International Wool Promotion Effectiveness

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International wool advertising was initiated in the late 1930s by Australia, New Zealand and South Africa through their membership in the International Wool Secretariat (IWS). At the time advertising may have been used to improve wool prices and to minimize the impact of competition from man-made fibres. The IWS now operates forty centres around the world and continues to conduct major advertising campaigns for wool. The most recognized advertising programs have been the "pure new wool" and "wool blend" marks developed and promoted by the IWS.

The main objective of the international promotional campaign is to increase the consumer's demand for woollen products. Wool growers contribute directly to the campaigns in an attempt to improve profitability of wool production. Each IWS member country supports the promotional effort through contributions reflecting respective production shares in the world market. Australia has consistently been the major contributor of IWS funds providing over two thirds of the IWS budget (AWC, 1989). Part of Australia's contribution to the advertising effort comes directly from the Australian government while the rest is generated from levies on wool growers.

An attempt is made in this research to quantify the impact of IWS advertising on international demand for wool. The implications of the advertising activities for producer profit and more particularly for Australian producer profit are to be established. An econometric modelling approach is to be used to determine advertising effectiveness. The econometric framework developed is used as the basis of a determination of optimal investment in wool advertising and the optimal regional distribution of advertising dollars.

The research is presented in the following order. The empirical model to be estimated and simulated is specified. Estimates and validation results are presented. Optimal advertising investment rules are generated and used in the simulation models. The implications of the simulation results are described for all wool growers and for the Australian wool industry.

Model Specification

In attempting to quantify the impact of an advertising campaign there are two distinct elements to the problem. The first element relates to the measured impact of advertising on demand for a variable. The second element relates to the measurement of the demand impact across a commodity market and ultimately on producer profit or surplus. The first element is possibly the most contentious of the two.

There is some debate in the economics literature as to the most appropriate way to incorporate advertising into the consumer choice problem. The debates revolve around whether advertising is eligible to appear as a shifter in utility functions (Dixit and Norman, 1978). If so and following most previous econometric advertising effectiveness studies (surveyed in Hurst and Forker) it can be assumed that demand for a particular commodity is a function of own and cross prices, income and advertising expenditure levels. It is worthwhile noting that since advertising effectiveness appears as an argument in the demand function, consumer theory suggests that advertising is playing a role in affecting the consumer's marginal utility associated with the advertised product. This study will utilize the above approach while recognizing that the relationship between consumer utility and advertising is an unresolved debate in the economics literature and persuasive arguments exist for other models of consumer response to advertising (eg. Kotowitz and Mathewson).

Given the above considerations there are still many decisions to be made before the demand equation is specified and estimated. Demand can be estimated as either price, quantity or expenditure dependent. Traditional single equation demand models express demand as either a price dependent or quantity dependent relationship. It is the norm to use the possibility of short term quantity adjustments (or lack) as a rationalization of which variable to use. As well it has become common practice to use either linear or logarithmic functional forms for the equations with their explicit implications of constant slopes or elasticities and quadratic or linear total revenue relationships. An alternate specification is the use of expenditure as a dependent variable and either price or quantity as an explanatory variable as appropriate. If estimated in linear form elasticities are not constant and total revenue functions are linear. If estimated in logarithmic form elasticities are constant and total revenue is linear and empirical results are identical to logarithmic quantity (or price) dependent equations. Since resulting elasticities are not invariant to selection of dependent variables or functional form different demand models will be estimated and compared.

The selection of functional form remains an open question in other contexts as well. In a recent paper (Venkateswaran and Kinnucan) some of the issues regarding functional form and the measurement of advertising effectiveness have been raised. Notwithstanding these issues further issues relevant to the determination of optimal producer advertising expenditure levels can be raised. Advertising operates in a number of different ways on the underlying demand curve. For example, with linear demand equations it could reasonably be assumed to cause a parallel shift in demand, a divergent shift around the intercept on the price axis or a divergent shift around the intercept on the quantity axis, in much the same way that research expenditure could cause a variety of shifts in a linear supply curve (eg. Lindner and Jarrett). The type of shift directly impacts on the determination of optimal producer advertising expenditure levels.

