A CRITICAL ANALYSIS OF THE MARKETING OF MOHAIR IN SOUTH AFRICA WITH SPECIAL REFERENCE TO THE PERIOD 1963 TO 1989

EHF Norton
Department of Economics and Economic History, Rhodes University, Grahamstown

Abstract

The objective of the research was to determine the extent to which marketing in general, and the Mohair Scheme in particular, played a part in the re-emergence of South Africa as the world's leading mohair producer. The two major components of the Scheme, the *voorskot*, or initial payment, and reserve prices were analysed separately. In the first part of the analysis only rainfall and the market price were found to be important determinants of mohair production. Although the *voorskot* price was found to be an unimportant determinant it may nevertheless have played an important part in making the Scheme as a whole acceptable to producers. In the second part of the analysis it was established that the reserve price had both stabilized the price of mohair and enabled producers to enjoy welfare gains. It was therefore concluded that the Mohair Scheme had played a major part in the re-emergence of South Africa as the world's leading mohair producer. Nevertheless, in view of the massive stock-piling in recent seasons, due to the reserve price being set too high, it was recommended that the Mohair Scheme be discontinued,, or at least that the reserve price should support only the finer mohair lines and be set at a much lower long-run, market clearing level.

1. Introduction

The re-emergence of South Africa as the world's leading mohair producer in 1976 (Mohair Board, 1989-90:9), after having trailed the United States and Turkey for almost half a century, has caused international attention to focus on the industry in general, and its marketing system in particular.

Most Angoras are to be found in the Cape Midlands. The erratic rainfall in this area, as well as unstable market prices have been largely responsible for the considerable fluctuations in mohair production as shown in Figure 1.

As the commencement of the last period of rising output coincided with the establishment of the Mohair Scheme in 1972, this study seeks to make a critical analysis of the marketing of mohair in South Africa over the period from 1963 to 1989.

The Mohair Scheme, a one-channel marketing system, consists of a pool price with pre- and post-payments. The marketing year is divided into a summer and winter pool, each comprising many pool types and subcategories. Soon after the delivery of their clip to the Mohair Board's agents and its subsequent auction, producers receive a *voorskot* payment, based on a guaranteed price, irrespective of whether their mohair is sold or not. All mohair which does not realise a reserve price, placed on it by the Mohair Board, is transferred to the next pool season. At the end of every season, producers receive an *agterskot* payment equal to that portion of the proceeds (including the value of mohair stockpiled during the season) remaining after the *voorskot* payment and marketing costs have been deducted.

The Scheme may have affected production through the *voorskot* price as well as the reserve price. Because no record is kept of the reserve price, the two prices have to be analysed separately.

2. Analysis of *Voorskot* Price

The *voorskot* price has been included as one of the explanatory variables in the following mohair model which is based on Nerlove's (1958) adaptive expectations distributed lag model of supply adjustment:

$$M_t = Ba + (1-B)M_{t-1} + BbPm_{t-1} + BcPv_t + BdPw_{t-1} +$$

$$BePn_{t-1} + BfPs_{t-1} + gR_{t-1} + hT_{t-2} + Bu_t \qquad (1)$$

Where a,b,c,d,e,f,g and h are the parameters of the model; M and M_{t-1} are the actual levels of mohair production in seasons t and t-1 respectively; Pm_{t-1}, Pw_{t-1}, Pn_{t-1} and Ps_{t-1} are the average real net prices of mohair, wool, beef and mutton/lamb and goat/goat kid meat respectively in season t-1 (i.e. gross price less directly allocatable costs); Pv_t is the average real net *voorskot* price of mohair in season t; R_{t-1} is the weighted rainfall in season t-1; T_{t-2} is technology, represent by the weighted cumulative real fencing cost per hectare in season t-2; u_t is the stochastic error term; and B is the coefficient of adjustment.

