

## Optimal Selling Prices for Small Sized Poultry Farmers

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**Abstract :** In Japan, meat-type chickens are mainly classified into three categories: (1) Broilers, (2) Branded chickens, and (3) Jidori (Free-range local traditional pedigree chickens). The Jidori chickens are certified by the Japanese Ministry of Agriculture, whilst, for the Branded chickens, there is no regulation with respect to their breed (genotype) or methods for rearing them. It is, therefore, relatively easy for poultry farmers to introduce Branded than Jidori chickens. The Branded chickens are normally fed a low-calorie diet with ingredients such as herbs, which lengthens their breeding period (compared with that of the Broilers) and increases their market value. In the field of inventory management, fast-growing animals such as broilers are categorised as ameliorating items. To the best of our knowledge, there are no previous studies that have explicitly considered smaller sized poultry farmers with limited breeding areas. This study develops an inventory model for a small sized poultry farmer that produces both the Broilers (Product 1) and the Branded chickens (Product 2) with different amelioration rates. The poultry farmer's total profit per unit of time is formulated as a function of selling prices by using a price-dependent demand function. The existence of a unique optimal selling price for each product, which maximises the total profit, is established. It has also been confirmed through numerical examples that, when the breeding area is fixed, the total profit could increase if the poultry farmer reduced the product quantity of Product 1 to introduce Product 2.

**Keywords :** amelioration, deterioration, small sized poultry farmers, optimal price

**Conference Title :** ICEORS 2018 : International Conference on Econometrics, Operations Research and Statistics

**Conference Location :** London, United Kingdom

**Conference Dates :** March 15-16, 2018