

Sensitivity Analysis of Product Price Decrease and Variable Cost Increase in Broiler Chicken Farming Business (Case Study at PT New Hop in Mandapa Village, Dawuan District, Majalengka Regency)

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ABSTRACT

This study conducts a sensitivity analysis on price decreases and variable cost increases in the broiler chicken farming sector, specifically focusing on PT New Hop in Mandapa Village, Dawuan District, Majalengka Regency. The objective of this research is to assess the impact of economic fluctuations on business profitability and sustainability within the broiler farming industry. Utilizing the Break-Even Point (BEP) method, the study identifies the critical variables that influence revenue and profitability, offering strategic recommendations for farmers in managing these factors. The findings show that the broiler farming business can tolerate a 14.75% decrease in selling prices and a 17.70% increase in variable costs without incurring losses, highlighting the business's resilience to certain economic changes. The results of this study provide valuable insights into risk management strategies for agribusinesses, emphasizing the importance of managing costs and pricing effectively to maintain profitability. Additionally, the research offers practical recommendations for improving operational efficiency in response to market fluctuations, which could support the long-term sustainability of broiler farming businesses. This study contributes to a broader understanding of how agricultural enterprises can mitigate financial risks and adapt to volatile market conditions.

INTRODUCTION

Sensitivity analysis in broiler businesses has become a crucial aspect in understanding the extent to which business resilience is able to respond to changes in economic and operational variables (Mastuti & Hidayat, 2021). Broiler businesses are significantly affected by fluctuations in feed prices, labor costs, chicken selling prices, as well as external factors such as government policies and weather conditions (Bahtiar & Raswatie, 2023). Through sensitivity analysis, farmers and business actors are able to identify the factors that have the most influence on profits and take appropriate risk mitigation measures. This type of study has proven to be important in improving

production efficiency, ensuring business sustainability, and providing strategic recommendations for poultry industry players (Nuary et al., 2022).

The broiler business is one of the agribusiness sectors that plays an important role in meeting the needs of animal protein in Indonesia (Sudarmaji et al., 2024). However, this sector is highly vulnerable to fluctuations in the price of raw materials, especially feed, which accounts for around 60–70% of the total cost of production (Mastuti & Hidayat, 2021). Therefore, sensitivity analysis has become a crucial tool in assessing the impact of changes in key variables, such as feed prices, chicken selling prices, and mortality rates, on business profitability. Research conducted by Gandhi & Sutanto (2017) revealed that price fluctuations and broiler chicken production volume have a significant influence on the feasibility of livestock businesses. Through the application of this analysis, farmers have been able to estimate the impact of various change scenarios and develop risk mitigation strategies in a more targeted and effective manner (Nugroho & Astuti, 2021).

Additionally, sensitivity analysis supports farmers in formulating more flexible financial and operational strategies to address market dynamics. As noted by Mastuti (2021), feed costs and *cage shrinkage* are two main factors that significantly affect the income of broiler farmers, so optimal management is needed to maintain income stability. By understanding these aspects, which have a major impact on profitability, farmers can adopt strategic measures to improve business efficiency. Preventive measures, such as diversifying raw material sources and more efficient stock management, have become important strategies. Therefore, sensitivity analysis not only helps farmers recognize potential risks, but also contributes to supporting the sustainability of their businesses over the long term (Subkhie et al., 2012).

Although sensitivity analysis provides great benefits, in practice there are various conditions that can make its application in the broiler business challenging (Nalendra et al., 2022). One of the main challenges faced is the price volatility of raw materials, especially feed, which has accounted for more than 60% of the total cost of production (Astria Hilipito et al., 2013). In addition, market uncertainty caused by changes in consumer demand, chicken import policies, and disease factors such as *bird flu*, have often hindered accurate predictions of business continuity. Some farmers also still apply traditional management methods that are less data-based, making it difficult to identify the most decisive variables in the sensitivity of their business (Fish, 2020). This condition also occurs in the broiler business in PT New Hop, *Mandapa Village, Dawuan District, Majalengka Regency*.

