Performance of broiler contract farmers: A case study in Perak, Malaysia

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Abstract

Contract broiler farming is one of the systems used to increase poultry production in Malaysia. Broiler contract farmers (BCF) participate in this system for having some benefits. This paper has evaluated the economic performance of BCFs in Perak. An economic evaluation of 60 BCFs was conducted in Perak to determine the performance of the system using economic performance analysis. Panel regression model was used in the analysis. This model involves price per bird (PRM) as dependent variable and size of farm (SOF), feed conversion rate (FCR), average body weight (ABW), average marketing age (AMA), mortality rate (MOR), and rearing housing system (DU). The results show that all variables, except SOF, are significantly influence the performance of BCF at five percent level of significance.

Keywords: Contract broiler farming; economic performance; panel regression model

1. Introduction

In Malaysia, poultry is singularly the most important livestock industry and poultry meat has become the staple meat. The production of broiler had increased for the same period due to its ability to meet level of self sufficiency with the technological progress in animal husbandry, nutrition, chicken breed and contract farming.
system that is practised widely (Tapsir, et al. 2011). It is estimated that the contract farming system dominate 75 percent of the national broiler production. In that case, shortage of chicken in the market would happen if the broiler contract farming system does not exist in Malaysia. Therefore, it is not surprising that the agenda of ensuring an adequate domestic supply of eggs and poultry is included in the Malaysia’s Third National Agricultural Policy (1998-2010). In order to achieve this agenda, an effort to vertically integrate the industry and to stimulate efficiency gains among the small farm sector was singled out as one of the strategies (Sugumar, 2006). As a result, reported by Department of Veterinary Service (DVS) in 2011, broiler production produces 53.2 percent for total livestock production which involve RM10.85 billion in the year 2010, even though Sulaiman et al. (2001) estimated that output from contract farming in Malaysia will increase about 55 percent of current broiler production and it is expected to increase further in the future. Meanwhile, broiler consumption per capita had increased from 28 kg in year 2000 to 34 kg in year 2010, an estimated increase of 2.14 percent per year (DVS, 2011).

As of September 2011, there are a total of 3,179 broiler farms in Peninsular Malaysia (see Table 1). The top three broiler-producing states are Kedah, Pulau Pinang and Perak, which account for 60 percent of total broiler population in Peninsular Malaysia. However, the DVS does not come across any information on the commercial parties (i.e. integrators or contract farmers) that operate these broiler farms.

In Perak, particularly, the commercial companies supply all the input production to the contract broiler farms. The companies mostly act as vertically integrators and own the feed mill, parent breeder farms, hatchery, processing plants and marketing division. On average, broiler contract farmer (BCF) manages 10,000-110,000 broiler chickens. BCFs are paid according to the contract agreement between them and integrator based on their broiler performance, particularly final live weight and dressed carcass weight. Therefore, this paper has evaluated economic performance of the BCFs in Perak.

Table 1: Broiler Farms by State (as of September 2011)

<table>
<thead>
<tr>
<th>State</th>
<th>Number of farm</th>
<th>Broiler population Number ('000)</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kedah</td>
<td>703</td>
<td>37,248.5</td>
<td>32.1</td>
</tr>
<tr>
<td>Pulau Pinang</td>
<td>592</td>
<td>25,663.2</td>
<td>22.1</td>
</tr>
<tr>
<td>Perak</td>
<td>335</td>
<td>9,928.0</td>
<td>8.6</td>
</tr>
<tr>
<td>Selangor</td>
<td>299</td>
<td>8,112.3</td>
<td>7.0</td>
</tr>
<tr>
<td>Negeri Sembilan</td>
<td>248</td>
<td>7,222.8</td>
<td>6.2</td>
</tr>
<tr>
<td>Melaka</td>
<td>233</td>
<td>6,579.8</td>
<td>5.7</td>
</tr>
<tr>
<td>Johor</td>
<td>200</td>
<td>6,267.8</td>
<td>5.4</td>
</tr>
<tr>
<td>Pahang</td>
<td>187</td>
<td>5,915.0</td>
<td>5.1</td>
</tr>
<tr>
<td>Terengganu</td>
<td>187</td>
<td>5,139.1</td>
<td>4.4</td>
</tr>
<tr>
<td>Kelantan</td>
<td>182</td>
<td>3,729.5</td>
<td>3.2</td>
</tr>
<tr>
<td>Perlis</td>
<td>13</td>
<td>180.0</td>
<td>0.2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>3,179</td>
<td>115,986.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: DVS

This paper is organized as follows. Section 2 reviews of the determinants of contract farmer system performance are scarce in literature. Follow up with methodology of study in Section 3. Section 4 present result and discussion the impact of size of farm (SOF), feed conversion rate (FCR), average body weight (ABW), mortality rate (MOR), average marketing age (AMA) and rear housing systems to profit per bird (PRM). Lastly, in Section 5 discusses policy implications to improve the BCF performance.