The study is concentrating on a single commodity, wool. While not disregarding their importance, cross commodity advertising effects have been constrained to zero due to data problems. Consumer theory restricts any estimated demand equation to be homogeneous of degree zero in prices and income. Additionally, in establishing optimal advertising expenditure levels, the demand equation must be twice differentiable with respect to advertising.

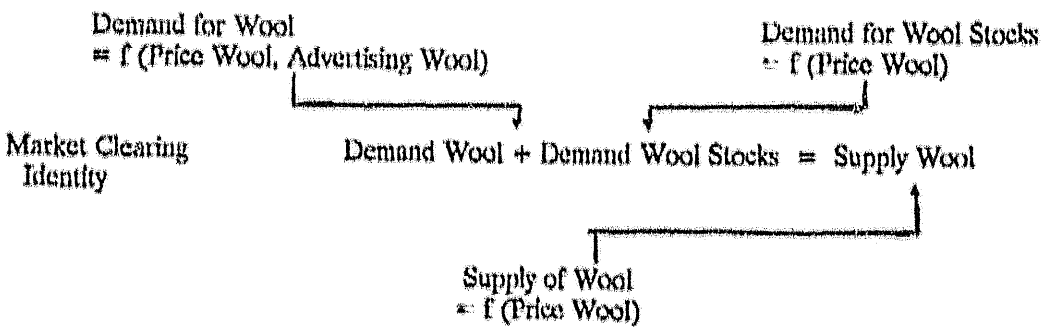
To complete the analysis the supply and stockholding decisions existing in the commodity market must be specified and estimated. For a storable commodity, such as wool, it is reasonable to assume that short run positive responses to any advertising campaign may result in depletion of stocks of wool (it is assumed that stocks are only held in greasy wool form). As price effects begin to evidence themselves and after sheep inventories have had time to build up there will likely be an increase in world wool production.

The supply decision for any livestock product (as livestock are both capital and consumption goods) comes from the decision to maintain or slaughter animals. For wool this implies disaggregating the supply decision into two component parts:

1. Total supply of wool as a function of wool prices and sheep numbers.
2. Sheep numbers as a function of wool prices, lamb prices and lagged sheep inventory levels.

In general terms a commodity model to describe the impact of an advertising program can be described as in the following flow chart:

Flow Chart



However, this only describes the model in very general terms. There are a number of questions relating more specifically to the wool market yet to be resolved.

Advertising campaigns are in general aimed at final consumers of woollen products not primary consumers of greasy wool. However the advertising campaigns are funded by producers of greasy wool and it is the implications on their profits which are of interest. Given better data it would be reasonable to estimate the retail demand for individual woollen products as a function of advertising expenditure on individual woollen products. The demand for woollen products could then be translated back into a demand for greasy wool facing wool producers. However data is very limited on wool advertising expenditures per woollen product. It is reasonable to assume that demand responses to advertising are not uniform worldwide. Since advertising data were available by major importing country it was decided to proceed with the analysis on a regional basis. This necessitated the generation of data for major importing countries on aggregate greasy wool consumption. This data was generated using production, consumption and net trade data for every stage in the wool processing chain for every importer and translating wool consumption figures at every stage in processing back to greasy wool equivalents using technical conversion factors. That these factors may under or over estimate actual wool utilization is recognized. However the object of the exercise was to establish credible aggregate greasy wool equivalent consumption figures for major wool importing regions where advertising expenditures have been significant in the past.

By definition in this somewhat traditional international commodity model specification wool is assumed to represent a homogeneous commodity in production, consumption and trade. That this assumption may not be realistic is recognized by the authors. However data is currently not available that would allow the disaggregation of wool consumption at every level of the marketing chain into greasy wool equivalents by country of origin. There would also be a dramatic increase in the number of regions to be modelled since there are many regions which import wool at various stages of processing, further process it and reexport it to other countries. It would be necessary to endogenize all of these transactions if wool were to be measured as a heterogeneous commodity.

By direct implication the international trade model for wool will have the following limitations.

