Sheep's back to Mill: "The case of the South African wool industry"

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Abstract

South Africa has a strong interest in maintaining its position in the international wool market. The low level of uniqueness between different wool producers internationally makes it difficult for countries to oppose the challenges and to remain competitive in the rather homogeneous wool market. Hence, structuring domestic cost information in a way that's globally comparable, presents a methodology through which managerial information could be gathered for both individuals and the industry. This will allow the South African industry to benchmark itself against the leading world producers. A survey approach was employed to determine the cost structure of the South African wool industry. Results indicated that although South Africa has a competitive advantage in the primary production phases, marketing cost and the countries location in relation to the main wool markets prohibit the local industry from obtaining a competitive advantage over its Australian counterpart.

Key words: wool fibers, cost structure, benchmark

1. Introduction

As the world 4th largest exporter of raw wool fibers, South Africa (SA) has a strong interest in maintaining its position in the international markets. However, the international wool market is perceived to be a very responsive and volatile market, which implies direct consequences for local producers and subsequently for South Africas international market position. Various global factors play a role in the responsiveness and volatility of the wool market, and include amongst others: currency fluctuations, the

state of different economies, a strong fluctuating stock of semi processed wool, fashion trends, retail condition, world climate, the quality and quantity of wool available in the stockpile and the price differential between wool and other textile products (Roche, 1995).

The low level of uniqueness between different wool producers internationally makes it difficult for countries to oppose the challenges of the international wool markets through innovative or promotional measures. Thus, for the SA wool industry to compete internationally, emphasis needs to be put on the cost structure of the local primary wool industry. Furthermore, various differences exist between wool producing countries, and their relative costing structures. It is therefore of critical importance to be able to benchmark the cost structure of the SA wool industry against that of competing wool producing countries. This will create a methodology through which the competitiveness of the SA primary wool industry could be measured.

The main aim of this study is firstly to estimate the cost of marketing wool from the back of the sheep (i.e. including the shearing process) to the gate of the mill (both locally and internationally). Secondly, the paper aims to benchmark the SA wool cost structure against that of Australia's, currently the leading wool producer in the world.

2 Procedures

In order to achieve the objectives of the study, the same methodological approach as the one that was used by the Australian Wool Innovation Limited (AWI, 2007); calculating the annual cost of producing wool from the Sheep's Back to Mill (SBTM) was adopted.
Both primary and secondary data were used in the study. Secondary data was obtained from Cape Wools SA (2008), a service company established and owned by the directly affected industry groups registered with the South African Wool Forum. Primary data was captured through surveys that were completed on a personal interview basis amongst most of the role players in the wool industry including: contract and private shearers, brokers, buyers and wool exporters. Different questionnaires were designed for each

group of role players, with questions capturing data pertaining to direct cost incurred from the shearing process to the gate of the mill (locally and internationally) for each company. The primary data from the surveys were combined with secondary data to quantify the cost structure of the SA wool industry by making use of an MS Excel spreadsheet model.

3. Results

The calculated cost reported in the paper represents the weighted averages in terms of the market shares of individual role players in the SA wool fibre chain from grower to mill. It's important to note that opportunity costs are excluded from the calculations, mainly due to the difficulty in accurately measuring such costs. The costs for the individual activities are broken down into:

- cost to the wool growers (sheep's back to auction),
- cost to the buyer or processor (auction to mill),
- the total SBTM costs as percentage of the total cost,
- comparison of the SA SBTM cost structure with that of the Australian counterparts.

3.1 Sheep's back to auction (cost to grower)

The cost to the wool grower includes all cost activities from the sheep's back (shearing) to the auction warehouse either in Port Elizabeth (PE), Durban (DBN) or Cape Town (CTN) for the 2006/2007 season. These activities include the labour and ration *(in natura)* cost for the shearing process as well as the packing and transportation of both the shearers and the wool to and from the farm.

3.1.1 Labour

The weighted average shearing cost is calculated based on the actual shearing service costs obtained from the individual shearing service providers surveyed. In total, the 11

shearing service providers shorn close to 14.5 million sheep during the 2006/2007 production season.

The labour component of the cost to get the wool from the sheep's back to the auction is shown in Table 1. Labour costs consists of the actual full body shearing (machines and blades) and crutching, sorting (classing, fleece thrower, skirter, wool worker and cook), baling and other general labour in and around the shearing shed.