Mandapa Village, Dawuan District, Majalengka Regency is one of the broiler production centers. One of the broiler producers in the region is PT New Hop, with an average production of 18,000 heads per production period (1 production period = 28–32 days). Based on a preliminary survey conducted at PT New Hop in November 2024, problems were found in the form of fluctuations in sales prices and increased production costs. This condition is a serious challenge for the sustainability of the broiler business, as it directly impacts income (Suryanti et al., 2019). Therefore, efforts are needed to overcome this, in order to determine the price tolerance limit (sensitivity) to the financial impact caused by increased production costs and decreased sales prices at harvest time (Mia Aprilia, 2019), so that the company can still maintain its operations.

Various previous studies related to the dynamics of the broiler business include: 1) Mastuti & Hidayat (2021), who concluded that production costs have a high sensitivity to income in broiler commercial businesses in *Banyumas Regency*, with a significance level of 99% ($P < 0.01$), through multiple linear regression analysis methods; 2) Heriwati & Haryono (2016), who show that business scale has a significant effect on cost efficiency, where large-scale farms tend to be more resistant to feed price fluctuations than small-scale farms. This study uses the RBP (Private Cost Ratio) and RBSD (Social Cost Ratio) coefficient analysis methods; and 3) Bayu Amil Saputra & Muzdalifah

(2024), who explain the importance of adapting business strategies in response to market uncertainty after conducting sensitivity analysis in the context of the livestock industry, using the switching value analysis method.

Referring to the above research, it can be concluded that dynamics in broiler businesses have been studied in terms of feed costs, business scale, and market adaptation strategies. However, there are still few studies that specifically use the Break Even Point (BEP) approach to analyze the sensitivity of these businesses (Regita Cahyani, 2024). Moreover, studies that focus on local contexts, such as in *Mandapa Village, Dawuan District, Majalengka Regency*, are still very limited. In fact, the socio-economic conditions and business patterns in this area have the potential to have different characteristics compared to other regions. Therefore, the research gap in this study covers two aspects, namely the methodological gap and the contextual gap. Thus, this research shows novelty in two main aspects. First, this study uses a sensitivity analysis approach based on the Break Even Point (BEP) method, which is still rarely applied in studies related to broiler businesses, especially in the context of business decision-making (Agustian, 2020). Second, this research is conducted specifically in *Mandapa Village, Dawuan District, Majalengka Regency*, which has not previously been used as a study location in existing literature. Therefore, the results of this study are expected to make a contextual empirical contribution to the dynamics of smallholder farming businesses in the area.

Thus, the purpose of this study is to fill the gap through sensitivity analysis using the Break Even Point (BEP) method in the broiler chicken business at PT New Hop, *Mandapa Village, Dawuan District, Majalengka Regency*. This research contributes in three main dimensions: theoretical, practical, and empirical, as follows: 1) Theoretical Contribution: This research enriches the scientific literature in agribusiness, especially in the broiler farming subsector, through the application of the Break Even Point (BEP) method in sensitivity analysis. This approach provides a relevant methodological alternative to evaluate the financial resilience of businesses to cost and price dynamics (Hariati, 2021). This approach is still rarely used in previous studies, so it has the potential to serve as a new reference in the development of financial analysis models in livestock businesses. 2) Practical Contribution: The results of this study can be used by local farmers as a basis for business decision-making, especially in managing risks related to fluctuations in feed prices and chicken selling prices. These findings provide practical guidance on the tolerance limits of cost and price changes, which can be used in designing more adaptive and sustainable business strategies (Efendi & Hidayatullah, 2018). Sensitivity analysis based on Break Even Point (BEP) provides a clear picture of the safe limits of production and potential profits, thereby increasing efficiency and supporting business sustainability. 3) Empirical/Contextual Contribution: This study presents local and contextual data and findings, especially in *Mandapa Village, Dawuan District, Majalengka Regency*, which has not been widely used as a study location. These findings are expected to be useful for local governments and related parties in designing policies or programs for fostering livestock businesses that are more responsive to real needs in the field (Adolph, 2016). Thus, the research entitled “Analysis of the Sensitivity of Product Selling Price Decreases and Variable Cost Increases in Broiler Businesses (Case Study at PT New Hop in *Mandapa Village, Dawuan District, Majalengka Regency*)” is considered very relevant and important to be carried out.