1. Advertising of wool will not impact on economic actions in the processing chain for wool. It will only impact on the volume of greasy wool consumed. The combination of woollen products will be unchanged by any advertising program.

2. Advertising of wool will not impact on wool production, or profits in any one country at a different rate than in any other country. Production and profit shares will remain constant at base levels.

These limitations should be resolved in further research.

The final model to be estimated for the greasy wool market will contain equations to represent

1. Wool consumption in each of Germany, U.K., France, Italy, U.S. and Japan (largest end use users of wool and the target of 79% of the IWS's advertising funds in 1990 (IWS, 1991)). A rest of the world region equation will also be estimated. However consumption by Eastern European countries and China will be exogenous to the analysis due to data limitations.

2. World wool supply and sheep numbers.

3. World wool stockholding.

Estimated equation results are presented in the following section.

Model Estimates

Using routine ordinary least squares estimation techniques demand equations were estimated in each major wool importing country (excluding Eastern European countries and China). These equations were tested under a variety of specifications of advertising impact and dependent variable. The results of the various regional equations are summarized briefly in the attached Table 1 (France, Germany, Italy, Japan, U.K., U.S., RoW). Annual data from 1976-1989 was used in estimation. Advertising variables were lagged one period (after pre-testing) time trends were included where appropriate, and the price of cotton was used as a proxy for other fibre prices. From the results presented it appears that advertising clearly has an impact in France, Italy and U.S. For Japan and U.K. it is possible to estimate demand equations with statistically significant advertising responses, however these are not robust results across all specifications. For Germany and the RoW it was not found possible to generate statistically significant advertising responses.

From the estimated equations one for each region was selected for further analysis (starred). These equations are, in some senses, the most optimistic for advertising effectiveness. These equations (reported in Table 2) were combined with estimated equations for world wool production, world sheep inventories and world wool stocks to form a compete closed model of the world wool market. The model was validated over the period 1988-1989 and results reported ind Table 4. Validation statistics were reasonable but not exceptional. Italy and Japan both exhibited validation diagnostic problems.

Table 1: Demand Equation Summary

France: Advertising Lagged One, Time, Cotton Price, Income

Equation Specification	R-Squared	Elasticity or Flexibility		Statistically Significant 10%	
		Price	Advertising	Price or Quantity	Advertising
Price Dependent (flexibilities)					
Parallel	.97	-.235	.208	Y	Y'
Divergent	.98	-.374	.141	Y	Y
Parallel and Divergent	.99	-.103	.227	Y	Y
Convergent (logarithmic)	.98	-.219	.226	Y	Y
Quantity Dependent (elasticities)					
Parallel	.72	-1.62	.500	Y	Y
Divergent	.70	-1.92	.532	Y	Y
Parallel and Divergent	.73	-1.83	.400	Y	N
Convergent (logarithmic)	.72	-1.61	.493	Y	N
Expenditure Dependent (flexibilities)					
Parallel	.99	-.221	.211	Y	Y
Divergent	.99	-.213	.138	Y	Y
Parallel and Divergent	.99	-.114	.240	Y	Y
Convergent (logarithmic)	.96	-.254	.271	Y	Y
Expenditure Dependent (elasticities)					
Parallel	.77	-1.632	.509	N	Y
Divergent	.76	-1.956	.545	N	Y
Parallel and Divergent	.78	-1.868	.596	N	N
Convergent (logarithmic)	.76	-1.614	.493	N	N