Table 1: Labour cost

Activity	Weighted Average			Total cost to RSA
	Per sheep	Per kg (greasy)	Per bale (greasy)	
Shear (body)	R 3.18	R 1.03	R 153.90	R 48,093,914
Crutching (share)	R 0.02	R 0.01	R 0.79	R 247,348
Classing	R 0.42	R 0.14	R 20.54	R 6,419,042
Fleece thrower	R 0.15	R 0.05	R 7.33	R 2,290,991
Skirter	R 0.15	R 0.05	R 7.31	R 2,283,810
Wool worker (piece classer)	R 0.12	R 0.04	R 5.63	R 1,760,192
Cook	R 0.04	R 0.01	R 1.92	R 600,436
Total labour	**R 4.08**	**R 1.32**	**R 197.42**	**R 61,695,732**

Source: Own calculations based on survey, 2008

The actual shearing costs pertaining to labour are quoted on a per sheep basis, with the majority of the providers having a detailed break-down on the individual shearing and sorting categories (including full body shearing, crutching, classing, etc.). From Table 1 it is clear that the weighted average body shearing costs amounts to R 4.08 per sheep.

In addition, the average weight of wool shorn per sheep (3.1 kg) was used to calculate the cost per kg greasy wool shorn. From this, the weighted average body shearing cost per kg wool shorn amounts to R 1.32 during the 2006/2007 wool marketing season. Given an average weight per bale during the 2006/2007 marketing season of 149.83 kg (Cape Wools, 2007), the body shearing cost per bale amounts to R 197.42, resulting in a total cost of R 61.6 million for the total clip of 46.8 million kg.

According to the shearing service providers surveyed, less than 2% of the national flock was crutched during the 2006/2007 marketing season. With a weighted average crutching cost of R 0.85 per sheep, (including service commission) and the assumption that only 2% of the national flock was crutched, the weighted average cost per sheep amounts to R0.02 and therefore less than R0.01 per kg wool. This equated to R 247 348 for the national clip.

The remaining sorting and preparation cost is also shown in the remaining part of Table 1, with weighted average classing costs of R 0.42 per sheep, R 0.15 for the fleece thrower and skirter respectively, R 0.12 for other wool workers and R0.04 for the cook. In total, the shearing and preparation costs amount to R4.08 per sheep, R 1.32 per kg wool shorn, R 197.4 per bale and R 61.7 million for the national clip.

3.1.2 Shearing service administration, Electricity, Rations and Transportation of shearers

The fixed administration cost charged (see Table 2) for shearing services amounts to R 0.03 per sheep, R 0.01 per kg wool and R 1.36 per bale, based on an estimated average of 1 820 (not shown) sheep shorn per grower. In total, for the SA clip during the 2006/2007 marketing season, shearing administration cost amounts to approximately R 402 000.

The calculated electricity cost is based on an estimated 35% of the national clip shorn with machines. Given an average electrical motor of a shearing machine of 550 W (i.e. 0.55 kW) and an estimated electricity charge of R 0.32 per kW/h, the electricity cost amounts to less than R 0.01 per sheep totalling an estimated R 62 072 for the national clip (see Table 2).

Table 2: Administration, Electricity, Rations and Transportation cost

Activity	Weighted Average			Total cost to RSA
	Per sheep	Per kg (greasy)	Per bale (greasy)	
Administration cost for shearing service	R 0.03	R 0.01	R 1.36	R 424,801
Electricity	R0.0041	R 0.0013	R 0.20	R 62,072
Rations	R 0.50	R 0.16	R 24.27	R 7,585,901
Transportation of shearers	R0.26	R0.08	R 12.42	R 3,881,937
Total				**R11,954,711**

Source: Own calculations based on survey, 2008

In the majority of the cases, wool growers are also responsible to provide meals/rations (*in natura*) to the shearers. In most cases, the shearing agreements specify the amount of food to be provided, including coffee and tea, sugar, maize meal (or other forms of starch), milk as well as meat (typically 1 sheep carcass per 1 000 sheep shorn). If not specified, the shearing rate is inclusive of all costs, and therefore specified as a total rate per head. The weighted average cost for rations (see Table 2) amounts to R 0.5 per head, i.e. R 0.16 per kg wool or R 24.27 per bale.

Transporting shearers is generally regarded as the responsibility of the grower. In order to calculate an average cost for transportation reported in Table 2, an average travel distance of 156 km (based on survey results - not shown) and a rate of R2/km were used. Based on these assumptions, together with the assumed weighted average of 1 818 sheep shorn per grower, the cost per kg amounts to R 0.08, i.e. R 3.9 million for the 2006/2007 wool clip.

3.1.3 Wool transportation and Packaging

The average travelling distance of 405 km is weighted based on the distance from all magisterial districts to the closest auction (PE, CTN, DBN) as well as the greasy wool sales on the auctions from each respective district. A provincial summary of the weighted average calculation is provided in Table 3.