This study aims to: Analyze the sensitivity level of product selling price declines to revenue in the broiler business at PT New Hop, *Mandapa Village, Dawuan District, Majalengka Regency*; and analyze the sensitivity level of variable production cost increases to revenue in the broiler business at PT New Hop, *Mandapa Village, Dawuan District, Majalengka Regency*.

This research is expected to provide the following benefits: It contributes to the development of scientific studies in the field of agribusiness, especially in the context of broiler farming, through the application of the Break Even Point (BEP) method in sensitivity analysis. This approach is still rarely used in similar research, so it can expand the financial analysis models that are relevant in the study of livestock businesses. Thus, this research is expected to be an academic reference that enriches the agribusiness literature in terms of methodology and application. By applying the Break Even Point (BEP) method in sensitivity analysis, this study introduces an alternative approach that is practical and applicable in evaluating business feasibility. This approach not only strengthens financial analysis, but also provides a methodological contribution that can be used as a reference by academics and researchers aiming to develop similar models in agricultural economics and business risk management. The findings from the sensitivity analysis based on the Break Even Point (BEP) method can serve as a strategic tool for farmers in formulating business decisions, especially in determining the minimum production limit, selling price, and variable cost levels that can still be tolerated for the business to remain in a break-even condition. This information encourages farmers to develop strategies that are more rational and responsive to the dynamics of price fluctuations and changes in production costs, thereby increasing the durability and efficiency of the overall business. This study presents empirical data on the key variables that most influence the sustainability of broiler businesses, such as fluctuations in feed prices, mortality rates, and decreases in market selling prices. With this information, farmers can identify and anticipate risks more proactively, allowing for more adaptive business planning based on an objective understanding of potential financial threats, so that risk mitigation strategies can be designed more effectively and accurately.

METHODS

Research Location and Time

This research was carried out at PT New Hop, which is located in *Mandapa Village, Dawuan District, Majalengka Regency*. This location was chosen deliberately (*purposive sampling*), considering that the company has been operating consistently for three years and has an average production capacity of 18,000 broilers per month. This makes PT New Hop a relevant representation to be analyzed in the context of efficiency and sensitivity within the broiler business. The implementation of the research is planned to last for two months, from June to July 2025. Research activities include several stages, namely the preparation stage, primary and secondary data collection, data processing and analysis, and the preparation of the final research report.

Research Methods

This study uses a *case study* method with a quantitative approach. The quantitative approach was applied to analyze financial data and calculate sensitivity based on the Break Even Point (*BEP*) method at PT New Hop, *Mandapa Village, Dawuan District, Majalengka Regency*. Data collection in this study was carried out through two main sources, namely *primary data* and *secondary data*. Primary data was collected directly in the field through interviews with broiler farmers and cage workers involved in operational activities at PT New Hop, *Mandapa Village, Dawuan District, Majalengka Regency*. The interviews were conducted based on a pre-designed question guide, which included information related to feed management, livestock health, production costs, chicken selling prices, productivity, and profits of the broiler business at PT New Hop, *Mandapa Village, Dawuan District, Majalengka Regency*. Meanwhile, secondary data was obtained from various supporting documents, such as farmers' production and financial records, business activity reports, as well as references from scientific journals and other

trusted sources related to the broiler farming sector. Secondary data serves as a complement as well as a comparison to verify primary data. The data collection process was carried out through several stages as follows:

- 1) Instrument Preparation: The researcher designed interview guides and observation sheets based on indicators relevant to the research objectives.
- 2) Initial Coordination: The researcher conducted an initial approach with the resource persons to obtain approval and access for carrying out the research at PT New Hop, *Mandapa Village, Dawuan District, Majalengka Regency*.
- 3) Interview Conduct: Information was extracted from respondents through in-depth question and answer sessions arranged according to the topic and focus of the research.
- 4) Secondary Data Collection: The researcher accessed the internal documents of the breeder as well as relevant scientific literature as supporting data.
- 5) Compilation and Documentation: The data collected was grouped and stored in a systematic format for further analysis.