Table 1 continued

Demand Equation Summary

Germany: Advertising x Time Lagged, Income, Price of Cotton, Price x Time

Equation Specification	R-Squared	Elasticity or Flexibility		Statistically Significant 10%	
		Price	Advertising	Price or Quantity	Advertising
Price Dependent (flexibilities)					
Parallel	.69	-.040	.124	N	N
Divergent	.67	-.161	-.003	N	N
Parallel and Divergent	.81	.715	.644	N	N
Convergent (logarithmic)	.50	.085	.143	N	N
Quantity Dependent (elasticities)					
Parallel	.82	.0085	-.110	N	Y
Divergent	.75	.0814	.010	N	N
Parallel and Divergent	.89	-.0855	-.171	N	N
Convergent (logarithmic)	.83	-.0790	-.049	N	N
Expenditure Dependent (flexibilities)					
Parallel	.81	-.999	.025	N	N
Divergent	.81	-.867	.121	N	N
Parallel and Divergent	.84	-.338	.134	N	N
Convergent (logarithmic)	.69	931	.116	N	N
Expenditure Dependent (elasticities)					
Parallel	.87	-0.836	.159	Y	Y(at 20%)
Divergent	.86	-0.694	.157	Y	Y(at 20%)*
Parallel and Divergent	.87	-0.767	.191	Y	N
Convergent (logarithmic)	.74	0.062	-.026	Y	N

Table 1 continued

Demand Equation Summary

Italy: Advertising x Time Lagged, Cotton Price, Income Price x Time

Equation Specification	R-Squared	Elasticity or Flexibility		Statistically Significant 10%	
		Price	Advertising	Price or Quantity	Advertising
Price Dependent (flexibilities)					
Parallel	.74	.188	.185	N	N
Divergent	.85	-.032	.337	Y	Y
Parallel and Divergent	.85	-.045	.235	Y	Y
Convergent (logarithmic)	.73	.185	.069	N	Y
Quantity Dependent (elasticities)					
Parallel	.23	.047	.097	N	N
Divergent	.25	.029	-.150	N	N
Parallel and Divergent	.35	.352	.301	N	N
Convergent (logarithmic)	.27	.117	.129	N	N
Expenditure Dependent (flexibilities)					
Parallel	.70	-.837	.523	Y	Y*
Divergent	.80	-.237	.650	Y	Y
Parallel and Divergent	.81	-.309	.695	Y	Y
Convergent (logarithmic)	.92	.048	.339	Y	Y
Expenditure Dependent (elasticities)					
Parallel	.49	-.917	.019	N	N
Divergent	.57	-.633	.385	N	N
Parallel and Divergent	.62	-.339	.314	N	Y
Convergent (logarithmic)	.59	-.404	.337	N	Y

Table 1 continued

Demand Equation Summary

U.K.: Income, Price x Time, Cotton Price, Advertising x Time Lagged

Equation Specification	R-Squared	Elasticity or Flexibility		Statistically Significant 10%	
		Price	Advertising	Price or Quantity	Advertising
Price Dependent (flexibilities)					
Parallel	.66	.002	.085	N	N
Divergent	.67	-.078	.059	N	N
Parallel and Divergent	.67	.156	.194	N	N
Convergent (logarithmic)	.55	.179	.185	N	N
Quantity Dependent (elasticities)					
Parallel	.86	.145	.039	N	N
Divergent	.85	.134	-.061	N	N
Parallel and Divergent	.86	.179	.025	N	N
Convergent (logarithmic)	.82	.006	-.129	N	N
Expenditure Dependent (flexibilities)					
Parallel	.87	-.872	.190	N	N
Divergent	.87	-.700	.185	N	N
Parallel and Divergent	.87	.902	.186	N	N
Convergent (logarithmic)	.87	-.440	.246	Y	Y
Expenditure Dependent (elasticities)					
Parallel	.92	-.709	-.003	Y	N
Divergent	.90	-.563	.206	Y	Y
Parallel and Divergent	.92	-.518	.163	Y	Y
Convergent (logarithmic)	.92	-.461	.131	Y	Y*

