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

by

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A thesis submitted in partial fulfilment
of the requirements for the degree of
Doctor of Philosophy

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December 1999

CERTIFICATE

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.

Acknowledgements

I gratefully acknowledge the financial support provided by the Beef Co-operative Research Centre, NSW Agriculture, and an Australian Postgraduate Award.

I would like to express my deepest gratitude to my exceptional supervisory team. I thank Professor Bill Griffiths for being a mentor in my professional development. His extensive and admirable knowledge in econometrics has always been an inspiration to me. I thank Professor Garry Griffith for teaching me about agricultural economics and for being a supportive friend. I give him credit also for reducing the number of grammatical errors I make. Thanks are due to Dr John Mullen for his motivation, guidance, and patience in answering my questions and for being a sounding board for all of my ideas. I am also very grateful to Professor Roley Piggott for his economic insight and his thorough attitude towards research.

My appreciation is also due to Professor Julian Alston, Assistant Professor Garth Holloway and Dr Nick Piggott for many helpful discussions. Data support from Cath Wade of AFFA, Chris Toyne of ABARE, Adrian Galea of NLRS and Bob Gaden of NSW Agriculture is gratefully acknowledged.

I am indebted to members of the former Econometrics Department at UNE. Thanks go to Associate Professor George Battese, Associate Professor Howard Doran, Professor Prasada Rao and Pauline Flemming for generous support during my early days of adapting to a new culture in Australia. I thank Associate Professor Tim Coelli, Dr Chris O'Donnell and Dr Alicia Rambaldi for research suggestions. I am also grateful to Mrs Marlene Youman for administrative support. Special thanks go to Mrs Sue Nano for editorial help. My thanks are also extended to staff of the NSW Agriculture Beef Centre for providing a friendly working environment during my early days on the thesis. I also wish to thank my good friend and colleague Debbie Hill for her support.

Last, my deepest appreciation goes to my parents who sacrificed their retirement time and came to Australia to help me with the birth of Liam and the care of him and Aiden, while I struggled with a full-time job, a part-time PhD and mothering. My love goes to my sons Aiden and Liam who make all the hard work meaningful. I now look forward to the extra time I will have to fulfil my promises and to enjoy them. Finally, my deep gratitude goes to my special friend Glyn for his support during the final year of this thesis.

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