Research Procedure

The research procedure was carried out in several stages as follows:

- 1) Problem Identification: The researcher identified the main issues faced by farmers, namely fluctuations in the selling price of chickens and increases in production costs at PT New Hop, *Mandapa Village, Dawuan District, Majalengka Regency*.
- 2) Data Collection:
 - a. Primary data was obtained through direct interviews with business owners as well as from financial statements, including information on receipts, costs, production amounts, and selling prices.
 - b. Secondary data was collected from relevant agencies, such as the *Central Statistics Agency (BPS)*, the *Animal Husbandry Service*, village governments, as well as from relevant journal references and academic literature.
- 3) Data Processing and Analysis: The quantitative data obtained was processed and analyzed using software such as Microsoft Excel to calculate the Break Even Point (*BEP*) value and sensitivity to price and cost changes.
- 4) Interpretation of Results: The results of the analysis were then interpreted to answer the problem formulation and research objectives, as well as to test the previously determined hypotheses.
- 5) Report Preparation: The final stage involved compiling the research results into a scientific report, in a systematic and logical form, consistent with academic writing standards.

Data Analysis

Data analysis was carried out using the Break Even Point (*BEP*) method to assess the level of sensitivity to decreases in product selling price and increases in variable costs in relation to revenue in the broiler business at PT New Hop, *Mandapa Village, Dawuan District, Majalengka Regency*. The analysis technique applied was *what-if analysis*, namely simulating changes in the variable selling price and variable cost within a range of 1% to 10%. The sensitivity criteria were determined based on whether the change in variables caused the selling price or production cost to exceed the break-even point (*Break Even Point*). Data was analyzed quantitatively to determine:

- a. The extent to which a decline in the selling price can still be tolerated without causing losses.
- b. The amount of increase in production costs that is still acceptable before the business experiences unfavorable conditions.

Definition of Operating Costs and Variable Operating Tables

Operational costs are a form of sacrifice that must be made so that the production process or company activities can continue to operate (Purnomo, 2021).

Table 1. Operational Definition of Research Variables

Yes	Variable	Indicator	Measurement Scale	Unit
1	Production costs	1. Fixed Costs a. Drum shrinkage b. Salary of permanent employees 2. Variable Costs a. DOC Fees b. Feed costs c. Drug costs d. Wages	Ratio Ratio Ratio Ratio Ratio Ratio	Rp/month Rp/month Rp/PP Rp/PP Rp/PP Rp/Tail
2.	Acceptance	Product sales: a. Price b. Production quantity	Ratio Ratio	Rp/Kg Kg/PP
3	BEP	a. Total cost= BT+BTT b. Total receipts c. Price d. Production quantity e. BEP	Ratio Ratio Ratio Ratio Ratio	Rp/PP RP/PP Rp/kg Tail/Kg % (percent)
4	Variable production cost sensitivity (SBP)	BEP Variable Cost = P x Q = BT + BTT BTT = P x Q – BT	Ratio	% (Percent)
5	Production Price Sensitivity (SHP)	BEP price = P x Q = BT + BTT $P = \frac{BT + BTT \times TC}{Q}$	Ratio	% (Percent)

Hypothesis Testing

- 1) If the Production Cost Sensitivity (SBP) < 20%, then Ho is rejected
If the Production Cost Sensitivity (SBP) > 20%, then Ho is accepted
- 2) If the Production Price Sensitivity (SHP) < 10% then Ho is rejected
If the Production Price Sensitivity (SHP) > 10% then Ho is accepted

RESULTS

Based on the calculation results, it is known that the total fixed cost (BT) reached IDR 13,833,333, while the total variable cost (BTT) was IDR 602,000,000 per period, with a total production of 33,600 kg. With the selling price at that time of IDR 21,500 per kilogram, the total business revenue reached IDR 722,400,000. Details of the calculation are presented in Table 2

Table 2. Average Fixed, Unfixed and Total Costs in 5 Production Periods

Information	Fixed Fee (BT) (Rp)	Non-Fixed Fee (BTT)	Total Cost (TC)
Cage shrinkage	5.833.33,33		
Electricity	8.000.000,00		
Doc		162.000.000	
Feed		425.000.000	
Vitamin		6.000.000	
Employee Wages		9.000.000	
Total	13.833.333,00	602.000.000,00	615.833.333,00

