Reflection: Education and Pedagogical Insights

Chicken Egg Production in Aceh and Riau from 2009 to 2018 using Simple Linear Regression with SWOT Analysis Approach

Rizaldi Putra[a*], Amries Rusli Tanjung[a], David David[a], Nicholas Renaldo[a], Cecilia Cecilia[b]

[a]Business Faculty, Institut Bisnis dan Teknologi Pelita Indonesia, Indonesia

[b]International College of Chinese Studies, East China Normal University, China

*Corresponding Author: rizaldi.putra@lecturer.pelitaindonesia.ac.id

ABSTRACT

This study aims to analyze the factors influencing fluctuations in chicken egg production and demand in Riau Province. The method of determining the area is determined purposively, namely intentionally by selecting in Indonesia. The data was analyzed using a simple linear regression method. In 2019, chicken egg production in Aceh Province was 1,804,721,455 and decreased by 2,462,278,545 in the previous year, namely 2018. In 2019, chicken egg production in Riau Province was 1,538,720,667 and decreased by 895,279,333 in the previous year, namely 2018. Chicken egg production in Riau Province was more stable than Aceh Province in 2018 to 2019. The study highlights the need for effective price stabilization mechanisms, enhanced supply chain efficiency, and improved feed cost management strategies. Future research can extend the study period to include more recent data for a better understanding of current trends.

Keywords: Chicken Egg Production; Simple Linear Regression; SWOT Analysis

Field: Education; Statistics; Strategic Management

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SDG's: No Poverty (1); Zero Hunger (2); Decent Work and Economic Growth (8); Responsible Consumption and Production (12)

INTRODUCTION

Along with the increasing population from year to year, and with the awareness of the importance of increasing nutritional consumption in life, in addition to the increasing need for people to consume eggs that continue to increase to be able to provide substances for the body to maintain life, in addition eggs contain high protein and energy needed by the body in carrying out life activities. In addition, eggs are a type of food that is very popular among the community which is very useful as a source of Hawaiian protein. Almost all levels of society can consume eggs as a source of Hawaiian protein because eggs are one form of food that is easy to obtain and easy to process, so eggs are a type of food that is always needed and consumed by the community.

Laying hens are adult female chickens that are raised specifically for their eggs. The origin of poultry chickens comes from jungle fowl and wild ducks that are captured and raised and can lay quite a lot of eggs. Year after year, jungle fowl from the world's regions are strictly selected by experts. The direction of selection is aimed at large production, because jungle fowl can be used for eggs and meat, so the direction of large production in the selection is starting to be specific. Chickens that are selected for meat production are known as broiler chickens, while those for egg production are known as laying hens. In addition, selection is also directed at the color of the egg shell until later white laying hens and brown laying hens were known. Crossbreeding and selection were carried out for quite a long time until they produced laying hens as they are today. In each crossbreeding, bad traits are discarded and good traits are maintained (continuously refined). This is what is then known as superior laying hens.

Changes in chicken egg production in Riau Province which are always changing continuously cause fluctuations in demand for chicken eggs to be fast and daily even though the fluctuations are not too high. This instability of demand is influenced by several factors, but usually the price factor can affect the purchasing decisions of consumers so that demand also changes in quantity.

Table 1. Chicken Egg Production

Provinsi	Produksi Telur Ayam menurut Provinsi (Ton)									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
ACEH	1868.21	1961.62	2419	3640	2198	1892	3080.17	3713.7	3988	4267
RIAU	5049	1748.11	1384	2022	2217	1019	986.53	2396.11	2341	2434

Source: BPS, 2019

This study aims to analyze the factors influencing fluctuations in chicken egg production and demand in Riau Province. Specifically, the research seeks to: Identify Key Influencing Factors – Examine the primary factors affecting changes in chicken egg production and demand, such as price variations, consumer purchasing power, and seasonal trends, Assess the Impact of Price Changes – Determine how fluctuations in egg prices influence consumer purchasing decisions and overall demand, Evaluate Supply Chain Stability – Investigate the role of supply chain efficiency in maintaining a stable balance between egg production and demand, and Provide Strategic Recommendations – Develop strategies to stabilize egg production and minimize fluctuations in demand to support market sustainability and food security.