In the model, real rather than nominal prices have been used because of the inclusion of a rainfall variable. Wool, beef, mutton/lamb and goat/goat kid meat are considered the only important substitute products of mohair in production. The two small-stock meat prices have been combined to circumvent multicollinearity and tolerance problems. The price variables have been lagged one season because it is assumed that producer expectations for the current season are based on the previous season's price, except in the case of the *voorskot* which is not lagged because it is announced at the beginning of each season. Rainfall and technology are weighted by the percentage of the national Angora flock in each of the twenty seven districts with the most Angoras and they are lagged one and two seasons respectively, because that is the expected length of time that it takes for each to influence production. The real fencing cost has been cumulated because fences are constantly maintained and have an effective life of at least twenty five years in the Cape Midlands and B, which is "a measure of the speed with which actual production adjusts in response to factors determining desired production" (Witherell, 1969:139) is dependent upon biological, institutional, technological and behavioural rigidities.

The coefficients of Equation 1 have been estimated as follows, by the method of ordinary least squares:

$$M_t =$$

$$-2869,231 + 0,885M_{t-1} + 0,374Pm_{t-1} - 1,047Pv_t + 0,076Pw_{t-1} +$$
$$\quad\quad\quad (11,05) \quad\quad (3,13) \quad\quad (-2,35) \quad\quad (0,15)$$
$$\quad\quad\quad (0,00) \quad\quad (0,00) \quad\quad (0,02) \quad\quad (0,88)$$

$$2,658Pn_{t-1} - 0,855Ps_{t-1} + 1,775R_{t-1} + 0,533T_{t-2}$$
$$\quad (1,70) \quad\quad (-0,54) \quad\quad (4,06) \quad\quad (1,86)$$
$$\quad (0,10) \quad\quad (0,59) \quad\quad (0,00) \quad\quad (0,07)$$

$$R^2 = 0,974 ; F = 173,187 ; S.C. = -0,241 ; B = 0,115 \ (0,00) \qquad (2)$$
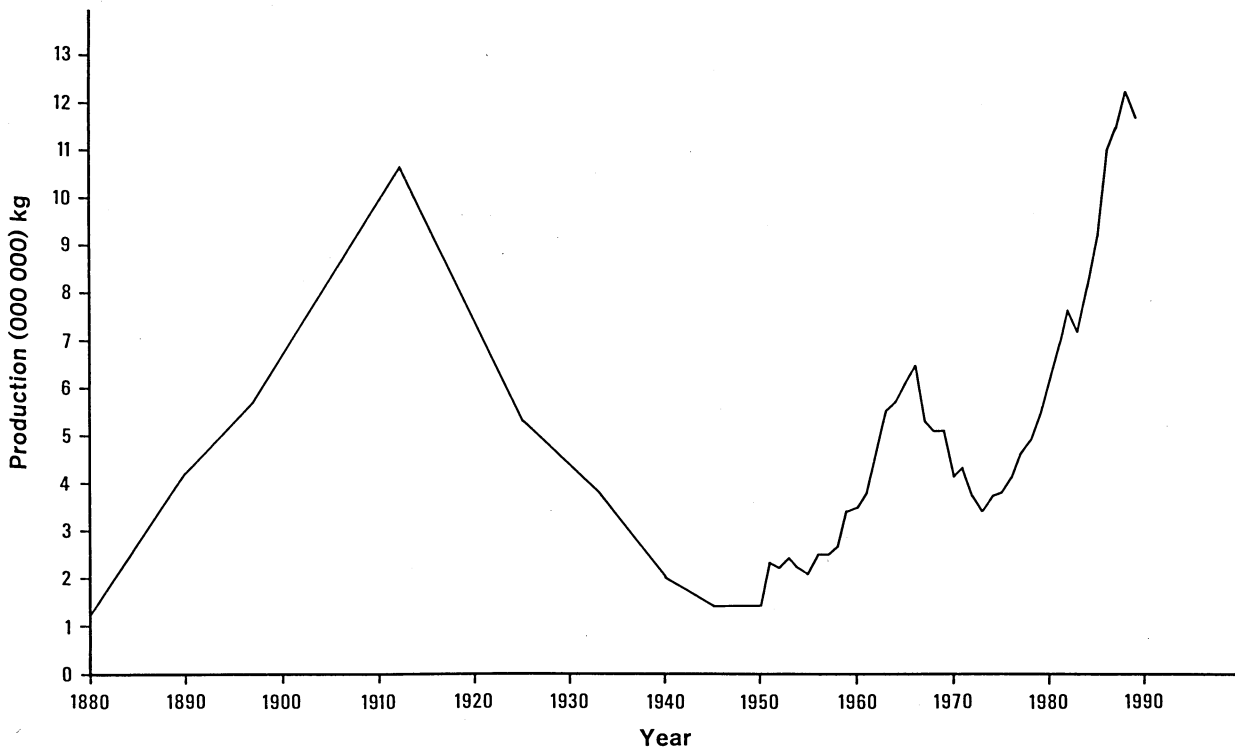
Figure 1: South African Mohair production, 1880-1989.
Source: Mohair Board, (1965-90).

