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THE ESTIMATION OF THE DERIVED DEMAND SCHEDULE FOR RAW WOOL USING THE JUSTER SCALE

VOLUME ONE

- Chapters 1 - 8 and References

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

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ERIC WILHELMUS ASSENDELFT

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ABSTRACT:

In this thesis the results of a two-season experiment using the Juster scale to elicit subjective probability estimates of raw wool purchases at auction in New Zealand for five discrete classes of wool are presented. The approach, which involves estimating the rate of purchase of a commodity at various prices, represents a radically different method of estimating demand slopes and price elasticities. Over sixteen four weekly periods during the 1991-92 and 1992-93 wool seasons, a panel of eleven buyers from wool exporting firms in New Zealand were interviewed to obtain four weekly raw wool auction purchase forecasts.

The results suggest that the use of a purchase probability scale to develop derived demand schedules for raw wool is possible. An average aggregate price elasticity of demand estimate of - 4.4 was generated for 1991-92 and - 4.6 for 1992-93. These values tend to be a little higher than those generated using an econometric approach and possibly reflect the nature of the wool market (i.e. falling prices and oversupply) and the higher 'information' content associated with the data generated through a survey instrument. It is shown that the panel's forecasts of aggregate wool purchases were reasonably accurate with an under-estimation of 8.3% and 12.9% respectively for 1991-92 and 1992-93. There was consistent under-estimation of aggregate purchases in the fine and fine-medium groups and consistent over-estimation of aggregate purchases in the coarse group. It is quite evident that the ability to forecast purchases within particular micron groups is fraught with difficulty due to the substitutability of wool types between the margins. Overall, the errors tended to fall over the study period reflecting, in part, a growing confidence by the respondents in the use of the survey instrument. An analysis of the qualitative data concurrently collected with the probability survey revealed a great degree of uncertainty and error in variables thought to be 'controllable'. The conclusion is reached that a great deal of the error in the results using the experimental survey instrument is a function more of uncontrollable external factors, rather than of the survey process.

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First and foremost, I would like to thank my wife Carol for her support and encouragement, particularly through the final stages of this research. Her motivation and inspiration have been paramount in getting this thesis finished on time. With this 'burden' out of the way, we can now get on with our life together!

I must also thank the 'in-laws', Joy and John Palmer, who have been also given me the motivation, support and encouragement to keep going right through to the end. Their hospitality on my Napier visits was often the highlight of the monthly 'tour of duty'.

I would also like to thank the panel of buyers who I got to know quite well over the study period and who often went to great lengths to accommodate the interview times and provide commercially sensitive data. It is an understatement to say that without them this study would not have been possible. Unfortunately, for reasons of confidentiality, these buyers cannot be individually identified. However, it goes without saying that I thank each of them individually and wish them all well for their future success in an extremely testing industry!

My appreciation is also extended to Professor Phil Gendall, and the Marketing Department, Massey University for the financial and administrative assistance to this research. I would especially like to record my gratitude to Margaret Corlett for all her administrative help in coordinating and managing the 'expense account'. Additional funding support was also provided by the Massey University Research

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I would also like to thank Stephen Britland of the New Zealand Wool Board who provided the statistics and background information on the New Zealand Wool Industry, often under short notice. I must also thank David Long of the New Zealand Wool Board for providing the sale and price data.

Last but not least I would like to thank my supervisors, Associate Professor Tony Lewis, Massey University and Associate Professor Rob Lawson, Otago University who provided me with helpful guidance and constructive comments without which this research would not have been fully realised.

DEDICATION:

To my mother, Bep Assendelft, who
sadly passed away before
this report could be finished.

PREFACE:

The Marketing Department of Massey University has been investigating the use of a purchase probability scale, known more widely as the Juster scale, over a number of years in order to more effectively estimate demand. Using the approach refined in 1966 by Thomas Juster while at the National Bureau of Economic Research, the Department has undertaken a number of studies into alternative forms of probability scales as well as its applicability to a range of product and service categories.

This study has its origins in this research programme with an attempt to apply the Juster scale to an undifferentiated commodity, namely raw wool. Coinciding with this part of the research programme was the decision in February 1991 by the New Zealand Wool Board to withdraw from the wool auction system through its indefinite abandonment of its minimum price scheme and market support scheme. A number of models had been developed earlier in the 1960's and 1970's to investigate the economic consequences of statutory intervention through a buffer-stock scheme. The generalised consequences of intervention were found to be essentially a function of the demand curve slope and elasticities in the buying and selling periods. Consistent estimates of the price elasticity of demand for raw wool however, were not possible due to a number of technical and mechanistic problems associated with the 'traditional' econometric approach.

It seemed appropriate therefore, that a 'marriage' between the two research issues would be sensible. In 1991 Associate Professor Tony Lewis of Massey University hypothesised that a purchase probability approach to slope and demand elasticity estimation may provide consistent slope estimates, and hence finally provide an answer to the implications of the New Zealand Wool Board's actions. This thesis presents the results of this hypothesis.

Eric W. Assendelft
December, 1994

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