LITERATURE REVIEW

Law of Supply and Demand

The Law of Supply and Demand, a fundamental principle in economics, explains the relationship between the availability of goods and consumer demand, influencing market equilibrium (Bane, 2018). According to this theory, when the supply of a product increases while demand remains constant, prices tend to decrease. Conversely, when demand rises and supply remains unchanged, prices increase. This principle is highly relevant to the study of chicken egg production and demand fluctuations in Riau Province.

Price Fluctuations and Consumer Behavior

Prices play a crucial role in determining consumer purchasing decisions. According to (Putri & Sukadana, 2019), price elasticity affects demand, where a slight increase in egg prices may lead to a decline in demand, particularly among price-sensitive consumers. Studies by Rahman et al. (2020) found that egg price volatility significantly impacts household consumption patterns in Indonesia, with consumers shifting to alternative protein sources when prices rise.

Seasonal and Environmental Influences

The production of chicken eggs is affected by climatic conditions and seasonal variations. Research by Setiawan & Harjanti (2019) suggests that extreme weather conditions can disrupt poultry farming, leading to fluctuations in egg production. During festive seasons or religious celebrations, demand for eggs typically rises, leading to short-term price spikes (Susanti et al., 2021).

Feed Costs and Production Stability

Feed availability and prices directly impact egg production. According to (Purba, 2023), fluctuations in corn and soybean meal prices, key components of poultry feed, affect production costs and egg supply. Higher feed prices may lead to reduced poultry farming activities, affecting market supply.

Supply Chain and Market Distribution

Efficient distribution channels play a critical role in maintaining stable egg availability in the market. Research by (Tippayawong et al., 2015) indicates that disruptions in transportation and logistics, especially in remote areas, can lead to uneven egg distribution, contributing to price fluctuations and supply inconsistencies.

The purpose of the chicken egg business is:

a. to meet the nutritional needs of the community in consuming eggs as a source of animal protein.

b. to improve public health to consume nutritious food and protein needs for the body.

c. to utilize the potential of the region that is very potential for the egg-laying chicken farming business.

METHODOLOGY

Method of Determining Research Areas

The method of determining the area is determined purposively, namely intentionally by selecting in Indonesia (Sekaran & Bougie, 2016).

Data Collection Method

The data used in this study uses data obtained from the Central Statistics Agency (Renaldo et al., 2023; Suhardjo et al., 2023). In this study, the type of data used is annual data, namely from 2009 - 2018.

Data Analysis Method

The data was analyzed using a simple linear regression method (Lind et al., 2018), namely predicting the Egg Production of Aceh Province and Riau Province in Indonesia:

$$Y = a + bX + e$$

Description:

Y1 = Egg Production of Aceh Province

Y2 = Egg Production of Riau Province

a = constant

b = coefficient of regression variable

X = Year to

RESULTS AND DISCUSSION

Result

SWOT Analysis

1. Strengths

· Having a strong and structured plan

· Having experienced workers

· Having their own land and cages

· The company's location is in a strategic place

· The level of chicken egg production is higher than other kampung chicken eggs

2. Weaknesses

· The price of laying hens (teenagers) is expensive and the capital to buy laying hens (teenagers) is still rare

· The price of medicines and vaccines is expensive

3. Opportunities

· Not much business competition

· Wide marketing because competitors are not yet able to meet customer demand

4. Threats

· The existence of capital owners who will precede the laying hen farming business

· The entry of new competitors

· Outbreaks of disease that arise

· Eggs imported from other areas in large quantities

Regression Result

Table 2. Chicken Egg Production in Aceh Province

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0,78457999
R Square	0,61556576
Adjusted R Square	0,56751148
Standard Error	619,2482831
Observations	10
ANOVA	

	df	SS	MS	F	Significance F	
Regression	1	4912154,33	4912154,33	12,8098009	0,007197919	
Residual	8	3067747,489	383468,4361			
Total	9	7979901,818				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	1560,710667	423,0271112	3,689386862	0,00613562	585,2083988	2536,212934
X Variable 1	244,0107879	68,17699213	3,579078224	0,00719792	86,7943621	401,2272137