The numbers in parenthesis beneath the coefficients are, firstly, the t-ratio and, secondly, the P(2 tail). Below the equation, R^2 is the multiple R square; F the F-statistic with its P(tail) in5 parenthesis below it; S.C. the serial correlation of residuals; and B, as before, the coefficient of adjustment.

The very high correlation coefficient, or R^2 value, indicates that all the major determinants of mohair production are present, while the B value reveals that the adjustment of actual to desired mohair production is a slow process. Apart from the lagged dependent variable, the weighted rainfall and the average real net price of mohair are clearly the most important production determinants, confirming *a priori* expectations. While the positive correlation between technology and mohair production is considered to be significant, the positively correlated average real net price of beef is, however, difficult to understand, although climatic conditions in the higher rainfall areas of the Cape Midlands might explain this particular phenomenon.

Both the average real net wool price and the average real net mutton/lamb and goat/goat kid meat price are statistically insignificant predictor variables of mohair production. This is possibly because during most of the period studied, the Angora gross margin was more than double that of wool and meat. Therefore, fluctuations in the price of these products did not enable their gross margin to exceed that of mohair, a requirement for the substitution of the one for the other.

Even more disappointing is the unexpected result for the average real net *voorskot* price of mohair. It has a significant negative correlation which is clearly unacceptable and must surely be coincidental. All that can be deduced from this is that producers do not pay any attention to this price when planning production levels because the *voorskot* price is set at levels far below the market price. The *voorskot* payment received by producers soon after the auction of their clip may, however, have played an important part in the concept of initial and final payments, and therefore the Mohair Scheme, being acceptable to producers.

3.   Analysis of Reserve Price

Before it is possible to determine the effect of the reserve price on production, we need to establish, firstly, whether the fixing of a reserve price has increased the stability of the mohair price and, secondly, what effect these stabilization activities have had on producers. It is not possible to make a direct comparison between two sets of concurrent prices, because, prior to 1972, only unsupported prices existed, while subsequently all prices have been supported. Two different strategies have been employed to address this problem. First, a system has been devised to estimate the prices that would have prevailed if the support mechanism had not existed. The relative ranges and standard deviations of these estimated prices and the actual prices for the period after the Scheme's implementation have then been compared. Second, a hypothesis test concerning the variance of the price before and after the Scheme's implementation has been conducted.

The first strategy, based largely on Lester Telser's (1957:298-408) work, assumes that the supply curve in a particular season is perfectly inelastic with respect to price in that season because of the various rigidities mentioned earlier. Let's suppose that there is excess demand at the reserve price, making it ineffective as a determinant of the actual price at which mohair is sold. This situation is illustrated in Figure 2, with D indicating the demand for, and S, the supply of, South African mohair. The seasonal average reserve price, Pr, is lower than the average price, Pe, that would equate supply from the current season's production, Qe, and demand. If the Board decides to draw down stocks by dQ, so that total supply from stocks and the current season's output together is Qe^1, the new supply curve becomes S^1, and the average market price for the season falls to Pe^1. The difference between Pe^1 and Pe may be estimated by means of Equation 3:

