AUSTRALIAN AGRICULTURAL ECONOMICS SOCIETY AWARDS 1986

MASTER'S THESIS PRIZE

The prize was awarded to King M. Wang for a thesis entitled 'Optimum policies for stabilising pig prices in Taiwan', submitted to the School of Agriculture, The University of Western Australia for the degree of Master of Science in Agriculture.*

Thesis Abstract

The pig industry is economically important in Taiwan because it supplies both the domestic and export markets. Also, pork is the most widely consumed of all meats in Taiwan.

During the 1960s, Taiwan pig farmers gradually altered their scale of production, the composition of feed and breeds. All of these factors shortened the pig cycle and increased the price elasticity of supply, which in turn resulted in an unstable pig market. An unexpected increase in pork exports and feed prices during the late 1960s and early 1970s also magnified the instability of the pig market. In April 1972 the government of Taiwan intervened in the pig market with an export slaughter control scheme. The purpose of the scheme was to stabilise domestic pig and pork prices by controlling the quantity of export slaughter permits each month. However, pig prices continued to fluctuate and with greater intensity in some years. As a result, in December 1979 the scheme was abandoned and the pig market restored to its non-intervention state.

The primary objective of the study was to develop optimal price stabilisation policies for the Taiwan pig industry and to compare and evaluate the effects of alternative stabilisation schemes. In addition, an attempt was made to identify the effectiveness of the government export slaughter control scheme on the stability of pig prices.

A quarterly linear recursive difference equation system was developed for the pig industry and used as a foundation for simulating the effects of optimal stabilisation policies. The effects of five policy options — non-intervention policy, the government export slaughter scheme, optimal export slaughter schemes, optimal pig feed price control schemes, and optimal combination of export slaughter and feed price control schemes — were compared and evaluated in terms of the levels and stabilities of prices, production, consumption, total industry gross revenue and consumer expenditure. Optimal stabilisation policies were derived by applying optimal control theory. A welfare loss function designed to simulate the objective of stabilisation together with the empirical recursive model of the pig industry and a set of initial conditions were formulated to form a linear-quadratic optimal control problem. By using Bellman's dynamic programming and the multi-

---

* Mr King M. Wang is presently enrolled as a Ph.D. candidate at the University of Western Australia. His thesis is unpublished.

period certainty equivalent principle, an optimal stabilisation policy was derived for each policy preference. Policy so derived enables a marketing authority to determine in advance the level of export slaughter permits to be issued or the level of pig feed price to be set for each quarter necessary to minimise the variability of pig prices.

The results of the study suggested that the variation of pork prices would be largest under non-intervention. The government export slaughter scheme had the ability to reduce the instability of pig prices. Compared to the government export slaughter scheme, the derived optimal export slaughter schemes could achieve a slightly higher level of price stability if the level of export slaughter were allowed to be negative in some periods, which might imply a pork import policy. The study also suggested that a lower average level of export slaughter permits should be issued under optimal export slaughter schemes during the control period. The optimal feed price control schemes were effective in achieving the pig and pork price stabilisation goal. They also could achieve production and consumption stability contemporaneously, provided that these stabilities were pursued in decision making. In addition, they suggested a lower average level of pig feed price for the control period. The optimal combination of export slaughter and feed price control schemes could result in a higher price stability than a policy of using optimal feed price alone.

JOURNAL ARTICLE PRIZE

The prize for the best article published in the *Australian Journal of Agricultural Economics* was awarded to Colin G. Brown and Ross G. Drynan for the article entitled 'Plant location analysis using discrete stochastic programming' published in Volume 30(1), pp. 1–22.