Table 1 continued

Demand Equation Summary

United States: Time, Price, Income, Price of Cotton, Advertising Lagged

Equation Specification	R-Squared	Elasticity or Flexibility		Statistically Significant 10%	
		Price	Advertising	Price or Quantity	Advertising
Price Dependent (flexibilities)					
Parallel	.74	-.61	.183	Y	Y
Divergent	.76	-.70	.185	Y	Y
Parallel and Divergent	.70	-.48	-.203	Y	N
Convergent (logarithmic)	.87	-.50	.26	Y	Y
Quantity Dependent (elasticities)					
Parallel	.83	-.91	.13	Y	Y
Divergent	.86	1.29	.27	Y	N
Parallel and Divergent	.95	2.28	-.61	Y	Y
Convergent (logarithmic)	.87	1.16	.25	Y	Y
Expenditure Dependent (flexibilities)					
Parallel	.90	-.767	.23	Y	Y
Divergent	.90	-.646	.24	N	Y
Parallel and Divergent	.96	-.672	.24	N	N
Convergent (logarithmic)	.96	-.47	.27	Y	Y*
Expenditure Dependent (elasticities)					
Parallel	.90	-1.12	.13	N	N
Divergent	.88	-.752	.27	N	N
Parallel and Divergent	.90	-2.13	.44	N	N
Convergent (logarithmic)	.89	-1.27	.26	N	N

Table 1 continued

Demand Equation Summary

Japan: Income, Cotton Price, Advertising Lagged One, Time, Price x Time

Equation Specification	R-Squared	Elasticity or Flexibility		Statistically Significant 10%	
		Price	Advertising	Price or Quantity	Advertising
Price Dependent (flexibilities)					
Parallel	.70	-.305	.169	Y	N
Divergent	.72	-.500	.216	Y	N
Parallel and Divergent	.72	-.510	.105	Y	N
Convergent (logarithmic)	.59	-.463	.473	Y	Y*
Quantity Dependent (elasticities)					
Parallel	.23	.069	-.229	N	N
Divergent	.14	-.103	-.053	N	N
Parallel and Divergent	.29	.225	.156	N	N
Convergent (logarithmic)	.10	-.038	.008	N	N
Expenditure Dependent (flexibilities)					
Parallel	.55	-1.649	.127	Y	N
Divergent	.54	-1.532	.068	Y	N
Parallel and Divergent	.55	-1.726	.109	N	N
Convergent (logarithmic)	.37	-1.630	.497	N	Y
Expenditure Dependent (elasticities)					
Parallel	.43	-1.220	-.282	N	N
Divergent	.41	-0.980	.160	N	N
Parallel and Divergent	.53	-0.443	-.099	N	N
Convergent (logarithmic)	.31	-1.162	.440	N	Y

Table 1 continued

Demand Equation Summary

Rest of World: Price, Price of Cotton, Income, Advertising Lagged

Equation Specification	R-Squared	Elasticity or Flexibility		Statistically Significant 10%	
		Price	Advertising	Price or Quantity	Advertising
Price Dependent (flexibilities)					
Parallel	.63	-.303	-.000	N	N
Divergent	.73	-.299	-.005	N	N
Parallel and Divergent	.65	.128	-.349	N	N
Convergent (logarithmic)	.56	-.351	-.007	N	N
Quantity Dependent (elasticities)					
Parallel	.56	-.318	-.015	N	N
Divergent	.55	-.305	-.015	N	N
Parallel and Divergent	.58	-.697	-.345	N	N
Convergent (logarithmic)	.50	-4.56	-.535	N	N
Expenditure Dependent (flexibilities)					
Parallel	.80	-.296	-.004	Y	N
Divergent	.80	-.300	-.005	Y	N*
Parallel and Divergent	.80	.075	-.02	Y	N
Convergent (logarithmic)	.81	-.351	-.007	Y	N
Expenditure Dependent (elasticities)					
Parallel	.79	-.281	-.016	Y	N
Divergent	.79	-.294	.015	Y	N
Parallel and Divergent	.80	-.606	-.011	Y	N
Convergent (logarithmic)	.70	-.537	-.063	N	N

