominate, and that the use of management accounting depends on the involvement of the owner, the qualification of accounting staff, and the size of the firm (Prihastiwi & Sholihin, 2018).

Cost-volume-profit (CVP) analysis is one of the easiest ways to replace intuition with numbers. It shows how selling price, volume, variable cost, and fixed cost affect profitability and yields indicators such as the break-even point, contribution margin, and margin of safety (Oktaviyah et al., 2025). Recent Indonesian studies of bakeries, a vegetable retailer, and restaurants all found that it tells owners the minimum sales needed to avoid a loss and how much room they have above it (Agista et al., 2025; Oktaviyah et al., 2025; Safry Saing et al., 2026). Studies from other countries point in the same direction. Lulaj and Iseni (2018) concluded that CVP analysis contributes to profitability and break-even planning and should be used in decision making because it lowers the risk threshold. Okpala and Osanebi (2020) surveyed 50 manufacturing small and medium enterprises in Nigeria and found that CVP analysis had a positive and statistically significant effect on profit planning. Joshi and Sapkota (2026) reported strong positive correlations between the application of CVP analysis, profit planning, and pricing decisions among enterprises in the Kailali district of Nepal. Even so, the tool is not used intensively: in the Yogyakarta survey, about 85% of respondents reported using CVP analysis, yet its mean frequency of use was only 3.13 on a five-point scale (Prihastiwi & Sholihin, 2018).

This paper examines Ayam Penyet Surakarta, a small eatery on Harmonika Street, Titi Rantai, Medan Baru District, Medan City, North Sumatra. Its menu has five items: *nasi ayam penyet* (rice with *ayam penyet*), *nasi ati ampela* (rice with chicken liver and gizzard), *nasi lele* (rice with fried catfish), *es* Nutrisari (an iced instant fruit drink), and *es teh manis* (sweetened iced tea). A menu this short suits CVP work because the ingredients behind each item are easy to trace. Yet it mixes three rice dishes with two drinks, and items with different prices and ingredient costs do not add equally to profit. Agista et al. (2025) show for a two-product business that a shift in the proportion sold lowered the contribution margin of the sales package even though the business stayed profitable. The same may happen here, so the sales mix has to be part of the analysis.

The analysis in this study rests on a set of concepts that recur in CVP research on small businesses. They are reviewed here in seven connected parts: cost behaviour, contribution margin, break-even, target profit, margin of safety and operating leverage, sales mix, and the assumptions of the model (Brewer et al., 2019; Okpala & Osanebi, 2020). Every CVP calculation begins with the question of how costs react when activity changes. Fixed costs stay roughly constant in the short run whatever the volume, whereas variable costs rise and fall together with purchases or sales (Safry Saing et al., 2026). Some costs contain both elements, so Agista et al. (2025) sort costs into fixed, variable, and semi-variable groups and split semi-variable items such as electricity and maintenance into their

fixed and variable parts before the analysis continues. Once costs are classified, total cost becomes a linear function of volume, as shown in Equation (1).

$$TC = FC + V \times Q \quad (1)$$

where TC is total cost, FC is total fixed cost, V is variable cost per unit, and Q is the quantity sold. Classification cannot be done mechanically and has to draw on information from the owner. For example, Safry Saing et al. (2026) found that daily transport and packaging costs, which are often treated as semi-variable, were in practice a fixed daily amount regardless of sales, and they therefore classified them as fixed.

Contribution margin is what remains of sales after variable costs are deducted, and it is the amount available first to cover fixed costs and then to generate profit (Oktaviyah et al., 2025). It can be stated in total, per unit, or as a ratio to sales, as in Equations (2) to (4).

$$CM = P \times Q - V \times Q \quad (2)$$

$$CM_{unit} = P - V \quad (3)$$

$$CM\ ratio = \frac{CM}{Sales} = \frac{P - V}{P} \quad (4)$$

Here P is the selling price per unit. The ratio shows what share of each IDR of sales is left for fixed costs and profit, so a higher ratio means that sales are converted into profit more efficiently (Oktaviyah et al., 2025). Profit is then the total contribution margin less fixed costs, which for a given quantity sold is written as Equation (5).

$$Profit = (P - V) \times Q - FC \quad (5)$$

Because the contribution margin ratio is based on revenue rather than units, it does not require a single price per unit and is therefore suitable for businesses that sell several products. Safry Saing et al. (2026) used it to move from contribution margin to break-even sales and to show how the cushion for fixed costs changed over time; in their study the ratio rose from 21.6% to 29.8% across three ten-day periods.

The break-even point is the level of sales at which total revenue equals total cost, so the business earns neither a profit nor a loss; sales above it produce a profit and sales below it a loss (Safry Saing et al., 2026). Setting profit to zero in Equation (5) and solving for quantity gives the break-even point in units (Equation 6). Dividing fixed costs by the contribution margin ratio, which is the part of each IDR of sales that contributes to fixed costs, gives the break-even point in IDR (Equation 7).

$$BEP_{units} = \frac{FC}{P - V} \quad (6)$$

$$BEP_{IDR} = \frac{FC}{CM\ ratio} \quad (7)$$

Oktaviyah et al. (2025) derive the break-even quantity from the operating income equation and the break-even revenue from the contribution margin ratio, and then compare both with actual sales to judge whether the restaurant operates profitably. For a small stall, the most useful result is a minimum volume that the owner can translate into

plates and glasses per day. The practical value of this exercise is supported by Lulaj and Iseni (2018), who recommend CVP analysis for decision making because it reduces the risk threshold of the business.

Knowing the break-even point is rarely enough, since owners usually want to reach a particular profit. Target profit analysis follows the same logic as break-even analysis but replaces zero profit with the desired amount. Agista et al. (2025) apply it to each of two products by adding the target profit to fixed costs and dividing the total by the unit contribution margin, as in Equation (8).

$$Q_{target} = \frac{FC + Profit\ target}{P - V} \tag{8}$$

A vague aim such as "earn more" thus becomes a concrete sales target. Oktaviyah et al. (2025) likewise convert a percentage profit goal into units to be sold, which shows how demanding the goal is compared with current volume. Profit planning of this kind is closely tied to pricing: Joshi and Sapkota (2026) found that applying CVP analysis was strongly and positively correlated with both profit planning (r = 0.829) and pricing decisions (r = 0.787) among the enterprises they studied.

The margin of safety is actual sales minus break-even sales. It indicates how far sales can fall before a loss occurs, so a larger margin means a more secure position (Oktaviyah et al., 2025). It can be expressed in IDR or as a percentage of actual sales, as in Equations (9) and (10).

$$MOS_{IDR} = Actual\ sales - BEP_{IDR} \tag{9}$$

$$MOS\ (\%) = \frac{Actual\ sales - BEP_{IDR}}{Actual\ sales} \times 100 \tag{10}$$

Operating leverage is related to the margin of safety but is a different measure. The degree of operating leverage (DOL) shows how strongly operating income responds to a change in sales (Oktaviyah et al., 2025), and the resulting change in income can be estimated with Equations (11) and (12).

$$DOL = \frac{CM}{Net\ operating\ income} \tag{11}$$

$$\%\Delta\ Net\ operating\ income = DOL \times \%\Delta\ Sales \tag{12}$$

Operating leverage depends on the cost structure. A business with a large share of fixed costs has a higher DOL, so even small changes in sales cause relatively large changes in operating income (Oktaviyah et al., 2025). The two measures are closely linked: in a single-period linear model with a constant sales mix, DOL equals the reciprocal of the margin of safety percentage, so a wider margin of safety always comes with lower operating leverage. Oktaviyah et al. (2025) report a contribution margin ratio of 25%, a margin of safety of 12%, and a DOL of 8.2 for a restaurant, and conclude that its profit is highly sensitive to sales. Safry Saing et al. (2026) add a caution for businesses with thin margins: in their case a 10% rise in variable costs pushed the business into a loss, while profit stayed

positive even after a 30% fall in volume. For a stall whose main variable cost is ingredients, the price of chicken and rice may matter as much as the number of customers.