$$dP = (dQ/n) (Pe^1/Qe^1) \qquad (3)$$

where dP is the difference between Pe^1 and Pe; and n is the price elasticity of demand.
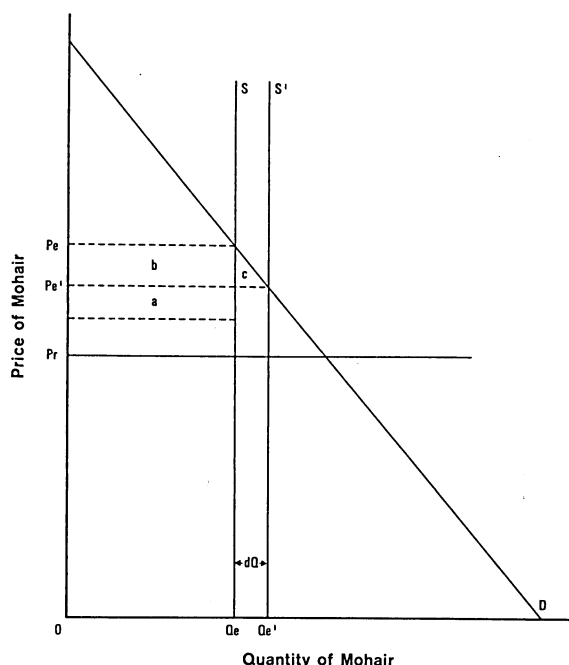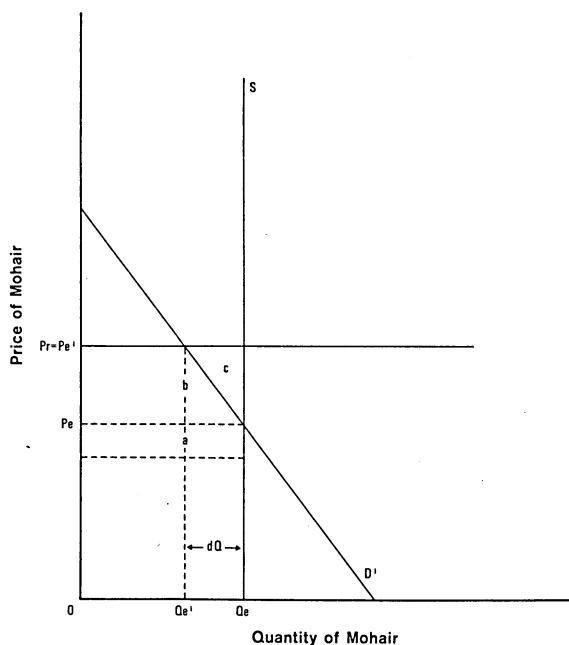
Figure 2: Ineffective reserve price.

Figure 3: Effective reserve price.

Now let's suppose that the quantity demanded at the reserve xprice is less than that supplied, as a result of weak demand forcing the demand curve to move leftwards to D^1. Pr would then become effective in that it would equal the market price Pe^1 in Figure 3. In this case, the quantity sold is only Qe^1. The surplus, dQ, depicted by the difference between the quantity produced, Qe, and that which is sold, is taken into stock by the Board. In this case the difference between Pr and Pe is estimated by means of equation 4:

$$dP = (dQ/n) (Pr/Qe^1) \qquad (4)$$

As no record is kept of the reserve price, Pr has been replaced by the observed average market price, Pe^1, in this calculation. The estimates have been determined by adding dP (which will be negative for seasons when there is a net increase in mohair stocks) to Pe^1. Three estimated ranges have been calculated because of the different free market prices that arise when using three probable price elasticities of demand.

The ranges and standard deviations in cents per kilogram are represented in Table 1.

Table 1: Ranges and Standard debviation in cents per kilogram

	Actual	Esti-mated	Esti-mated	Estimated
n	-0,15	-0,5	-1	
Range	2153,8	9295,1	3620,0	2533,0
Range Increase	-	7141,3	1466,2	379,2
Std Deviation	534,7	1895,3	782,7	614,5

These results clearly indicate that, for the range of likely price elasticities of demand, the reserve price mechanism increases price stability.

The second strategy used, based on work done by Mendenhall et al (1981:398-9), arrives at a similar conclusion. A hypothesis test, at a five percent level of significance, shows that the price variance was larger for the period before the reserve price mechanism's implementation than it was thereafter.

