(RESEARCH ARTICLE)

Factors impacting the financial efficiency of pig farming models in Can Tho City

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Abstract

The study's objective is to evaluate the financial efficiency and determine the factors affecting pig farming models' financial efficiency in Can Tho City. The study collected data from 118 households raising pigs for meat. The methods used in the study include financial ratios analysis and multivariable linear regression. The research results show that models of raising pigs for meat have high financial efficiency. The financial performance of the models is positively correlated with the educational level of the farmer and the participation in technical training programs. In contrast, financial efficiency is negatively correlated with seed cost, feed cost, farm drug cost, and total risk.

Keywords: Pig farming; Financial efficiency; Farmer, Can Tho City

1. Problem statement

Can Tho is a first-class city directly under the Central Government, in the Mekong Delta region. Can Tho locates entirely on the alluvial land consolidated by the Mekong River. Moreover, Hau River's silt has been raising the level of the soil. The main city's terrain is relatively flat that is suitable for agricultural and fishery production. The agricultural activities in Can Tho are rice production and pig raising. For a long time, pig farming has become a major economic activity, contributing significantly to develop farmers' incomes and living standards in rural areas (Nghi, 2013). However, in recent years, pig farming households have encountered difficulties and challenges that have huge impacts such as foot-and-mouth disease or porcine reproductive and respiratory syndrome (PRRS). In addition to this, the increase of input prices or output volatility put obstacles in the way of achieving high productivity (Nghi et al., 2013). Thus, the research question is whether the pig farming model in Can Tho City is financially effective or not. The study is conducted to find out the answer.

2. Research methodology

2.1. Research data

To ensure representativeness and scientificity, the authors collect primary data by stratified random sampling. Two criteria to select data are production area and production scale. The survey subjects are pig-raising households in Can Tho City with a sample size of 118 (50 in Thot Not District, 40 in Co Do District, and 28 in Vinh Thanh District).

2.2. Analytical methods

The research team uses descriptive statistics with indicators such as mean, frequency, ratio, etc. to reflect the current situation of the pig production. Besides, financial ratios such as return on sales (ROS), benefit-cost ratio (BCR), and cost

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revenue ratio (CRR) are used to evaluate the financial effectiveness of the business. Simultaneously, the multivariable linear regression is used to determine affecting factors to the financial efficiency of the pig production model in Can Tho City.

3. Research results and discussion

3.1. Characteristics of pig farming households

Based on survey results, the average number of laborers in one pig raising household is 4, the highest number is 13, and the lowest is 1 person. The average age of the household head is relatively high (about 49 years old), the highest age is 82, and the youngest is 29. Besides, the education level of the household head is relatively low (grade 7). The proportion of farmers participating in technical dissemination classes is low (61.9%). Pig-raising households take part in technical training activities such as how to choose breeds, feed planning, vaccination, etc. The application of production models such as VAC or Biogas helps pig farmers reduce costs and make use of waste products to increase production efficiency. However, the survey results say that only 11% of households have applied advanced technology models. Besides, farmers find it hard to update and understand the market information. They mainly follow two information channels which are acquaintances and local radio stations. Other resources such as the internet and newspapers have low accessibility.

Table 1 Breeding techniques and market information accessibility

	Frequency (household)	**Percentage (%)**
Participate in technical training programs		
Yes	73	61.9
No	45	38.1
Apply engineering models		
Yes	13	11.0
No	105	89.0
Follow market information		
Acquaintances	64	54.2
Radio and television	22	18.6
Others	57	48.3

According to the actual survey, the average years of experience of pig farming households are about 11 years. Farmers usually raise pigs two times per year on average, some of them raise 4 times/year. The average size of every pig herd is 16 heads. Farmers raise pigs at least 3 pigs and the maximum is 181 pigs per batch. The survey results also indicate that the accessibility to input resources and the level of product consumption are relatively high.