Sales mix is the relative proportion in which a business sells its products. When products earn different contribution margins, total profit depends on what makes up total sales, so a change in the mix can alter profit even if total sales stay the same. Agista et al. (2025) define the mix as the ratio of units sold of each product, reduced to the smallest whole numbers, and use it to build a sales package whose contribution margin is the sum of each product's unit contribution margin weighted by its share in the mix. When the mix is expressed as each product's share of total units, the same weighting gives the weighted average unit contribution margin in Equation (13).

$$\overline{CM} = \sum_{i=1}^{n} w_i \ (P_i - V_i) \tag{13}$$

Agista et al. (2025) obtain the break-even units of each product by multiplying the number of break-even packages by that product's share in the mix. When the mix is stated as shares of total units, the same result follows from applying Equation (6) with the weighted average unit contribution margin and then multiplying total break-even units by each share. An alternative in IDR uses the overall contribution margin ratio in Equation (14), which weights each product by its share of sales revenue and replaces the single ratio in Equation (7).

$$CM\ ratio_{overall} = \sum_{i=1}^{n} s_i \times \frac{P_i - V_i}{P_i} = \frac{\sum_i C\ M_i}{\sum_i S\ ales_i} \tag{14}$$

where w_i is the share of product i in total units sold and s_i is its share in total sales revenue.

The evidence that the mix matters is clear. In the bagelen business studied by Agista et al. (2025), the proportion of the two products changed between 2023 and 2024, contribution margin per package fell from about IDR 55,898 to about IDR 28,773, and the margin of safety dropped from 80% to 70%, although the business stayed safe. Safry Saing et al. (2026) also named a shift toward higher-margin products as one reason their contribution margin ratio improved. Both results hold only while the mix is stable, so break-even has to be recalculated whenever the mix moves. That matters here, since the three rice dishes and two drinks may differ in margin and may be ordered in different combinations from day to day.

CVP analysis rests on simplifying assumptions: the selling price per unit is constant, costs are linear in volume and can be divided into fixed and variable parts, and, when several products are sold, the sales mix stays constant. These assumptions keep the model simple but also limit it. Safry Saing et al. (2026) note that the linear relationship may fail when purchase prices change at any time, and that their results are tied to one business and a short observation window. Oktaviyah et al. (2025) likewise caution that such a model may miss the dynamics of the restaurant industry and that results from one period and one

object should be read carefully. For a small eatery with stable menu prices, the assumptions are reasonable over a short period if they are stated openly as limitations.

Recent studies show that CVP analysis has been applied to food-related and small businesses with useful results. Table 1 summarizes the three closest to this research (Agista et al., 2025; Oktaviyah et al., 2025; Safry Saing et al., 2026).

Table 1. Summary of Recent CVP Studies Related to This Research

Study	Object	Indicators examined	Main finding
Oktaviyah et al. (2025)	RM Seafood Restaurant, Makassar	Contribution margin, break-even, margin of safety, degree of operating leverage, profit planning	Sales exceeded break-even; CM ratio 25%, MOS 12%, DOL 8.2, indicating high profit sensitivity to sales
Agista et al. (2025)	Bagelen MSME with two products, Kediri	Cost classification, contribution margin, break-even, target profit, MOS, DOL, sales mix	Break-even computed per sales package; a change in mix lowered CM per package and MOS (80% to 70%)
Safry Saing et al. (2026)	Fresh vegetable store, Medan	Contribution margin, break-even, margin of safety, sensitivity analysis, pricing	CM ratio and MOS improved over three periods, but a 10% rise in variable costs caused a loss

Source: Compiled by the authors from the cited studies.

The three studies differ in scale and product from a small *penyet* stall: a large restaurant, a two-product bakery, and a vegetable retailer in Medan. None examines a short menu where meals and drinks are sold together and where both sales mix and ingredient prices can move profit. Survey evidence leaves a further gap: Prihastiwi and Sholihin (2018) show how widely CVP and break-even analysis are reported by small and medium enterprises, but a survey cannot show what these tools reveal about the cost structure of one particular small food business. This study fills that gap by applying the full set of CVP tools, from cost classification to sales mix, to a five-item MSME in Medan.

The owner therefore faces several practical questions. How many plates and glasses must be sold each month to cover all costs? What sales are needed for a profit the owner finds satisfactory? How far can sales fall before the business loses money? How strongly does profit react to changes in sales or ingredient prices? And what happens to profit when prices, costs, or the volume of particular menu items change? Questions of this kind are hard to answer from simple financial records alone, which is the situation described

for MSMEs in Serang City (Afiah et al., 2026), and answering them requires a framework that links cost, volume, and profit in one model (Lulaj & Iseni, 2018).

This study contributes in three ways. First, it adds a small five-item case from Medan to a literature that so far covers a large seafood restaurant, a vegetable store, and a bagelen bakery, but not a short-menu stall selling meals and drinks together (Agista et al., 2025; Oktaviyah et al., 2025; Safry Saing et al., 2026). Second, because the business does not record ingredient usage per menu item, the study shows how a sales-mix-based CVP model can still be built by allocating joint variable costs according to units sold, an allocation that changes the margin of each product but not the total break-even point or operating income. Third, it turns the results into daily sales targets and scenario tests that an owner can use without formal accounting training, which responds to the limited use of accounting information reported for Indonesian MSMEs (Afiah et al., 2026; Prihastiwi & Sholihin, 2018).

The objective of this study is therefore to apply CVP analysis to Ayam Penyet Surakarta in order to support the owner's managerial decisions. The study classifies the business's costs, computes the contribution margin and its ratio, finds the break-even point in units and IDR, estimates the sales needed for a target profit, and measures the margin of safety and degree of operating leverage. It also evaluates four hypothetical scenarios and the sensitivity of profit to chicken prices, using the observed sales mix of the five menu items. The findings should help the owner with pricing, purchasing, and sales planning, in line with the use of CVP analysis for profit planning and pricing decisions reported by Joshi and Sapkota (2026). Three research questions guide the work:

- **RQ1**. What are the break-even point (in units and IDR), the margin of safety, and the degree of operating leverage of Ayam Penyet Surakarta under its observed sales mix, and how many units must be sold to reach a target profit of IDR 20,000,000 per month?
- **RQ2**. How do four hypothetical operating scenarios (a higher price for *nasi ayam penyet*, a promotion, a cheaper chicken supplier, and additional sales of sweet iced tea) change monthly operating income?
- **RQ3**. How sensitive are the break-even point and operating income to changes in the price of chicken?