Based on Table 2, the sensitivity to the increase in variable costs and the decrease in the selling price of products to the revenue in the broiler business in Mandapa Village, Dawuan District, Majalengka Regency, has been calculated as follows:

Sensitivity of Variable Cost Increase to Revenue in Broiler Business

This analysis was carried out to determine the maximum limit of variable cost increase (BTT) that can still be tolerated by broiler entrepreneurs so that the business remains at break-even (break-even point) (Dicky & Kuntari, 2017). The formula used is as follows:

$$P \times Q = BT + BTT \approx BTT = P \times Q - BT$$

(1) (Rahayu et al., 2020)

It is known that the total income (TR), obtained from the multiplication of the selling price per kilogram and the total production, is:

$$TR = P \times Q = 21.500 \times 33.600kg = 722.400.000$$

Meanwhile, the total fixed cost (BT) was recorded as:

$$BT = 13.833.333$$

Thus, the maximum limit of variable cost increases (BTT) that can still be tolerated before the business suffers losses is calculated as follows:

$$BTT = TR - BT = 722.400.000 - 13.833.333 = 708.566.667$$

From the results of the analysis carried out, it is known that the maximum limit of variable costs that can still be tolerated so that the business remains at break-even is IDR 708,566,667. This shows that the broiler business is still able to tolerate the increase in variable costs of up to IDR 106,566,667 from the actual variable cost of IDR 602,000,000.

When calculated in the form of percentages, then:

$$\text{Presentase kenaikan } BTT = \frac{106.566.667}{602.000.000} \times 100\% = 17.70\%$$

Thus, if there is an increase in variable costs—such as feed prices, DOC, vitamins, and workers' wages—as a whole, as long as the increase does not exceed 17.7%, the broiler business is still in a financially secure condition.

In addition, when viewed from the average variable cost per kilogram of production, namely:

$$\frac{BTT}{kg} = \frac{602.000.000}{33.600kg} = 17.916,67$$

Thus, the maximum limit of variable costs per kilogram that can still be tolerated to break even is:

$$17.916,67 \times 1,177 = 21.100,49$$

The results of the analysis showed that broiler businesses could still tolerate an increase in variable costs of up to 17.70% from the current condition. The maximum limit of variable costs that can be borne without causing losses was recorded at IDR 708,566,667, or equivalent to IDR 21,100.49 per kilogram of production. Thus, businesses remain in a financially secure condition as long as the increase in production costs does not exceed this threshold, especially in the feed cost component which is the most dominant cost element.

These results are in accordance with the assessment Mastuti & Hidayat (2021), which states that feed is the most dominant and sensitive cost component in broiler production cost structure, so efficient feed management greatly affects the stability of profits Gandhi & Sutanto (2017), which explains that changes in the price and production volume of broiler chickens significantly affect the feasibility of the business, and In terms of analytical approach, the use of the Break Even Point (BEP)

method in this study is also strengthened by the research Regita Cahyani (2024), which uses the BEP method as the basis for assessing the sensitivity of livestock businesses. This proves that the BEP approach is relevant in describing business resilience to changes in production inputs and outputs.

However, not all of the results of previous studies support these findings. Irhais Research (2019), Found that independent broiler chicken businesses in Garut Regency have a low sensitivity tolerance to price and cost changes. This condition is caused by suboptimal management efficiency and limited business scale, so that businesses become more vulnerable to market uncertainty.

Fish Research (2020) It also stated that most farmers in the broiler sector still use traditional management systems that are not yet data-based, which can be an obstacle in the accurate application of sensitivity analysis. Therefore, the results of the simulation in this study need to be considered together with the ability to record and manage business in the field.

In addition, Ezra Mohammad and Roessali Wiludjeng (2025) stated that DOC price risks and feed price fluctuations create significant uncertainty for the income of small farmers. This uncertainty lowers the accuracy of financial sensitivity estimates, especially in businesses with limited production scale and no price protection mechanisms.