2. Literature review

In term of institutional perspective, majority agrees that there are more positive about the potential of contract farming. In principle, contract farming provides significant benefits to those who involve in the system. Glover and Kusterer (1990) and Glover and Ghee (1992) have mentioned that contract farming as an institutional arrangement enables farmers to access markets. While contractual arrangements can vary by crop and by country, contracting is a
form of joint production where the contract farmer’s supplies tools, land, labour and management while the integrators supplies technical assistance, some inputs such as seeds or pesticides and undertakes to buy the grower’s output at a pre-determined price. From the point of view of the integrators, this arrangement ensures raw material supplies of the desired quality (subject, of course, to production uncertainty). Meanwhile, from the point of view of the contract farmers, such an arrangement provides an assured market and hence reliable income (to the extent permitted by production risks). Without a contract, risks would be too much and few small contract farmers would want to produce these crops. For this reason, Glover (1987) described contract farming as an institutional arrangement that combined the advantages of plantations (quality control, coordination of production and marketing) and of smallholder production (superior incentives, equity considerations).

Glover (1983, 1987) is more positive about the potential of contract farming. Whilst acknowledging the contracts are often exploitive, he also emphasizes that contract farming and out grower schemes have very often led to a significant rise in living standard. His studies have also paid considerable attention to the impact of contract farming on regional development, but he claimed that the issue was not included in the contracts. In addition, Ghee and Dorral (1992) have evaluated the out grower schemes in Malaysia as successful, with a notable success in increasing farmer incomes and national economic returns. The same argument has been given by Miyata et al. (2009). Contract farming system is estimated to dominate 75 percent of the Malaysia’s chicken meat production through efficient integrated production. However, there are issues shackling this system particularly relating to contract agreement, deposit, marketing freedom, effectiveness of extension services, prices of input-output, risk of losses, technical performance, and impact on farmer life’s well-being (Tapsir et al., 2011).

Survival of broiler contract farmers actually depends to their performance and profitability. According to D’Silva (2009), contract farming has tremendous potential to boost the agricultural sector in Malaysia to be on par with other sectors that exist in an economy. The survival of this industry depends very much on three major factors namely its effectiveness, ability to withstand obstacles in the competitive market and the competitiveness of those who run this business. Shaikh and Zala (2011) mentioned that to examine and evaluate production performance, the average $FCR$, liveability percentage, $ABW$ and $AMA$ need to be worked out. Greg (2012) found that feed is typically the most costly expense in broiler production. As a result, feed efficiency or $FCR$ is typically the primary tool by which a flock is evaluated. Sharma (2003) mentioned that mortality in broiler flocks represents lost income to growers and integrators alike. According to Samarokoon and Samarasinghe (2012), even though mortality is an everyday part of broiler production, growers should tailor management programs to reduce its overall effect on flock performance. Embrapa (2008) stated that the cycle length or $AMA$ is also an important factor when the annual return from the broiler businesses considered. Extending cycle length will increase the return per bird, whereas, shortening the grow-out time will increase the number of harvests per year. According to Genda (2012), efficient feed conversion and excellent growth rate assist in the broiler grower’s goal of achieving a targeted weight with competitive advantage of lowest cost.

3. Methodology

This study employed panel data. Data in 2012 were collected using survey. Data were collected from the first two rearing cycles in that year for each BCF. In sampling, sixty BCFs were randomly chosen from approximately 335 farmers in three locations in Perak, namely Manjong, Sungai Siput, and Taiping. According to Perak’s DVS, there are 70 percent of broiler farms located in district of Manjung. Therefore, ninety percent of respondents were mainly selected from Manjung’s district.