METHOD

Research Design

This research adopts a descriptive case study design with a quantitative analysis of cost and sales data. According to Sugiyono (2020), quantitative research methods are rooted in positivist philosophy and are used to examine specific populations or samples, utilizing research instruments for data collection and quantitative or statistical techniques for data analysis. Descriptive statistics are applied to analyze the collected data by describing its characteristics without aiming to draw generalized conclusions (Sugiyono, 2020).

A case study approach was selected because this study aims to apply managerial accounting concepts, specifically cost-volume-profit analysis, in depth to a single real-world

micro, small, and medium enterprise, rather than attempting to generalize findings across the entire sector.

Research Object, Population, and Sample

The object of research is the business "Ayam Penyet Surakarta," a food microenterprise located on Harmonika Street, Titi Rantai, in the Medan Baru District of Medan City, North Sumatra, Indonesia, 20156. This business has been operating for more than eight years and employs three workers. Its menu consists of three rice dishes, namely *nasi ayam penyet* as the main menu, *nasi ati ampela*, and *nasi lele*, as well as two beverage options, namely iced Nutrisari and sweet iced tea.

Cost-volume-profit analysis is the analytical technique applied in this study, while the object being studied is the business and its five menu items. Because this is a single case study, the whole business is the unit of analysis, so no separate population and sample are defined: all five menu items and all cost components reported by the supervisor are analyzed without sampling. Ayam Penyet Surakarta was selected purposively because it has operated for more than eight years with relatively stable sales. The data source is the business supervisor (hereafter, the supervisor), who manages daily operations.

Data Collection Procedure

Data were collected at Ayam Penyet Surakarta in Medan. Field observation took place on Monday, 5 October 2026, and Tuesday, 6 October 2026, and the interview with the supervisor was held on 6 October 2026. Both observation days were weekdays. Data came from primary and secondary sources. Primary data were collected through an interview, observation, and documentation.

The interview followed a guide covering selling prices, daily sales volumes per menu item, ingredient measurements and prices, and monthly fixed and variable costs such as labor, rent, and utilities. The daily sales volumes are the supervisor's statements. The supervisor reported that the business prepares the same quantity of each menu item every day and that the quantity is sold out daily, and said that these figures were based on the business's sales records, which were not shown to the researchers. Direct observation at the premises on both days was used to check portion sizes and production processes. Sales were not counted systematically during observation, so the daily volumes rest on the supervisor's statements. Documentation consisted of the business's purchasing records, which were shown to the researchers and served as a reference for ingredient costs.

Secondary data were obtained from the textbook *Introduction to Managerial Accounting* by Brewer, Garrison, and Noreen and from recent journal articles on cost-volume-profit analysis.

Basis for the Monthly Extrapolation

The monthly figures in this study are not measured totals. They were produced by multiplying the supervisor's reported average daily sales by 28 operating days per month (the business closes on two days each month, which are employee days off). This approach

has a clear weakness: two observation days and one informant cannot show how sales differ between weekdays and weekends, between the start and the end of the month, or between ordinary weeks and holiday periods. The observation days were both weekdays, so weekend foot traffic was not observed at all. The model therefore treats the reported average as a typical day and does not model day-of-week variation. This treatment is consistent with the supervisor's account that the same quantity is prepared and sold every day, which would imply little variation between weekdays and weekends. That account could not be verified, however, because the sales records were not shown and only two weekdays were observed. Selling out daily also means that the reported volume reflects the quantity prepared and not necessarily the quantity customers would buy, so actual demand may be higher than the figures used here. To show how much this assumption matters, the Results section reports how operating income changes if the true average monthly volume is 10% to 40% lower than assumed (see "Margin of Safety and Operating Leverage"). Because the margin of safety is wide, the conclusion about the business's safety is not very sensitive to this assumption, but the exact level of profit is.

Data Analysis

The data were analyzed using cost-volume-profit analysis with descriptive quantitative techniques. The analysis was conducted in five stages. The first stage involved grouping all costs into raw materials, indirect materials, labor, and overhead, and then classifying them as either variable or fixed. Electricity, water, and waste collection fees were treated as fixed costs based on the monthly billing amounts reported by the supervisor. Equipment depreciation was calculated by the authors with the straight-line method and zero residual value. It is an analytical charge and not an entry taken from the business's accounts. The second stage was calculating the variable cost and contribution margin per unit for each product. The third stage was calculating the weighted average contribution margin from the observed sales mix. The fourth stage was calculating the break-even point, margin of safety, degree of operating leverage, and target profit volume with Equations (1) to (19). The fifth stage was evaluating four scenarios and one sensitivity test on chicken prices by recalculating operating income under modified assumptions.

All calculations were performed in Microsoft Excel. Monetary amounts were rounded to the nearest IDR and ratios to one decimal place (operating leverage to two decimals), unless unrounded values are stated. Break-even and target-profit volumes were rounded up to the next whole unit, because a fraction of a unit cannot be sold.

Multi-Product Computation

Because the business sells five products, the single-product formulas in Equations (6) to (8) are applied with weighted averages. Let Q_i be the units of product i sold, P_i its price, V_i its variable cost per unit, and n = 5. The sales mix and the weighted averages are

$$w_i = \frac{Q_i}{\sum_{j=1}^{n} Q_j} \tag{15}$$

$$\overline{P} = \sum_{i=1}^{n} w_i P_i, \qquad \overline{V} = \sum_{i=1}^{n} w_i V_i, \qquad \overline{CM} = \overline{P} - \overline{V} = \sum_{i=1}^{n} w_i (P_i - V_i) \tag{16}$$

The break-even volume for the whole business, its split by product, and the break-even sales value are

$$BEP_{total} = \frac{FC}{\overline{CM}} \tag{17}$$

$$BEP_i = w_i \times BEP_{total} \tag{18}$$

$$BEP_{IDR} = BEP_{total} \times \overline{P} = \frac{FC}{CM\ ratio_{overall}} \tag{19}$$

The target-profit volume is obtained by replacing *FC* in Equation (17) with *FC* + target profit, which is Equation (8) evaluated with the weighted average contribution margin. All five products are assumed to be sold in the proportions w_i at every volume, and the break-even volume of each product in Equation (18) holds only under that assumption.

Allocation of Joint Variable Costs

The business does not record how much rice, oil, gas, seasoning, or sugar goes into each menu item, so the joint variable costs had to be allocated. They were allocated by the number of units sold within the group of products that uses them (Table 6), and not by revenue share or by the share of direct ingredient cost. There are three reasons. First, units sold is the only driver that the researchers could count directly during observation and that the supervisor could report consistently. Second, rice, cooking oil, gas, chilies, and side items are consumed per plate prepared, whatever the price on the menu, so a per-plate basis follows the way these inputs are used more closely than a revenue basis would. A revenue basis would make a plate that sells for IDR 10,000 absorb twice the oil and gas of a plate that sells for IDR 5,000, and it would shift costs between products whenever a price changed, which would distort the price scenario in this study. Third, an allocation by direct ingredient cost would load more joint cost onto *nasi ayam penyet* only because chicken is expensive, although chicken does not add to the oil, gas, or seasoning used. To reduce the distortion, drinks and rice dishes were treated as two separate groups, so that no gas or oil cost is charged to a glass of tea. The allocation affects the contribution margin reported per product, which should be read as an estimate. It does not affect total variable costs, the aggregate break-even point, or operating income.

Operational Definitions

The variables used in the analysis are defined as follows.