Table 2 Some characteristics of pig raising activities

Characteristic	Unit	Min	Max	Mean	Standard deviation
Years of experience	Year	1	40	10.86	7.4
Number of farms	Batch/year	2	4	2.33	0.51
Breeding scale	Pig/batch	3	181	15.57	16.94
Accessibility to input resources	1-5	2	5	4.23	0.51
Product consumption level	1-5	2	5	4.28	0.54

Note: 1 = Very difficult, ascending to 5 = Very convenient

3.2. Evaluate the financial efficiency of the pig farming model

The cost structure calculation confirms that feed costs account for the highest proportion of the total cost (about 60%). Each pig raising household spends an average of 2,000,000 VND/head on feed, the highest amount spent on feed is 3,545,000 VND/head, and the lowest is 500,000 VND/head. Farmers use various types of feed, so the investment amount for this item is also different. In some areas such as Co Do Farm, most pig farmers use bran pellets instead of bran or broken rice to shorten the production time. However, the cost for this type is very high. In some other areas (Thot Not and Vinh Thanh), pig-raising households mainly use bran and broken rice purchased from local suppliers or milling factories. Seed cost accounts for the second-highest proportion in the cost structure (about 30%). The average seed price is 1,146,000 VND/head, the highest reach 1,600,000 VND/head while the lowest is 500,000 VND/head, depending on weight. The primary cause for the gap in the breed price is that some households buy breeds at local hatcheries or suppliers, while other pig breeders choose the self-production method or purchase breeds from acquaintances. Finally, other expenses account for the lowest proportion of the total cost (about 10%), including expenses for drugs, electricity, and water. In particular, the cost of veterinary medicine accounts the most for over 50%. According to the survey, several households prefer to hire veterinary staff to vaccinate; however, many farmers buy drugs for vaccination if pigs encounter epidemics to save costs.

Table 3 Financial efficiency of pig farming

Criteria	Unit	Min	Max	Mean	Standard deviation
Total cost	VND/head	1.900.000	4.530.000	3.567.932.20	647.951,81
Breed cost	VND/head	500.000	1.600.000	1.146.864,41	301.176,33
Feed cost	VND/head	500.000	3.545.000	2.054.872,88	653.319,32
Others	VND/head	40.000	1.460.000	366.194,92	274.095,32
Revenue	VND/head	3.583.333	5.578.947	4.552.782,71	291.297,60
Quantity	100kg/head	0,83	1,11	0,99	0,02
Price	VND/100kg	3.800.000	5.400.000	4.552.966,10	260.939,49
Profit	VND/head	-416.667	2.800.000	984.850,51	709.808,70
Profit margin	Time	-0.10	1,40	0,33	0,31

Based on the survey results, with an average raising time of about five months, the pig reaches a weight of about 100kg and can be released. The average selling price is about 4,552,966 VND/100kg, ranging from 3,800,000 VND/100kg to 5,400,000 VND/100kg. Pig quality is the main cause for the difference in output prices. With the above output and selling price, farmers may get an average revenue of 4,500,000 VND/head. If the investment cost is 3,567,932 VND/head, farmers may earn a profit of 984,850 VND/head. The average profit margin of 0.33 shows that pig farming households will earn 0.33 VND if they invest 1 VND in production. Compared with the bank interest rate corresponding to the pig farming cycle (5 months), the financial efficiency of the pig farming in Can Tho City is high.

3.3. Factors affecting the financial efficiency of pig farming models

Reviewing research documents and field surveys, the research team has built a study model of factors affecting the financial efficiency of pig farming in Can Tho City as below.

$$PROFITMARGIN = B0 + B1EDUCATION + B2EXPERIENCE + B3SCALE + B4TRAINING$$

$$+ B5BREED + B6FEED + B7DRUG + B8RISK$$

In which: PROFITMARGIN is the dependent variable, measuring the financial performance achieved by the household; independent variables include EDUCATION, EXPERIENCE, SCALE, TRAINING, BREED, FEED, DRUG, RISK.