For each BCF, the data of price per bird ($PRM$), size of farms ($SOF$), $FCR$, $ABW$, mortality rate ($MOR$), and $AMA$ were collected. The $PRM$, as dependent variable, measures the BCFs’ performance. This is considered as a major indicator success of the BCF. Other variables are considered as independent variables. In addition, a dummy variable ($DU$) has also been included in the analysis to take into account the effect of rear housing systems, Closed House System (CHS) or Opened House System (OHS), to the BCFs’ performance. The dummy variable were given
score 0 for OHS and 1 for CHS.

In particular, panel analysis was employed to perform the evaluation of the economic performance of the BCF system. The panel analysis of the BCF is shown by the following Equation.

\[
PRM_{it} = \beta_1 + \beta_1 SOF_{it} + \beta_2 ABW_{it} + \beta_3 MOR_{it} + \beta_4 FCR_{it} + \beta_5 AMA_{it} + \beta_6 DU + \epsilon_{it}; \\
i = 1,2,...60, t = 1, 2
\]

where:
- \(PRM\) = Price per bird (RM)
- \(SOF\) = Size of farms (number of birds)
- \(ABW\) = Average body weight (kg)
- \(MOR\) = Mortality rate (%)
- \(FCR\) = Feed conversion ratio
- \(AMA\) = Average marketing age (days)
- \(DU\) = Dummy
- \(\beta_i\) = Coefficients \((i = 1,2,...,6)\)

4. Results and discussion

Table 2 shows the results of estimation. All coefficients, except coefficient of \(SOF\), are statistically significant at five percent level of significance. It means that \(ABW, FCR, AMA, MOR,\) and \(DU\) variables are highly significantly affect the performance of the BCF in Perak. For instance, increase one kilogram of \(ABW\) causes increase \(PRM\) by RM 0.91. This finding is in line with the results of the study by Kleyn (2012). He argued that the most important aspect of broiler production in terms of feed efficiency and growth is to ensure that the birds consume adequate amounts of feed and maximizing technical efficiency. This will improve the \(ABW\) and automatically will increase the profit per birds.

Furthermore, the table also shows that increases one unit of \(FCR, PRM\) declines by RM 1.75 per bird. The effect of \(FCR\) on \(PRM\) is considered as the largest compare to other independents. This evidence is supported by Bandara and Dassanayake (2006). They stated that \(FCR\) is the important factor contributing to the profitability of broiler production. The effect of \(FCR\) increases with the increasing age of birds on marketing in both sexes is also stated by Samarokoon and Samarasinghe (2012).

\* MOR is computed using the following formula.

\[
MOR = \frac{\text{Size of farm} \times \text{Number of Livability}}{\text{Size of farm}} \times 100
\]
Table 2: Estimation Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>3.407</td>
<td>0.328</td>
<td>10.399</td>
<td>0.000*</td>
</tr>
<tr>
<td>SOF</td>
<td>3.21E-07</td>
<td>4.40E-07</td>
<td>0.730</td>
<td>0.467</td>
</tr>
<tr>
<td>ABW</td>
<td>0.913</td>
<td>0.081</td>
<td>11.230</td>
<td>0.000*</td>
</tr>
<tr>
<td>FCR</td>
<td>-1.749</td>
<td>0.195</td>
<td>-8.950</td>
<td>0.000*</td>
</tr>
<tr>
<td>AMA</td>
<td>-0.023</td>
<td>0.009</td>
<td>-2.512</td>
<td>0.013*</td>
</tr>
<tr>
<td>MOR</td>
<td>-0.047</td>
<td>0.005</td>
<td>-9.120</td>
<td>0.000*</td>
</tr>
<tr>
<td>DU</td>
<td>0.075</td>
<td>0.031</td>
<td>-2.447</td>
<td>0.016*</td>
</tr>
</tbody>
</table>

R² = 0.889  
Adj. R² = 0.883  
F-stat = 150.239  
D-W stat = 1.733

The results also indicate that AMA and MOR are important factors that contribute to PRM. If AMA increases by one day and MOR increases by one percent, PRM will decline by RM0.02 and RM0.05, respectively. As stated by Farooq et al. (2001), higher market age and smaller flock size would narrow the margin between total gross income and net profit per broiler. It is well-known fact that the FCR increases as the bird gets old (Lesson, 2000). Park and Joeng (1990) and Holsheimer and Veerkamp (1992) from their study also reported better overall performance of broilers marketed at the age of six weeks than at the age of seven through nine weeks. In terms of MOR, our findings are similar to the result of the study by Kitsopanidis and Manos (1991). They found that if MOR increases by one percent, PRM reduces by 2.5 to 10 percent.