- **Sales volume:** the number of portions of *nasi ayam penyet*, *nasi ati ampela*, and *nasi lele*, and of glasses of iced Nutrisari and sweet iced tea, sold in one month, calculated as reported average daily sales multiplied by 28 operating days.
- **Selling price:** the price per unit paid by customers.
- **Variable costs:** costs of raw materials, indirect materials, and variable overhead (seasonings, cooking gas, cooking oil, packaging, and similar items) that change in

proportion to the number of units sold, calculated per unit from the supervisor's statements and purchasing records.

- **Fixed costs:** costs that stay constant regardless of sales volume, namely employee wages, rent, holiday allowances (*THR*) and religious donations (*infaq*), electricity, water, waste collection fees, and equipment depreciation.
- **Sales mix:** the percentage of total units contributed by each of the five menu products.
- **Contribution margin:** sales minus variable costs, expressed per unit, in total, and as a ratio to sales.
- **Operating income:** contribution margin minus fixed costs, measured before income tax and owner compensation.

Assumptions and Limitations

The analysis covers one month of 28 operating days. It assumes linear cost behavior and a constant sales mix of 50.0% *nasi ayam penyet*, 5.9% *nasi ati ampela*, 2.9% *nasi lele*, 11.8% iced Nutrisari, and 29.4% sweet iced tea. Monthly volumes were derived from the average daily sales reported by the supervisor and extrapolated from a two-day observation. Because the business does not record ingredient usage per menu item, joint variable costs were allocated by units sold; the contribution margin per product is therefore an estimate, whereas total variable costs, the aggregate break-even point, and operating income are not affected by the allocation. Part of the equipment has reached the end of its assumed useful life but is still in use, and the treatment of its depreciation is explained in the Fixed Costs subsection. The scenarios are hypothetical. All figures come from a single source, the supervisor, who provided the cost and sales figures with the owner's consent. Ingredient costs were cross-checked against purchasing records that were shown to the researchers, but the sales volumes rest on the supervisor's statements because the sales records were not shown, so the sales figures cannot be audited independently. The model also assumes that the quantity prepared, and therefore sold, stays at the reported level of 340 units per day.

RESULTS AND DISCUSSION

RESEARCH RESULT

The results follow the order of the research questions: the cost structure, the contribution margin per product and the sales mix, the break-even point, the margin of safety and operating leverage, the sales volume required for a target profit, and the effect of scenarios and chicken prices on profit. All figures are monthly, based on 28 operating days and extrapolated from the supervisor's reported daily average.

Business Profile

Table 2 summarizes the business profile based on the interview and observation. The business sells five products: three rice dishes (*nasi ayam penyet*, *nasi ati ampela*, and *nasi lele*) and two beverages (iced Nutrisari and sweet iced tea).

Table 2. Business Profile of the MSME Ayam Penyet Surakarta

Description	Details
Business name	Ayam Penyet Surakarta
Location	Harmonika Street, Titi Rantai, Medan Baru District, Medan City, North Sumatra, Indonesia, 20156
Years in operation	More than 8 years
Operating hours	11:30 a.m. – 11:00 p.m.
Number of employees	3 employees
Menu and prices	*Nasi ayam penyet*: IDR 10,000; *nasi ati ampela*: IDR 8,000; *nasi lele*: IDR 10,000; *es* Nutrisari: IDR 5,000; sweet iced tea: IDR 3,000
Average sales volume (reported by the supervisor)	340 units per day (9,520 units per month)
Observation dates	Monday 5 and Tuesday 6 October 2026
Interview date	Tuesday 6 October 2026

Source: Authors' interviews and observations (2026).

Production Cost Structure

Total production cost is IDR 53,956,292 per month (Table 3). Raw materials are the largest component at IDR 23,128,000 (42.9%), followed by overhead at IDR 15,274,292 (28.3%), labor at IDR 12,600,000 (23.3%), and indirect materials at IDR 2,954,000 (5.5%). Chicken alone accounts for IDR 14,896,000 (27.6%) of total production cost. By cost behavior, variable costs total IDR 38,034,000 (70.5%) and fixed costs total IDR 15,922,292 (29.5%).

Table 3. Monthly Production Cost Structure (IDR)

Cost item	Behavior	Amount per month	Share of total (%)
A. Raw material costs			
Chicken	Variable	14,896,000	
Chicken liver and gizzard	Variable	1,120,000	
Catfish	Variable	840,000	
Rice	Variable	4,032,000	
Nutrisari sachets	Variable	1,680,000	
Tea powder	Variable	560,000	

Cost item	Behavior	Amount per month	Share of total (%)
Total raw material costs		**23,128,000**	**42.9**
B. Indirect material costs			
Rice flour, bread, cornstarch	Variable	700,000	
Sugar	Variable	2,128,000	
Ice cubes	Variable	126,000	
Total indirect material costs		**2,954,000**	**5.5**
C. Labor costs			
Labor (3 employees)	Fixed	12,600,000	
Total labor costs		**12,600,000**	**23.3**
D. Overhead costs			
Chilies, shallots, and garlic	Variable	1,960,000	
Seasonings (coriander, pepper, salt, flavor enhancer, etc.)	Variable	1,120,000	
Packaging (plastic, rice wrapping paper, styrofoam, paper clips)	Variable	1,680,000	
Cooking gas	Variable	1,680,000	
Side items (cabbage, eggplant, tempeh)	Variable	3,360,000	
Cooking oil	Variable	1,764,000	
Tissue	Variable	52,000	
Drinking water	Variable	336,000	
Rent	Fixed	1,400,000	
Holiday allowance (*THR*) and religious donations (*infaq*)	Fixed	1,120,000	
Electricity	Fixed	500,000	
Water	Fixed	200,000	
Waste collection fees	Fixed	20,000	
Equipment depreciation	Fixed	82,292	
Total overhead costs		**15,274,292**	**28.3**
Total production costs (A + B + C + D)		**53,956,292**	**100.0**

Cost item	Behavior	Amount per month	Share of total (%)
Of which: total variable costs		*38,034,000*	*70.5*
Of which: total fixed costs		*15,922,292*	*29.5*

Source: Interview with the supervisor; calculated by the authors. Shares are rounded to one decimal with the largest-remainder method so that the four categories sum to exactly 100.0%; the unrounded shares are 42.86%, 5.47%, 23.35%, and 28.31%.

Fixed Costs

Fixed costs total IDR 15,922,292 per month (Table 4). Labor makes up 79.13% of fixed costs and, together with rent, about 87.9%.

Table 4. Monthly Fixed Costs (IDR)

Fixed cost item	Amount per month	Proportion (%)
Labor (3 employees)	12,600,000	79.13
Rent	1,400,000	8.79
Holiday allowance (*THR*) and religious donations (*infaq*)	1,120,000	7.03
Electricity	500,000	3.14
Water	200,000	1.26
Waste collection fees	20,000	0.13
Equipment depreciation	82,292	0.52
Total fixed costs	**15,922,292**	**100.00**

Source: Interview with the supervisor; calculated by the authors.

Depreciation was calculated by the authors with the straight-line method and no residual value, on equipment with a total acquisition cost of IDR 7,120,000 (Table 5). Most of the equipment was bought in 2018 with an assumed useful life of eight years. The large wok was bought in 2022 with a life of four years, the rice steamer in 2025 with a life of five years, and the blender and the hose and regulator in 2026 with a life of three years. Annual depreciation is IDR 987,500, or IDR 82,291.67 per month, shown as IDR 82,292 in the tables.