The Sensitivity of the Decline in Product Selling Prices to Revenue in the Broiler Business

Selling price tolerance is the minimum limit of the selling price per kilogram of broiler that can still cover the total cost of production or in other words not suffer losses (*break-even point*) (Worang et al., 2018).

In an effort to maintain the continuity of the broiler business, it is important to know the minimum selling price that can still cover all production costs. The calculation of the minimum selling price is done by dividing the total cost (fixed costs and variable costs) by the amount of production:

$$P = \frac{BT + BTT}{Q} = \frac{615.833.333}{33.600kg} = 18.328/kg$$

Based on the results of the calculation, it is known that the minimum selling price of broiler chickens so that the business does not suffer losses is 18,328 per kilogram. When compared to the current actual selling price of 21,500 per kilogram, the maximum allowable selling price decrease is:

$$\frac{21.500 - 18.328}{21.500} \times 100\% = 14,75\%$$

Thus, the selling price of broilers can decrease by up to 14.75% from the current price before the business breaks even. If the price decline exceeds this limit, then the business income is no longer able to cover the total cost of production, which means the business is in a losing position (Worang et al., 2018).

Based on the results of the study, it is shown that the variable cost component has the most dominant portion in the total structure of broiler business costs. This condition shows that operational activities are highly dependent on production factors such as feed, chicken seeds (DOC), vitamins, and labor. In one production period, it was recorded that the total variable cost reached 602,000,000, while the fixed cost was recorded at 13,833,333.

To analyze the extent to which businesses can withstand the increase in production costs, simulations are carried out using a sensitivity approach. The simulation results stated that the maximum limit of variable costs that can still be borne by the business without incurring losses is 708,566,667. This figure is the result of a reduction in total revenue (722,400,000) with fixed costs. Thus, there is a tolerance for variable cost increases of 106,566,667, which if converted into a percentage reaches 17.70%.

This indicates that the broiler business still has strong financial resilience in the face of a potential surge in production input prices. As long as the total variable costs do not exceed 17.7% of the initial figure, the business position remains at break-even.

In units per kilogram, the current average variable cost is around 17,916.67/kg, while the maximum tolerance limit is 21,100.49/kg. So, there is a difference of around 3,183.82/kg as a space for flexibility. Therefore, efficient cost management is very necessary, especially for dominant components such as feed, so that businesses continue to operate in optimal profit corridors. The selling price is also an important variable that affects the financial sustainability of the broiler business. Considering that market prices are volatile, it is very important for business actors to understand the minimum selling price that is still able to cover all production costs.

Based on the results of the research, it shows that the minimum selling price that must be maintained so as not to suffer losses is 18,328/kg, which is obtained from the division of the total production cost by the amount of production (33,600 kg). Currently, the actual selling price is 21,500/kg, so there is a tolerance of 3,172/kg, or in a percentage of 14.75%. In other words, if there is a decrease in the selling price in the market, the broiler business can still operate in a financially healthy manner as long as the decline does not exceed 14.75% of the prevailing price. If the decline exceeds that threshold, then the income is no longer sufficient to cover production costs, which ultimately leads to losses.

Research Implications

Based on the results of the sensitivity analysis, the broiler business at PT New Hop still shows a relatively high level of flexibility to market price dynamics and changes in production input costs. The tolerance for the decrease in selling price of up to 14.75% and the tolerance for the increase in variable costs of up to 17.70% indicates that the business is still within the safe limit of potential losses due to external fluctuations.

These findings provide important implications for management, particularly in strategic decision-making related to cost efficiency and pricing policies (Rahmatin et al., 2019). Given that feed costs are the largest component of a variable cost structure and have a high sensitivity to profits, controlling feed costs must be a top priority (Rahmatin et al., 2019). Efficiency in the use and procurement of feed has the potential to significantly increase profit margins.

CONCLUSION

Based on the results of the study, it can be concluded as follows: The sensitivity of the decrease in the selling price of products to the revenue of the broiler business at PT New Hop, *Mandapa Village, Dawuan District, Majalengka Regency* is 14.75%. The sensitivity of the increase in variable production costs to broiler business revenue at PT New Hop, *Mandapa Village, Dawuan District, Majalengka Regency* is 17.70%.

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