

**THE ECONOMIC IMPACTS OF  
NEW TECHNOLOGIES AND PROMOTIONS  
ON THE AUSTRALIAN BEEF INDUSTRY**

by

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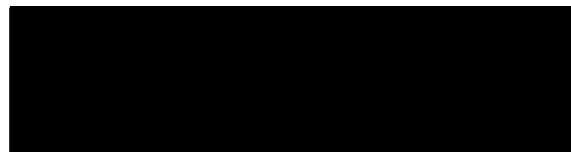
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## CERTIFICATE

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*I certify that the substance of this thesis has not already been submitted for any degree and is not currently being submitted for any other degree.*

*I certify that to the best of my knowledge any help received in preparing this thesis, and all sources used, have been acknowledged in this thesis.*

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## **Abstract**

Around \$100 million has been spent annually on R&D and promotion in the Australian red meat industries in recent years. Producer groups have been questioning the pay-offs from these investments. These pay-offs are also a public policy issue since the coercive powers of government are used to underpin the levy system and government also directly contributes to research expenditures. In this thesis, an equilibrium displacement model (EDM) of the Australian beef industry is specified and simulated to study the returns from alternative research and promotion investments. The model is more disaggregated than existing studies of the beef industry. It provides an economic framework for cost-benefit analysis of various investments in the industry, as well as for examining the impacts of other exogenous changes such as government price and tax policies.

Twelve investment scenarios were considered relating to one per cent shifts in the relevant supply or demand curves due to new technologies in individual sectors and promotion in export or domestic markets. For each scenario, total returns in terms of economic surplus gains and the distribution of total returns among individual groups, namely, among cattle producers, feedlotters, processors, exporters, retailers and domestic and overseas consumers, are estimated. Producers and domestic consumers are shown to be the main beneficiaries in all scenarios. The results indicate that, in general, producers receive larger benefit shares from on-farm research than from off-farm research. They also receive significantly larger shares from export marketing research and promotion than from domestic marketing research and promotion. In general, while they should prefer research investments over domestic promotion, they gain as large or even larger shares from export promotion than from various research scenarios.

Some methodological issues are also examined. The assumptions required for the EDM results to be exactly correct, in terms of the functional forms and the nature of the initial shifts of the supply and demand functions, and the expressions for errors when these assumptions are not met, are derived. The results indicate that, for a small shift, functional form is irrelevant when a parallel shift is assumed, but significant errors are possible for the case of a proportional shift. The issue of economic welfare change measures in multi-market models is also studied in the context of the current model. In particular, the measures of economic surplus changes in the case of two sources

of equilibrium feedback are discussed. Finally, a rigorous stochastic approach to sensitivity analysis is proposed to systematically study the sensitivity of the estimated welfare changes in EDM to uncertainty about market elasticities. The proposed methodology enables the uncertainty in policy-related conclusions to be represented in terms of probabilities and probability intervals. Some useful statistical measures are also defined to measure the relative importance of individual parameters. The methodology is relevant to sensitivity analysis issues in any economic modelling.

In summary, the research provides a rigorous and consistent economic framework for studying the returns from R&D and promotion investments in the Australian beef industry. The findings of the study should be valuable in aiding policy-decisions about levy payments and allocating R&D and promotion expenditures.

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