Ten of the thirteen items (Items 1–8, 11, and 12) have reached or passed the end of their assumed useful life, and the business still uses them. The depreciation charge on these items is not an expense taken from the business's accounts, because the figure is the authors' own estimate. It is kept in the model as an economic cost: it represents the monthly amount needed to keep the present equipment base working and to replace it eventually. Leaving it out would overstate profit for equipment that will have to be replaced. To show that this choice does not drive the findings, the model was recalculated

without depreciation on those ten items. Monthly depreciation then falls by IDR 69,792 (from IDR 82,292 to IDR 12,500), fixed costs fall to IDR 15,852,500, operating income rises to IDR 14,993,500, and the break-even point moves from 4,915 to 4,893 units per month. None of the conclusions changes.

Table 5. Equipment Depreciation (Straight-Line, No Residual Value)

No	Equipment	Acquisition cost (IDR)	Year acquired	Useful life (years)	Depreciation per year (IDR)	Depreciation per month (IDR)
1	Table	3,000,000	2018	8	375,000	31,250
2	Stove	500,000	2018	8	62,500	5,208
3	Chairs	800,000	2018	8	100,000	8,333
4	Shelving rack	1,000,000	2018	8	125,000	10,417
5	Plates and cups	300,000	2018	8	37,500	3,125
6	Two gas cylinders	400,000	2018	8	50,000	4,167
7	Strainer	100,000	2018	8	12,500	1,042
8	Large wok	150,000	2022	4	37,500	3,125
9	Blender	150,000	2026	3	50,000	4,167
10	Rice steamer	300,000	2025	5	60,000	5,000
11	Cutting boards and basins	150,000	2018	8	18,750	1,563
12	Three water gallons	150,000	2018	8	18,750	1,563
13	Hose and regulator	120,000	2026	3	40,000	3,333
	Total	**7,120,000**			**987,500**	**82,292**

Source: Interview with the supervisor; calculated by the authors. Monthly figures are rounded. The monthly total is the annual total divided by 12 (987,500 ÷ 12 = 82,291.67), so the sum of the rounded rows can differ from it by IDR 1.

Variable Costs and Contribution Margin per Unit

Variable costs that can be traced directly to one product, namely chicken, chicken liver and gizzard, catfish, Nutrisari sachets, and tea powder, are assigned entirely to that product. Joint variable costs are allocated by the number of units sold within the product group that uses them (Table 6), for the reasons given in the Method section.

Table 6. Basis for Allocating Variable Costs to Products

Variable cost	Allocation basis
Chicken; chicken liver and gizzard; catfish; Nutrisari sachets; tea powder	Directly to the related product
Rice; rice flour, bread, cornstarch; chilies, shallots, and garlic; seasonings; gas; side items; cooking oil	Portions sold across the three rice dishes
Sugar; ice cubes; drinking water	Glasses sold across the two beverages
Packaging (plastic, rice wrapping paper, styrofoam); tissue	All units sold

Source: Designed by the authors based on supervisor data.

Table 7 shows that the highest contribution margin (CM) per unit belongs to *nasi lele* (IDR 4,208) and *nasi ayam penyet* (IDR 4,079), followed by *nasi ati ampela* (IDR 3,208), iced Nutrisari (IDR 2,657), and sweet iced tea (IDR 1,957). The highest CM ratios belong to the beverages: sweet iced tea at 65.2% and iced Nutrisari at 53.1%, while the three rice dishes range from 40.1% to 42.1%. For *nasi ayam penyet*, chicken accounts for IDR 3,129 of the IDR 5,921 variable cost per portion (52.8%).

Table 7. Selling Price, Variable Cost, and Contribution Margin per Unit (IDR)

Item	*Nasi ayam penyet*	*Nasi ati ampela*	*Nasi lele*	Iced Nutrisari	Sweet iced tea
Selling price	10,000	8,000	10,000	5,000	3,000
Main raw materials	3,129	2,000	3,000	1,500	200
Rice	720	720	720	–	–
Indirect materials	125	125	125	575	575
Variable overhead	1,947	1,947	1,947	268	268

Item	*Nasi ayam penyet*	*Nasi ati ampela*	*Nasi lele*	Iced Nutrisari	Sweet iced tea
Total variable cost	**5,921**	**4,792**	**5,792**	**2,343**	**1,043**
CM per unit	**4,079**	**3,208**	**4,208**	**2,657**	**1,957**
CM ratio	**40.8%**	**40.1%**	**42.1%**	**53.1%**	**65.2%**

Source: Calculated by the authors. Figures are rounded, so small rounding differences may occur

Sales Mix and Contribution Format Income Statement

In one month (28 days) the business sells 4,760 portions of *nasi ayam penyet* (50.0% of units), 560 portions of *nasi ati ampela* (5.9%), 280 portions of *nasi lele* (2.9%), 1,120 glasses of iced Nutrisari (11.8%), and 2,800 glasses of sweet iced tea (29.4%), a total of 9,520 units. Table 8 presents the contribution format income statement. Sales reach IDR 68,880,000, contribution margin is IDR 30,846,000 (44.8% of sales), and operating income is IDR 14,923,708. *Nasi ayam penyet* generates 69.1% of sales and 62.9% of contribution margin. Sweet iced tea accounts for only 12.2% of sales but contributes 17.8% of contribution margin.

Table 8. Monthly Contribution Format Income Statement by Product (IDR)

Product	Units	Sales	Variable cost	Contribution margin
Nasi ayam penyet	4,760	47,600,000	28,185,600	19,414,400
Nasi ati ampela	560	4,480,000	2,683,482	1,796,518
Nasi lele	280	2,800,000	1,621,741	1,178,259
Iced Nutrisari	1,120	5,600,000	2,623,765	2,976,235
Sweet iced tea	2,800	8,400,000	2,919,412	5,480,588
Total	**9,520**	**68,880,000**	**38,034,000**	**30,846,000**
Less: fixed costs				15,922,292
Operating income				**14,923,708**

Source: Primary data from the interview with the supervisor, processed by the authors (2026).

Break-Even Point

Because five products are sold together, the break-even point is calculated with weighted averages (Equations 15 to 19). The average selling price is IDR 7,235 per unit and the average variable cost is IDR 3,995, which gives a weighted average CM of IDR 3,240 per

unit and a weighted CM ratio of 44.8%. The calculations below use unrounded values (weighted average CM of IDR 3,240.13 per unit, average price of IDR 7,235.29, and CM ratio of 44.78%), so recalculating from the rounded figures may give slightly different results.

Break-even point (units) = 15,922,292 ÷ 3,240.13 = 4,914.1, rounded up to 4,915 units per month

Break-even point (IDR) = 4,914.1 units × IDR 7,235.29 = IDR 35,554,933 per month

Under the observed sales mix, the break-even point is equivalent to about 176 units per day, including about 88 portions of *nasi ayam penyet* (Table 9). Assumed sales of 9,520 units per month are 1.94 times the break-even volume.