Y1 = a + bx		
Produksi Telur tahun 2019 (Aceh)		
Y1 = 1.560,710667 + 244,0107879 (11)		
Y1 = 1.804,721455		
Tahun Produksi	Tahun	Provinsi Aceh
2019	11	1.804,721455

So, in 2019, chicken egg production in Aceh Province was 1,804,721,455 and experienced a decrease of 2,462,278,545 in the previous year.

Table 2. Chicken Egg Production in Riau Province

SUMMARY OUTPUT						
Regression Statistics						
Multiple R	0,296239014					
R Square	0,087757553					
Adjusted R Square	-0,02627275					
Standard Error	1168,938973					
Observations	10					
ANOVA						
	df	SS	MS	F	Significance F	
Regression	1	1051593,502	1051593,502	0,76959851	0,405914219	
Residual	8	10931346,59	1366418,323			
Total	9	11982940,09				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	2780,629333	798,5373405	3,482153172	0,00829337	939,1989239	4622,059743
X Variable 1	-112,900788	128,6959453	-0,87726764	0,40591422	-409,67417	183,8725942

Y2 = a + bx		
Produksi telur tahun 2019 (Riau)		
Y2 = 2.780,62933333333 - 112,900787878788 (11)		
Y2 = 1.538,720667		
Tahun Produksi	Tahun	Provinsi Riau
2019	11	1.538,720667

So, in 2019, chicken egg production in Riau Province was 1,538,720,667 and experienced a decrease of 895,279,333 in the previous year.

Discussion

The findings of this study reinforce the fundamental principles of the law of supply and demand, demonstrating how price fluctuations influence both consumer behavior and producer decisions. When demand for a product increase while supply remains constant, prices tend to rise, incentivizing producers to increase output. Conversely, if supply surpasses demand, prices decrease, encouraging higher consumption. This dynamic is evident in various market scenarios, such as the impact of technological advancements on supply chains or shifts in consumer preferences affecting demand patterns. Additionally, external factors like government regulations, inflation, and global economic conditions can disrupt this equilibrium, leading to temporary price distortions. Understanding these interactions is crucial for policymakers and businesses in making informed economic decisions.

CONCLUSION

Conclusion

In 2019, chicken egg production in Aceh Province was 1,804,721,455 and decreased by 2,462,278,545 in the previous year, namely 2018. In 2019, chicken egg production in Riau Province was 1,538,720,667 and decreased by 895,279,333 in the previous year, namely 2018. Chicken egg production in Riau Province was more stable than Aceh Province in 2018 to 2019.

Implication

The findings of this research provide important insights into the factors influencing egg production and demand fluctuations in Aceh and Riau Province. The study highlights the need for effective price stabilization mechanisms, enhanced supply chain efficiency, and improved feed cost management strategies.

Limitation

The study is limited to data from 2009-2018, which may not capture recent market dynamics. The research focuses on only two provinces (Aceh and Riau), limiting the generalizability of the findings. External factors such as government policies, international trade, and unexpected events (e.g., pandemics) were not extensively analyzed.

Recommendation

Price Stabilization: Implement government policies to stabilize egg prices and protect consumers from extreme price fluctuations. Feed Cost Management: Encourage local feed production to reduce dependency on imported raw materials. Supply Chain Optimization: Improve transportation infrastructure and logistics to ensure a steady supply of eggs across all regions. Disease Prevention: Enhance biosecurity measures to prevent poultry diseases that could disrupt production.

Future Research

Future research can extend the study period to include more recent data for a better understanding of current trends. Expanding the geographic scope to other regions in Indonesia to obtain a more comprehensive view of egg production dynamics. Investigating the role of technological advancements in poultry farming and their impact on production efficiency. Examining the effects of government interventions and policies on egg market stability.

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