Table 2: Estimated Demand Equations for Wool Products

VARIABLE	COEFFICIENT	T-STATISTIC	ELASTICITY/ FLEXIBILITY
France Dependent Variable: price			
R^2 = 0.72 D.W. = 2.28	F statistic = 4.08	# of Obs. = 14	
Constant	2.094	1.647	
Quantity	-1.244	-2.43*	-.235 (F)
Income	.3439	4.03*	
Price of cotton	1.460	1.22	
Inv. of advertising(-1)	-.0361	-2.41*	.208
Time	.139	2.48*	
Germany Dependent Variable: per capita expenditure			
R^2 = 0.86 D.W. = 1.90	F statistic = 14.19		
Constant	-.642	-.170	
Price*time	.108	1.87*	-.694 (E)
Income	.815	2.18*	
Price of cotton	8.78	2.12*	
Inv. of advertising*time(-1)	-.026	-1.32	.157
Italy Dependent Variable: per capita expenditure			
R^2 = 0.70 D.W. = 1.62	F statistic = 5.27		
Constant	-.214	-.030	
Quantity*time	.330	2.64*	-.837 (F)
Income	1.139	1.50	
Price of cotton	7.913	1.105	
Quan.*Inv. of advertising*time(-1)	-.010	-1.91*	.523
Japan Dependent Variable: log of price of wool			
R^2 = 0.59 D.W. = 2.31	F statistic= 3.22		
Constant	2.512	3.83*	
Log quantity*time(-1)	-.054	-1.76*	-.463 (F)
Log income	.274	1.54	
Log price of cotton	.058	.281	
Log advertising(-1)	.473	2.55*	.473

Table 2 continued

VARIABLE	COEFFICIENT	T-STATISTIC	ELASTICITY
United Kingdom Dependent Variable: log of per capita expenditure			
R^2 = 0.91 D.W. = 2.41 F statistic = 120.2			
Constant	1.76	7.87*	
Log price*time	.063	3.24*	-.46 (E)
Log income	.198	.847	
Log price of cotton	-.269	-1.14	
Log advertising*time(-1)	.015	2.17*	.131
Rho	-.427	1.54	
United States Dependent Variable: per capita expenditure			
R^2 = 0.96 D.W. = 2.37 F statistic = 36.30			
Constant	2.66	4.24*	
Log of quantity	.530	3.49*	-.47 (F)
Log of income	.182	.892	
Log price of cotton	.444	2.76*	
Log advertising(-1)	.265	4.57*	.27
Time	.007	.62	
Rest of World Dependent Variable: per capita expenditure			
R^2 = 0.80 D.W. = 2.21 F statistic = 8.82			
Constant	-.156	-.689	
Quantity	2.894	2.20*	.300 (F)
Income	.038	3.64*	
Price of cotton	.077	.55	
Inv advertising(-1)	.000002	.24	

* **indicates significant at the 10% level**

Table 3

World Supply
Dependent Variable: Quantity of Greasy Wool Produced ('000,000 kilos)

Variable	Coefficient	T-statistic	Elasticity
Constant	374.51	0.65	
Price*time(-1)	2.434	1.59*	0.03
Price of wheat(-1)	0.141	0.57	
Price of lamb (-1)	0.145	1.47	
Sheep numbers	4.723	2.83*	
Lagged dependent variable	0.294	1.49	

$R^2 = 0.98$
D.W. = 2.41
F-statistics (5,8) = 115.54

World Sheep Inventory
Dependent Variable: Sheep Numbers ('000,000)

Variable	Coefficient	T-statistic
Constant	154.9	2.214
$\frac{\text{Price of lamb}}{\text{Price of wool}}$ (-1)	-.065	-1.466
Lagged dependent variable	.406	1.53
Time	2.32	3.11

$R^2 = 0.92$
D.H. = .90
F statistic = 36.90

World Stocks
Dependent Variable: Log of stocks

Variable	Coefficient	T-statistic
Constant	7.195	-2.09
Log reserve to price of wool ratio	1.994	3.08*
Lagged dependent variable	0.675	3.09*