Table 9. Break-Even Point by Product Under the Observed Sales Mix

Product	Mix	Break-even (units/month)	Break-even (units/day)	Assumed actual (units/day)
Nasi ayam penyet	50.0%	2,457	88	170
Nasi ati ampela	5.9%	289	10	20
Nasi lele	2.9%	145	5	10
Iced Nutrisari	11.8%	578	21	40
Sweet iced tea	29.4%	1,445	52	100
Total	**100.0%**	**4,915**	**176**	**340**

Source: Calculated by the authors. Per-product figures are rounded from the unrounded break-even point of 4,914.1 units and therefore sum to 4,914; the total is rounded up to 4,915 units.

Figure 1 illustrates the CVP relationship for the base case. The total revenue line crosses the total cost line at about 4,915 units per month.

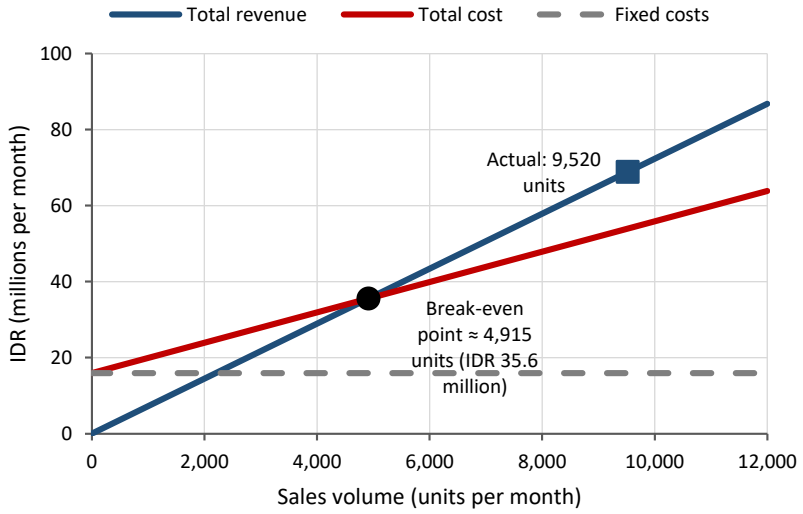


Figure 1. Cost-Volume-Profit Chart (Source: calculated by the authors)

Margin of Safety and Operating Leverage

The margin of safety is IDR 68,880,000 – IDR 35,554,933 = IDR 33,325,067, or 48.4% of sales (4,605 units). The degree of operating leverage is IDR 30,846,000 ÷ IDR 14,923,708 = 2.07. With fixed costs held constant, a 10% increase in sales is expected to raise operating income by 20.7% (about IDR 3,084,600) to IDR 18,008,308, whereas a 10% decrease in sales would lower operating income to about IDR 11,839,108.

Because the monthly volume is extrapolated from a two-day observation, the same logic was used to test how far the true average could differ from the assumed 9,520 units. If monthly volume were 10%, 20%, 30%, or 40% below the assumed level, with the sales mix and costs unchanged, operating income would be about IDR 11,839,108, IDR 8,754,508, IDR 5,669,908, and IDR 2,585,308 respectively. The business would start to lose money only if volume fell by more than 48.4%. A weekday-only observation could therefore overstate or understate monthly volume without changing the finding that the business operates well above break-even, although the exact profit would change.

Profit Target

As an illustration of profit planning, assume that the owner targets a profit of IDR 20,000,000 per month. The required volume is (15,922,292 + 20,000,000) ÷ 3,240.13 = 11,086.7 (unrounded values), rounded up to 11,087 units per month, or about 396 units per day. This is 16.5% above the assumed volume of 9,520 units.

Scenario Analysis

Four hypothetical scenarios are evaluated with the authors' assumptions, which still need to be confirmed with the owner.

- **Scenario A** raises the price of *nasi ayam penyet* from IDR 10,000 to IDR 11,000, and the volume of that dish falls by 5% (from 4,760 to 4,522 portions).
- **Scenario B** adds a promotional budget of IDR 1,000,000 per month (a fixed cost) and raises the volume of all products by 10% at the same sales mix.
- **Scenario C** switches to a cheaper chicken supplier, so that the chicken cost of each portion of *nasi ayam penyet* falls by IDR 300, with no change in volume.
- **Scenario D** trains employees to offer a drink to every customer, so that 20 more glasses of sweet iced tea are sold per day (560 per month) without any change in food sales.

The results are in Table 10.

Table 10. Operating Income Under Various Scenarios (IDR per Month)

Scenario	Units	CM	Fixed costs	Operating income	Change
Base (assumed actual)	9,520	30,846,000	15,922,292	14,923,708	–
A: *Nasi ayam penyet* price at IDR 11,000	9,282	34,397,280	15,922,292	18,474,988	+3,551,280

Scenario	Units	CM	Fixed costs	Operating income	Change
B: Promotion + IDR 1,000,000	10,472	33,930,600	16,922,292	17,008,308	+2,084,600
C: Cheaper chicken, IDR 300 per portion	9,520	32,274,000	15,922,292	16,351,708	+1,428,000
D: Additional 20 sweet iced teas per day	10,080	31,942,118	15,922,292	16,019,826	+1,096,118

Source: Calculated by the authors based on scenario assumptions. Operating income and changes are computed from unrounded values (for example, Scenario D uses a sweet iced tea CM of IDR 1,957.35 per glass rather than the rounded IDR 1,957 in Table 7), so recalculating from rounded figures may differ by a few hundred IDR.

Calculation for Scenario A (unrounded). The variable cost of *nasi ayam penyet* in Table 8 is IDR 28,185,600 for 4,760 portions, or IDR 5,921.3445 per portion. The steps are:

- New contribution margin per portion = 11,000 − 5,921.3445 = IDR 5,078.6555.
- New volume = 4,760 × (1 − 0.05) = 4,522 portions.
- Contribution margin of *nasi ayam penyet* = 4,522 × 5,078.6555 = IDR 22,965,680.
- Contribution margin of the other four products, which do not change = 1,796,518 + 1,178,259 + 2,976,235 + 5,480,588 = IDR 11,431,600.
- Total contribution margin = 22,965,680 + 11,431,600 = IDR 34,397,280.
- Operating income = 34,397,280 − 15,922,292 = IDR 18,474,988, which is IDR 3,551,280 above the base case.

The total of 9,282 units in Table 10 is 9,520 minus the 238 portions of *nasi ayam penyet* lost (4,760 − 4,522).

Sensitivity to Chicken Prices

The sensitivity test changes the chicken cost per portion by −10%, +10%, and +20% while holding all other variables constant (Table 11). Each 10% change in the chicken price changes operating income by IDR 1,489,600 per month.

Table 11. Sensitivity of Break-Even Point and Profit to Chicken Prices

Change in chicken price	Chicken cost per portion (IDR)	Weighted CM per unit (IDR)	Break-even point (units)	Operating income (IDR)	Margin of safety
−10%	2,816	3,397	4,688	16,413,308	50.8%
0% (base)	3,129	3,240	4,915	14,923,708	48.4%
+10%	3,442	3,084	5,164	13,434,108	45.8%

Change in chicken price	Chicken cost per portion (IDR)	Weighted CM per unit (IDR)	Break-even point (units)	Operating income (IDR)	Margin of safety
+20%	3,755	2,927	5,440	11,944,508	42.9%

Source: Calculated by the authors (sales volume held constant at 9,520 units per month).

