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One size fits all? Contract farming among broiler producers in China



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Abstract

Contract farming has been increasingly found to benefit smallholders in developing countries, yet much less is known about its role in the poultry industry where economies of scale could be more prominent. This study aims to narrow this gap by analysing the choice of contract farming among Chinese broiler producers using a nationally representative survey. Simply cost-benefit analysis and multinomial logit regression modelling are jointly employed to explain contract farming decision making especially among small producers. In contrast to many recent studies, we find that small producers, though not passively excluded, usually opt out of contract farming due to limited profitability when large producers are coexistent. Such relationship is appropriately identified through a control function approach to correct for possible endogeneity. Therefore, contract farming may not help achieve higher welfare goals for small broiler producers who actually instead seek alternative market opportunities that better realise their comparative advantages.

Keywords: contract farming, broiler, price, multinomial logit, China

1. Introduction

Agricultural contract can be generally defined as an agreement between producer and buyer which specifies the price of an agricultural commodity to be delivered at a certain point of time in the future (Harwood *et al.* 1999). In the past decades, contract farming has observed increasing popularity in agrarian economies (Glover 1984; Nguyen *et al.* 2015). The expansion of contract farming is jointly

triggered by increasing demand of agricultural products due to income and population growth, and increasing productivity given modern agricultural technologies in production, post-harvest processing and distribution (Barrett *et al.* 2012). With potential benefits such as market assurance, input access for producers and risk mitigation for downstream contractors, contract farming is at the heart of agricultural value chain modernisation in developing countries (Glover 1990; Oya 2012; Martinez-Gomez *et al.* 2013).

As most of the poor in developing countries are small agricultural producers, the welfare impacts of contract farming on smallholders have attracted growing attention in search of policy implications (Nguyen *et al.* 2015). Existing literature, however, provides only inconsistent findings. Political economy analyses tend to agree that smallholders have weak bargaining power *vis-à-vis* monopsonistic contractors, especially if they have few alternatives of livelihood (Grosh 1994; Little 1994). For this reason,

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smallholders might have seen little welfare improvement from contract farming (Merry *et al.* 2004; Sivramkrishna and Jyotishi 2008), and likely become quasi-employees as they yield to the downstream contractor in production decision making (Reardon and Barrett 2000). Moreover, contractors may favour larger producers while poorer growers could be marginalised (Little and Watts 1994; Singh 2002; Dev and Rao 2005). Negative externalities may further occur (Welsh 2009). While these critics seem appealing, a growing number of studies from a purely empirical perspective actually suggest the opposite: smallholders in developing countries do benefit from contract farming in terms of income (Bolwig and Gibbon *et al.* 2009; Miyata *et al.* 2009; Bellemare 2012), return to capital (Simmons *et al.* 2005), food security (Bellemare and Novak 2015), and women's employment (Raynolds 2002). These conflicting results can hardly assist policy decisions aiming to improve welfare through contract farming, and more evidence is needed to build up external validity.

Agricultural production in China has observed substantial changes in the past decades. The dietary structure has been shifting from plant-based to animal-based foods as a result of income growth (Fukase and Martin 2016), which is further magnified by population increase, yet the production behaviour in the poultry industry remains much unknown. In this article, we aim to narrow this knowledge gap through the investigation of contract farming participation of small broiler producers in China using a nationally representative survey. During the past decades, poultry industry in China has observed significant growth and has undergone rapid structural change from smallholder-dominated production to large-scale contract farming (Xie and Marchant 2015). Consequently, the poultry sector is no longer dominated by smallholders and many of them who used to keep broilers as a sideline activity have given up production (Ke and Han 2007). Remaining farmers generally specialise in broiler production (Xin *et al.* 2016). The welfare implications of broiler contract farming in China have not been formally analysed, though contract farming has grown rapidly in China (Guo *et al.* 2007), and empirical literature occasionally reports increased profitability for producers in neighbouring countries (Simmons *et al.* 2005; Narayanan 2014). The structural change and coexistence of small and large producers jointly provide a unique opportunity to analyse smallholder participation in contract farming and associated welfare results.

We approach this topic from both descriptive and quantitative perspectives. We first summarise the characteristics of surveyed households as well as the market prices and costs in their broiler production, the latter of which suggests that contract farming might not be optimal

for small producers through cost-benefit comparisons. We then proceed with the estimation of a multinomial logistic regression model to reveal how farmers' choices among individual farming and three types of contract farming are associated with their socioeconomic characteristics, where the possible endogeneity of broiler production is corrected for using a control function approach. It is found that farm size significantly and consistently explains the variation in these choices. We finally discuss the implications of our findings, and conclude our analysis specifically with strategic suggestions for small broiler producers.

2. Analytical framework

While the contradictory welfare results in literature may be puzzling, a closer look reveals that contract farming usually leads to welfare improvements where most producers are smallholders (Simmons *et al.* 2005; Bolwig and Gibbon 2009; Miyata *et al.* 2009; Bellemare 2012; Bellemare and Novak 2015). This is intuitive because, if the market is mostly supplied by smallholders who face similar production costs, contracts would only occur if the contracted price is high enough to incentivise most smallholders to participate. However, when large holders are also existent, there could be some room for arbitrage for the downstream contractor, and smallholders would therefore lose. This is likely the case when the contracted price is large enough to attract large holders with their economies of scale and thus lower per unit production costs, but is not sufficient to offset the higher production costs faced by smallholders. Hence, the smallholder welfare impacts of contract farming may vary with the supply-side market structure.

Fig. 1 depicts two different scenarios: with homogeneous producers (smallholders) and with heterogeneous producers (both small and large holders). In each graph, the upper block shows the cumulative percentage of total market production plotted against the cumulative percentage of the corresponding producers ranked by farm size from small to large, which is comparable to the Lorenz curve income distribution. The lower block, on the other hand, shows the average production cost among producers ranked in exactly the same manner. Therefore, with homogeneous producers, the cumulative production share curve is the 45-degree line and the average production cost is the same for all producers, as shown in Fig. 1-A. While with heterogeneous producers, the cumulative production share curve is below the 45-degree line as large holders produce disproportionately more than smallholders, and the average production cost is downward sloping given economies of scale that lowers the average cost when production increases. In both cases,

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