We now need to establish what effect this greater price stability has had on producers. Use has been made of a Marshallian partial equilibrium analysis, which assumes that the demand curve is a measure of total utility for a good and that the supply curve is a measure of the opportunity cost of the resources used to produce that good. Consumer surplus is thus the area below the demand curve and above the equilibrium price line while producer surplus is the area above the supply curve and below the price line.

Irrespective of whether the average reserve price is effective or not, in Figures 2 and 3, producers lose area (a), the cost of operating the Mohair Scheme. During seasons when the reserve price is ineffective, in Figure 2, producers also lose area (b) to consumers. At the same time, consumers gain area (c), a windfall gain. On the other hand, when the reserve price is effective, in Figure 3, producers gain area (b) from consumers and area (c), the windfall gain. In both cases the social welfare gain or loss is depicted by area (c) minus area (a).

Each of the areas has been individually measured for every season. While areas (b) and (c) have been calculated by simple formulae, area (a) is estimated to equal two thirds of the entire net Pool and Mohair Centre expenses. These seasonal values have then been summed over the period. As the results conclusively show that producers have gained at the expense of consumers and that the social welfare cost is minimal, we can say with reasonable confidence, that the reserve price has stimulated production.

4.   Conclusion and Recommendations

The overall conclusion to be drawn from the present study is that the Mohair Scheme, through both the *voorskot* and reserve prices, played a major role in the re-emergence of South Africa as the world's leading mohair producer. It would, however, be naive to accept that the Mohair Scheme was the only reason for the increase in production. Other related issues must also have played a role, even if that role was only secondary to that of the

Scheme. Lower relative production costs, the depreciation of the Rand and vastly superior methods of classification would surely have contributed as well.

The massive stockpiling which has taken place in recent years is of grave concern to the industry. As the production region has been in the grip of one of the worst droughts in living memory, the blame for this must be laid at the door of the high reserve price. On the one hand, it has caused a sharp decline in consumer demand, because of the welfare losses imposed on consumers while, on the other hand, it has continued to stimulate production. Clearly the reserve price needs to be set at the long-run market clearing level and the correct signals resulting from the market forces of supply and demand must be transmitted to producers.

One possible solution to this is that only kid, young goat and possibly fine adult mohair should be supported by the *voorskot* and reserve prices. All other mohair which is either too strong, mixed, contaminated with kemp or seed and the like should be unsupported. In this way the responsibility for the decision as to when and what to sell will rest entirely with the producer. Quite obviously the price of such mohair will be volatile, but then that will be part of the price to be paid for producing such lines. The advantages of such a policy will be numerous. Stockpiling will be greatly reduced and the adverse effect such mohair has on the market in future seasons will be eliminated. The quality of the South African mohair clip will also be greatly enhanced, as many producers are likely to dispose of goats producing substandard mohair.

Even with these adjustments, it is possible that the Mohair Scheme will be unable to address the present problems confronting the industry. It is therefore suggested that total deregulation of the industry be considered. In addition to the advantages cited above, when part of the clip is supported by the Scheme, deregulation would allow producers to add value to their product, by means of the partial processing of their own mohair. Much needed rural employment would also be created. While this would favour enterprising producers and entrepreneurs, it would no doubt hurt some inefficient producers. However, it is better that only these latter producers be eliminated rather than the entire industry crippled, which is what will inevitably happen if the *status quo* is maintained.

References

MARSHALL, A. (1947). Principles of economics. London, Macmillan and Co. Limited.

MENDENHALL, W, SCHEAFFER, RL and WACKERLY, DD. (1981). Mathematical statistics and applications. Boston, Duxbury Press.

MOHAIR BOARD. (1965-1990). Annual reports, No's 1-24. Port Elizabeth.

NERLOVE, M. (1958). The dynamics of supply: estimation of farmers' response to price. Baltimore. The John Hopkins University Press.

TELSER, LG. (1957). The support program and the stability of cotton prices. Journal of Farm Economics, Vol 39, No 2:398-408.

WITHERELL, WH. (1969). A comparison of the determinants of wool production in six leading producing countries: 1949-1965. American Journal of Agricultural Economics, Vol 51, No 1:138-158.