The table shows how exposed the business is to chicken. A rise of 20% moves the break-even point up by about 525 units a month, yet operating income stays near IDR 11.9 million, because chicken costs IDR 3,129 per portion of a dish that sells for IDR 10,000. Holding volume constant, the chicken price would have to rise by about 100% before operating income reached zero. This is a long way off, but the loss of profit is gradual and steady. For an owner who cannot influence market prices, three responses follow from the figures.

- **Supplier agreement.** A purchase agreement that fixes the chicken price for a set period, even a month at a time, takes away some of the uncertainty that Table 11 describes and makes it possible to plan the monthly budget. The cost is that the owner gives up the benefit when market prices fall, and the supplier may ask for a minimum order. A stall that sells about 170 portions of *nasi ayam penyet* a day should find a minimum order manageable, but this should be checked with real quotations.
- **Portion control**. Chicken is 52.8% of the variable cost of *nasi ayam penyet*, so the weight of chicken in each portion matters. Under the model, trimming the chicken in each portion by 10% has the same effect as buying 10% cheaper, about IDR 1,489,600 a month, but only if customers accept the smaller portion and do not buy less. A fixed, weighed portion would also make the cost per plate more predictable.
- **Price pass-through**. A 10% rise in the chicken price adds about IDR 313 to the cost of each portion, which is 3.1% of the current menu price. A price increase of that size on *nasi ayam penyet* would offset the extra cost if volume held, and Scenario A shows that the business could absorb a rise of IDR 1,000 with a volume loss of up to about one fifth before the gain disappears.

These measures are not exclusive, and they can be combined with Scenario C (a cheaper supplier). The figures describe what the model implies; whether customers accept smaller portions or higher prices still has to be tested at the stall.

DISCUSSION

On the figures reported, Ayam Penyet Surakarta sells almost twice its break-even volume, with a margin of safety of 48.4%. Two things produce this position: a high contribution margin ratio (44.8%) and fixed costs that are small relative to sales. A few slow days would not threaten the business. Fixed costs are dominated by wages, however, and

wages are hard to cut when sales drop, so the business still depends on a steady flow of customers.

The sales mix shows that the five products do different jobs. *Nasi ayam penyet* contributes the most profit because it combines high volume with a high margin per portion. Sweet iced tea and iced Nutrisari have the highest margin ratios but the lowest margin per glass. The ratio tells the owner how efficiently each rupiah of sales is converted into contribution, while the margin per unit tells how much each portion adds, and the two should be read together. Because the break-even point rests on weighted averages, it is valid only while the observed mix holds.

On pricing, the higher price of *nasi ayam penyet* gives the largest gain of the four scenarios. The ingredient cost of a portion does not change, so the whole price increase goes straight into contribution margin. By the authors' calculation, the gain would be lost only if the volume of *nasi ayam penyet* fell by about 19.7%, which is far more than the 5% assumed. Customer response has not been tested, though, and since *nasi ayam penyet* is the main dish, any increase should be introduced gradually while sales are monitored.

A promotion adds a fixed cost, so it pays off only if volume rises enough to cover it. At a weighted average contribution margin of IDR 3,240, a promotional budget of IDR 1,000,000 is recovered once volume rises by about 309 units a month (3.2%, or 11 units a day). That is far below the 10% increase in the scenario. A promotion also tends to push particular menu items and so changes the sales mix, which means the 10% increase at a fixed mix should be treated as an upper bound. The wide margin of safety allows the owner to try small, rotating promotions at a limited risk. Because the business reportedly sells out every day, a 10% rise in volume would also require preparing more stock, which the scenario does not cost. The same applies to the volume of 11,087 units needed for the profit target. Both figures should therefore be read as upper bounds that would need additional capacity.

Chicken is the main source of risk, since it is the largest single ingredient cost and its price is outside the owner's control. A higher price raises variable costs, lowers the contribution margin ratio, and moves the break-even point to the right. The effect is a smaller profit and not a loss, because the margin of safety absorbs it. Menu price increases and cheaper suppliers can work together against this risk. The operating leverage of 2.07 is moderate. Profit therefore responds moderately to changes in sales, which fits a cost structure dominated by variable costs. Moderate leverage keeps profit relatively stable but also slows its growth when sales rise, so larger gains are more likely to come from prices, ingredient costs, and sales composition than from simply adding customers.

The results can be compared with the three earlier studies on three points: the level of safety (contribution margin ratio, margin of safety, and operating leverage), the effect of the sales mix, and the resilience of profit to cost increases. The seafood restaurant in Makassar (Oktaviyah et al., 2025) recorded a contribution margin ratio of 25%, a margin of safety of 12%, and a degree of operating leverage of 8.2. Ayam Penyet Surakarta recorded 44.8%, 48.4%, and 2.07. Both operate above their break-even points. The restaurant, however, has a very narrow margin of safety, so its profit is highly sensitive to changes in sales, whereas the margin of safety at Ayam Penyet Surakarta is much wider. The difference

in leverage fits the cost structures: businesses with a larger share of fixed costs tend to have much higher leverage.

In the bagelen business in Kediri (Agista et al., 2025), a change in the proportion of the two products between 2023 and 2024 cut the contribution margin per package from about IDR 55,898 to about IDR 28,773 and the margin of safety from 80% to 70%, although the business stayed above break-even. Ayam Penyet Surakarta is also in a safe position, and the contribution margins of its products differ widely (IDR 1,957 to IDR 4,208 per unit), so the sales mix can influence its break-even point as it did in Kediri. Its margin of safety (48.4%) is lower than that of the bagelen business, though, and the effect of a shift in the mix could not be tested here because only one month and one mix were available.

In the vegetable store in Medan (Safry Saing et al., 2026), the contribution margin ratio rose from 21.6% to 29.8%, profit stayed positive even after a 30% fall in volume, and a 10% rise in variable costs caused a loss. Ayam Penyet Surakarta has a higher ratio of 44.8% and a margin of safety of 48.4%, and a 20% rise in the chicken price only reduces operating income to IDR 11,944,508. By the authors' calculation, if all variable costs rose by 10%, operating income would fall to about IDR 11,120,308 and remain positive. In both cases the price of the main raw material strongly affects profit, but Ayam Penyet Surakarta seems more resilient because of its higher contribution margin ratio. Overall, it resembles the three comparison cases in operating above break-even, in having a sales mix that affects margins, and in depending on the cost of its main ingredient. It differs in the width of its cushion: a higher contribution margin ratio than both the restaurant and the vegetable store, and a wider margin of safety and lower operating leverage than the restaurant. The comparison is only indicative, because the studies differ in object, size, and observation period.

The study has three main limitations. The first concerns data and duration. All information comes from one source, and observation lasted two days, both of them weekdays. The monthly figures were extrapolated from the supervisor's reported daily average over 28 operating days, so differences between days, weeks, and seasons, including weekend traffic, are not visible. The supervisor's statement that the same quantity is sold out every day suggests stable volumes, but it was not verified, and it also means that the figures describe supply and not demand. The volume sensitivity test shows that the conclusion on safety survives a sizeable error in the assumed volume, but the level of profit does not. The figures could not be checked against sales records, and only one month is covered, so the finding on safety is provisional and cannot be compared across periods or used to study changes in the mix over time.