The house system chosen by the BCF in rearing broiler significantly affect PRM. Since the coefficient DU is statistically significant, the study proves that CHS contribute to increase the performance of the BCF. This finding is relevant to Cunningham (2004) statement. According to him, closed houses system provides greater control over the birds’ environment. Economic benefits of closed housing include fewer condemnations and downgrades will improve feed conversion, and better livability. Furthermore, he argued that even though the closed housing costs more to build and operate than conventional curtain-sided housing, but economic benefits achieved through improved performances generally offset the additional costs.

The R² value shows that 88.3% variation of the dependent variable is explained simultaneously by all independent variables. So, it reassures the precession of the model and data gathered.

5. Policy implication and conclusion

Since the coefficient magnitudes of ABW and FCR are higher than other independent variables, these variables are considered to have the highest impact on the PRM.

FCR is a measure of how well a flock converts feed intake into live weight and provides an indicator of BCF performance at any given feed cost. Increase in FCR which is due to many factors that result in an over-estimation or artificial increase in feed usage or an under-estimation of live weight causes decline in PRM. Shahvali and Moeinizadeh (2009) in their studied found those factors which can lead to high FCR were lack of official authority for operation, usage of mash feed, feed supplied by non-official providers, incorrect usage of some technology for hygiene and ventilating, careless the time between two rearing periods, rearing period numbers in the year, chick numbers for a rearing period, early sale of produce, lack of knowledge about feed wastages standard, excessive feeding and incorrect mode of feeding. Therefore, to solve or preventing FCR problems, both good planning and good management is requires and in place throughout the brooding until marketing stages.
As discussed in the previous section, we significantly found that increase the PRM is mainly due to increase ABW. Therefore, BCFs need to improve their broilers’ ABW to improve the PRM value. As concluded by Waine (2002) in his study, a few factors can increase the ABW. Those factors are type of breeds which carrying the genetic potential to an attainable goal, quality products or good raw materials, proper feed design, enough water supply, good housing and equipment where chicken to compensate for its surroundings, management in term of the utilization of available resources in order to achieve the maximum performance from the investment, fully support by technical services team and veterinary products and fast action in trouble shooting.

AMa significantly affects the PRM. Increasing in AMa will decrease the PRM value. Samarokoon and Samarasinghe (2012) found males should be slaughtered at day 36 to get the optimum return. Depending to size of market, day 40 can be considered as the optimum grows out time for male broilers. Further researches are needed to find out the optimum grow-out period of females. Sex-separate growing can be recommended to broiler operations as male and female broilers since had different optimum grow-out periods when assessing the same parameter of performance to avoid marketing at age which will result of decrease of PRM value.

Increase percentage of MOR will significantly decrease the PRM value. According to Emine (2013), age of the producer, number of family members involve in the production, the budget for producing terms, good management, heating system, coop relaxation time, curtain opening time, weight of the chicks in the broiler and the transportation distance have been found statistically significantly affect MOR. She stated the broilers need a certain budget provides for their expenditures such as heating, lightening and work-labour. In her research area, it has been observed that the more the budget increases, the less the death rates become. The broiler farms with the automatic heating system the death rate is relatively less in comparison to the other farms. This is the reason of the necessity for building modern coops with automatic closed heating systems in Turkey.

Since contract farming contributes 70 percent of national broiler production, the government should consider playing part intensively to improve performance of contract farmers. This can be done by providing more technical supports especially the veterinarian to teach and to train BCFs and technicians of integrators the latest technologies in broiler farming. The government should do more research about diseases, birds genetic and raw material quality to improve the production of broilers. Furthermore, BCFs should aware about the important of FCR, ABW, AMA, and MOR which significantly affects the PRM. Based on our results, we would suggest to the government to encourage the integrators to recruit more BCFs with closed house system since the CHS significantly affect the BCFs’ performance. The government should also encourage BCFs to convert their present rearing housing system from OHS to CHS by providing special scheme.

Finally, the poultry industry in Malaysia has undergone significant change in the recent past due to vertical coordination in the contract farming system initiated by private companies. The system needs to be reinforced particularly in the aspects of FCR, ABW, AMA, MOR and rearing housing system transmission in order to ensure efficiency, effectiveness and sustainability of poultry production through contract farming in Malaysia.

References