Table 4 Interpretation of independent variables in the research model

Sign	Unit	Variable description
EDUCATION	Year	The number of school years of the household head up to the time of the study.
EXPERIENCE	Year	The number of years farmers engaged in pig farming up to the time of the study.
SCALE	Head	The scale of the production, measured by the number of pigs in a farming season.
TRAINING	(1/0)	Take value 1 if the household has participated in pig raising techniques training and value 0 otherwise.
BREED	Million VND/head	Get the value corresponding to the amount of money the household spends on the breed in one crop.
FEED	Million VND/head	Get the value corresponding to the amount of money the household spends on feed in one crop.
DRUG	Million VND/head	Get the value corresponding to the amount of money the household spends on the farm drug in one crop.
RISK	Time	Get the value corresponding to the total number of risks that the household face, including all risks such as production risk, market risk, financial risk.

The analysis result indicates that the Sig.F value of the model is low (Sig.F = 0.000), so the model is appropriate. The adjusted R^2 reaches 84.1%, which means that the variables included in the model can explain 84.1% of the variation in pig farming's financial performance. Durbin-Watson and VIF values of the model are within the allowable limits. This means the model does not have autocorrelation and multicollinearity (Trong and Ngoc, 2008; Nam, 2008).

Table 5 Factors affecting financial efficiency of pig raising models

Factor	B coefficient	t-test	Significance	VIF (Variance inflation factor)
Constant	1.042	8.221	***	-
EDUCATION	0.023	3.403	***	3.285
EXPERIENCE	0.000	-0.399	ns	1.106
SCALE	0.001	1.325	ns	1.072
TRAINING	0.061	2.271	**	1.469
BREED	-0.223	-4.722	***	1.594
FEED	-0.219	-8.212	***	2.498
DRUG	-0.227	-4.687	***	1.463
RISK	-0.030	-3.088	***	3.873
Adjusted R^2				0.841
Sig.F				0.000
Durbin-Watson stat				1.851

Note: **: Significance level 5%; ***: Significance level 1%; ns: Not significant

Based on table 5, the two variables EXPERIENCE and SCALE are not statistically significant. The remaining variables are all statistically significant. Specifically, the variables BREED, FEED, DRUG all have negative coefficients at a 1% significance level. In other words, the higher the cost of breed, feed, and farm drug, the lower the financial efficiency of

pig farming models. This finding shows that pig-raising households have not effectively used input costs. Also, the variable RISK has a negative coefficient with a significance level of 1%, thereby showing that the total risk of pig farming households is negatively correlated with their financial efficiency. In other words, if pig-raising households encounter different kinds of risks at the same time, the financial efficiency will decrease. In addition to this, the variables related to the individual characteristics of farmers also affect the financial performance of the pig meat production model. The variable EDUCATION has a positive coefficient at the significance level of 1%, which means that the higher the education level, the higher the livestock efficiency. Furthermore, the variable TRAINING has a positive impact with a significance level of 5%, thereby showing that participation in technical training courses has a great meaning for the financial performance of the pig production (Nghi et al., 2013).

4. Conclusion

In general, the model of raising pigs for meat in Can Tho City has achieved high financial efficiency. The financial performance of the model is positively correlated with the educational level of the household head and the participation in technical training programs. In contrast, seed cost, feed cost, drug cost, and total risk negatively impact financial efficiency. With this research result, the authors hope that relevant agencies and pig farming households may consider it as a scientific basis to improve financial efficiency for the model in Can Tho City. The limitation of the study is that it is carried out within a few districts in the city. Therefore, the research results will be more general if the scope of research expands to other districts. Besides, the study only considers the influence of some controllable factors, there may be other factors that affect the financial performance but have not been mentioned in the model.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that there are no competing or potential conflicts of interest.

References

[1]   Nam MV. Econometrics. Hanoi: Culture and Information Publishing House. 2008.

[2]   Nghi NQ. The impact of agricultural risks on the efficiency of pig production in Can Tho City. Can Tho University Journal of Science. 2013; 29B: 32-37.

[3]   Nghi NQ, Anh TQ, Oanh NDY, Phong VV. Building the linkage model to prevent agricultural risks on pig production of farmer households in Can Tho City. Can Tho University Journal of Science. 2013; 25: 61-69.

[4]   Trong H, Ngoc CNM. Data analysis with SPSS. Hanoi: Statistical Publishing House. 2008.