The second limitation concerns the model and the allocation of costs. CVP analysis assumes linear costs, a constant selling price, and a constant sales mix, whereas in practice ingredient prices fluctuate and customers' orders change. The business does not record the use of ingredients per menu item, so joint variable costs were allocated by units sold. This makes the margin per product an estimate, although total variable costs, the overall break-even point, and operating income are unaffected. Depreciation is also an estimate. Ten items of equipment have reached the end of their assumed useful life but are still in use,

and the model keeps their depreciation as the cost of the equipment base in service. Excluding it changes the break-even point only from 4,915 to 4,893 units.

The third limitation concerns the scenarios and generalization. All four scenarios are hypothetical. The 5% fall in volume after a price increase and the 10% rise after a promotion have not been tested against real customer behavior, and the chicken price test covers changes of only up to 20%. The study is also a single case in one eatery in Medan, so it is not meant to be generalized to other MSMEs. These limits should be kept in mind if the results are used for decisions on pricing, promotion, or suppliers.

For management, the results suggest several practical steps. First, the owner can compare daily sales with the daily break-even point, about 176 units including about 88 portions of *nasi ayam penyet*, and with the daily volume needed for the desired profit, so that the month can be followed with numbers that are easy to check every day. Second, because price has the biggest effect on profit and the business tolerates a sizeable fall in volume, the owner can test a gradual price increase on *nasi ayam penyet* while recording volume before and after. Third, drinks should be offered to every rice customer, because this raises the margin at very low cost and adds no fixed cost. Fourth, to manage the chicken price risk, the owner should compare suppliers, consider a fixed-price agreement, keep portions of chicken consistent, and track purchase prices regularly. Fifth, the owner should record ingredient use per menu item and recalculate the break-even point whenever prices or the mix change, so that decisions do not rest on estimated cost allocations.

For theory, the study shows that a CVP model with a sales mix can be applied to a small eatery that sells food and drinks without recording cost per menu item, by allocating joint variable costs on units sold. The allocation changes the margin per product but not the overall break-even or profit. The results also show that the contribution margin ratio and the absolute margin per unit carry different information. Finally, in a single-period linear model, the margin of safety and the degree of operating leverage describe the same cushion from two sides, so they should be interpreted together.

CONCLUSION

This study applies cost-volume-profit analysis to Ayam Penyet Surakarta, a five-item eatery in Medan, using a month of 28 operating days extrapolated from the supervisor's reported daily average and two weekday observations. On these figures the business is in a safe position, although its profit depends heavily on *nasi ayam penyet* and on the chicken price. Total production cost of IDR 53,956,292 per month consists of variable costs of IDR 38,034,000 (70.5%) and fixed costs of IDR 15,922,292 (29.5%), with labor as the largest fixed component. Sales of IDR 68,880,000 give a contribution margin of IDR 30,846,000 (44.8%) and an operating income of IDR 14,923,708. Unit contribution margins range from IDR 1,957 (sweet iced tea) to IDR 4,208 (*nasi lele*), and *nasi ayam penyet* supplies 62.9% of the total contribution margin. The break-even point is 4,915 units, or IDR 35,554,933, per month (about 176 units per day), far below the assumed sales of 340 units per day. The margin of safety is 48.4% and the degree of operating leverage is 2.07, which

indicates a wide cushion and a moderate response of profit to sales. A profit target of IDR 20,000,000 requires 11,087 units per month, 16.5% above the assumed volume (RQ1).

Of the four hypothetical scenarios, raising the price of *nasi ayam penyet* to IDR 11,000 gives the largest additional profit (IDR 3,551,280), followed by a promotion (IDR 2,084,600), a cheaper chicken supplier (IDR 1,428,000), and extra sales of sweet iced tea (IDR 1,096,118) (RQ2). Each 10% change in the chicken price shifts profit by IDR 1,489,600 per month, and profit stays positive (IDR 11,944,508) even after a 20% rise, so the risk from chicken prices is a smaller profit and not a loss (RQ3). The owner is advised to compare daily sales with the daily break-even point, raise the price of *nasi ayam penyet* gradually while watching volume, offer a drink with every rice order, compare chicken suppliers and consider a fixed-price agreement, record ingredient use per menu item, and recalculate the break-even point whenever prices or the menu mix change.

The study adds a short-menu food stall in Medan to a CVP literature that has covered seafood restaurants, vegetable shops, and bagelen bakeries. It is limited to one business, one month, one data source, and a two-day observation window, and it assumes linear costs, a constant sales mix, and hypothetical scenarios whose customer reactions remain untested. Future research could use several months of sales records or several similar businesses, include weekend and weekday observation, record costs per menu item, test real customer responses to price changes and promotions, and compare the sales mix across periods.

REFERENCES

Afiah, E. T., Nurizki, A. T., & Kusumawati, N. (2026). An analysis of the role of management accounting in strategic decision-making at MSMEs in Serang City. *Jurnal Economina*, *5*(8), 5071–5078. https://doi.org/10.55681/economina.v5i8.3681

Agista, Z., Farida, W. M., & Alawia, M. T. (2025). Analisis cost-volume-profit (CVP) sebagai dasar perencanaan laba pada UMKM Ratu Tlatah Agung Kediri [Cost-volume-profit (CVP) analysis as a basis for profit planning at the MSME Ratu Tlatah Agung Kediri]. *Analisa: Jurnal Manajemen dan Akuntansi*, *13*(2), 89–99. https://doi.org/10.62734/analisa.v13i2.679

Brewer, P. C., Garrison, R. H., & Noreen, E. W. (2019). *Introduction to managerial accounting* (8th ed.). McGraw-Hill Education.

Joshi, T. R., & Sapkota, S. P. (2026). The role of CVP analysis in strategic decision-making for small and medium enterprises. *AMC Journal (Dhangadhi)*, *7*(1), 127–138. https://doi.org/10.3126/amcjd.v7i1.91976

Lulaj, E., & Iseni, E. (2018). Role of analysis CVP (cost-volume-profit) as important indicator for planning and making decisions in the business environment. *European Journal of Economics and Business Studies*, *4*(2), 99–114. https://doi.org/10.26417/ejes.v4i2.p104-120

Okpala, K. E., & Osanebi, C. (2020). Cost volume profit analysis and profit planning in manufacturing SMEs in Nigeria. *Asia-Pacific Management Accounting Journal*, *15*(2), 207–240. https://doi.org/10.24191/APMAJ.v15i2-10

Oktaviyah, N., Idrus, M., & Rais, A. H. (2025). Sustainable profitability through cost-volume-profit analysis: Evidence from RM Seafood Restaurant. *International Environmental Conference on Biosustainability Advancement*, *3*(1), 176–183. https://proceeding.unesa.ac.id/index.php/iecba/article/view/6392

Prihastiwi, D. A., & Sholihin, M. (2018). Factors affecting the use of management accounting practices in small and medium enterprises: Evidence from Indonesia. *Jurnal Dinamika Akuntansi*, *10*(2), 158–176. https://doi.org/10.15294/jda.v10i2.17307

Safry Saing, S. A., Nurbaiti, & Nasution, Y. S. J. (2026). Cost-volume-profit (CVP) analysis in assessing break-even point and fluctuation of contribution margin on pricing strategy in the trade sector. *Jurnal Ilmu Akuntansi dan Bisnis Syariah (AKSY)*, *8*(2), 113–135. https://doi.org/10.15575/aksy.v8i2.56029

Sugiyono. (2020). *Metode penelitian kuantitatif, kualitatif, dan R&D* [Quantitative, qualitative, and R&D research methods]. Alfabeta.