$R^2 = 0.57$
D.H. = .52
F statistics (2,10) = 7.21

* **Indicates significant at the 10% level**

Table 4: Validation Statistics for World Wool Model

Variable	Mean	RMSE	RMSPE	Correlation Coefficient
Expenditure (kilos per capita)				
France	4.365	.645	14.9	.80
Germany	13.430	1.149	8.6	.94
Italy	11.298	8.25	73.0	.22
Japan	8.170	1.57	19.2	.65
U.K.	14.462	1.44	9.9	.91
U.S.	3.005	.16	5.3	.97
ROW	0.469	.07	14.9	.59
Quantity (kilos per capita)				
France	1.051	.20	19.0	.40
Germany	3.197	.19	5.9	.67
Italy	2.688	1.96	72.9	-.11
Japan	1.941	.25	12.9	-.12
U.K.	3.444	.17	4.9	.93
U.S.	0.724	.05	6.9	.94
ROW	0.113	.02	17.7	.41
Price ($/kilo)	4.166	.32	7.7	.89
Stock (million kilos)	194.470	42.87	22.0	.78
World (million kilos)	2687.	18.35	.7	.99
Sheep (million head)	292.8	2.88	1.0	.97
Producer surplus (million $ Aust.)	6224.	500.58	8.0	.93

For illustrative purposes the base model was simulated over 1980-1989 with the exogenous advertising levels doubled in each region, and Chinese and Eastern Europe consumption levels held constant. As expected, doubling advertising expenditure levels increased expenditure on wool and the quantity of wool purchased in every region except the ROW (Table 5).

The results also suggest that producer surplus net of advertising costs, in aggregate and to Australian woolgrowers, increases with increased advertising expenditure. Here the Australian returns from increased advertising are approximated using the Australian share of raw wool production and assuming Australia continues to contribute half of the IWS advertising budget.

Conclusions

Since advertising clearly has a positive impact in France, Italy and the United States, the IWS should be confident about continuing advertising campaigns in these markets. Further, and even though the selected simulation equations were "optimistic" for advertising responses, the simulation result of doubled advertising expenditure levels increasing expenditure on wool and the quantity of wool purchased in every region except the ROW, should make IWS reasonably confident about increasing advertising levels in these three markets. For Japan and the United Kingdom, advertising responses, although positive and significant in several cases, are heavily dependent on the selected functional form and type of advertising shift. As these results are not robust, the IWS should be cautious about increasing advertising expenditure in these markets. For Germany and the ROW, with no statistically significant advertising responses, IWS should be looking very closely at winding down expenditure. Certainly there is no justification, based on these results, for any increases.

Two major difficulties were encountered in undertaking the work and therefore remain as limitations. First, even though previous wool researchers kindly made their databases available, substantial difficulties were faced in deriving a data set for the wool market which provides consistent information on flows between regions and flows between different market levels. Data limitations precluded the tracking of raw wool equivalents by country of origin or wool type back to basic raw wool production. Thus the research team was forced to treat wool as homogenous rather than differentiated by country of origin, as originally proposed. Second, all wool products were converted into greasy wool equivalents so that the empirical model could be solved in terms of greasy wool rather than a range of raw and processed products. Both these assumptions made it feasible to construct the prototype world wool model, reported here.

Second, IWS kindly provided aggregate level advertising expenditure data for wool products for the major import markets and this enabled the researchers to measure in a "broad brush" manner the influence of advertising on wool consumption. However such measures would be considerably more accurate if cross sectional data from IWS survey programs were used to specify the response variables. Negotiations have been underway with IWS for some time to attempt to obtain these data, but given the delays so far we are not hopeful that they will be made available.

Table 5: Simulation Results

	Base	Advertising Doubled
Quantity Consumed (mil. kilo)		
France	56.75	60.81
Germany	197.64	200.34
Italy	171.24	192.03
Japan	223.53	318.44
U.K.	195.87	209.97
U.S.	170.86	184.23
RoW	472.79	355.98
Expenditure (mil. $ Aust)		
France	239.89	281.45
Germany	832.63	931.24
Italy	716.63	911.91
Japan	939.56	1465.00
U.K.	826.86	982.99
U.S.	717.70	858.85
RoW	1986.00	1644.00
Price ($/kilo)	4.183	4.628
Advertising (mil. $ Aust.)		
France	3.07	6.14
Germany	10.56	21.12
Italy	3.51	7.02
Japan	13.15	26.30
U.K.	4.37	8.74
U.S.	12.04	24.08
RoW	14.28	28.56
Producer Surplus (mil $ Aust.)	6248	6909
Total Benefit/Cost		10.8:1
Australia Producer Surplus (mil $ Aust.)	1687	1865
Australia Benefit/Cost		5.9:1

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