Table 3: Weighted average distance per Province

Province	Weighted average distance from auction (km)	Share of wool production	Weight (km)
Eastern Cape	315.4	33.5%	106
Northern Cape	602.3	13.1%	79
Western Cape	212.8	19.6%	42
Free State	547.8	24.3%	133
Mpumalanga	475.8	6.1%	29
Limpopo	720.0	0.0%	0
Gauteng	544.4	0.4%	2
North West	964.9	0.9%	9
KwaZulu-Natal	269.9	2.1%	6
Total	**517.0**	**100.0%**	**405.2**

Source: Cape Wools (2007), Brabys (2008) and own calculations

Table 4 provides an estimate of the transportation costs of wool bales from the farm to the auction warehouse, based on a rate of R 14/km (under load) and a weighted average travelling distance of 405 km. Based on these assumptions, the average cost per bale is approximately R 61.5, i.e. R 0.41/kg.

Table 4: Wool transportation and Packaging

Activity	Weighted Average			Total cost to RSA
	Per sheep	Per kg (greasy)	Per bale (greasy)	
Transport of wool (grower to auction)	R 1.27	R 0.41	R 61.48	R19,213,311
Wool pack cost	R 1.45	R 0.47	R 70	R21,875,210

Source: Own calculations based on survey, 2008

The cost of woolpacks amounted to R 1.45 per head or R 0.47 per kg wool (see Table 4). This was calculated based on based on an average weight per bale of 149.8 kg and the estimated weighted average fleece of 3.1 kg.

3.1.4 Broker fees

Table 5 reports the fees charged by the brokers to the producers. Broker's commission was based on the weighted average commission paid by the growers, with the weighted brokerage fee per sheep that amounts to R 3.31, totalling to R 47.3 million for the

2006/2007 clip sold on auctions. In addition, the voluntary National Wool Growers Association (NWGA) membership fee is treated as a levy paid by members and totals R 373,612 for the 2006/07 season.

Table 5: Brokers fees

Activity	Weighted Average			Total cost to RSA
	Per sheep	Per kg (greasy)	Per bale (greasy)	
Broker's commission	R 3.31	R 1.01	R 151.36	R 47,299,903
Growers levies	R 0.02	R 0.01	R 1.20	R 373,612
Test certificates – Core	R 0.89	R 0.29	R 40.52	R 12,663,775
Test certificates –Staple strength & length	R 0.11	R 0.04	R 5.22	R 1,632,290
Interlotting	R 0.16	R 0.05	R 7.68	R 2,399,126
Bulkclassing	R 0.53	R 0.17	R 24.69	R 7,714,298
Total				**R 72,083,004**

Source: Own calculations based on survey, 2008

In total 76 196 core tests and 22 990 staple strength and length tests were conducted, amounting to an average weighted total cost per kg greasy wool of R 0.89 and R 0.11 respectively. Moreover, interlotting and bulk-classing (re-handling) was performed in total to 20 510 and 30 317 wool bales during the 2006/2007 marketing season respectively, with a weighted average cost of R 0.05 per kg wool for interlotting and R 0.07 for bulk-classing (see Table 5).

3.2 Auction to mill (cost to buyer)

The cost for taking the wool from the auction warehouse to the mill is treated in two parts, as discussed in the following two sub-sections: Firstly the pre-shipment costs and secondly the actual shipment and transportation costs.

3.2.1 Pre-shipment Cost

Table 6 reports the total pre-shipment cost for SA based on buying costs, post service charges as well as finance and storage cost. The weighted average buying cost that was based on the levies payable by the wool buyers (all in greasy equivalents) amounted to an

estimated total of R 1.1 million for the total national clip. Moreover, post-service charges reflected the transportation of wool bales from an auction warehouse to the required dump. From this the weighted average post service charges amounted to R 9.43 per bale, which equates to a total of R 2.9 million for SA.

Buyer finance was calculated based on the average finance rate and finance period that applied to the individual buyers. Finance rates and periods are strongly influenced by each buyers' selling terms and means of finance i.e. finance in local or foreign currency, own capital and wool that is locally processed. The weighted average finance cost therefore amounts to R48.16 per bale. Hence, buyer storage cost accounts for greasy wool that was stored at the auction warehouse exceeding the general 14 days free storage period granted by the brokers. Similar to the buyer finance above, the storage cost of greasy wool stored at local mills for processing is excluded as it is already regarded as being at the mill. From Table 6, the average weighted storage cost amounts to R 2.76 per bale, which adds up to R 861 227 for the national clip.

Table 6: Pre-shipment Cost

Activities	Weighted Average			Total cost to RSA
	Per sheep	Per kg (greasy)	Per bale (greasy)	
Buying cost (levies)	R 0.07	R 0.023	R 3.52	R1,099,335
Post-service charge	R 0.20	R 0.063	R 9.43	R2,947,937
Buyer finance	R 1.00	R 0.321	R 48.16	R15,049,841
Buyer storage cost	R 0.06	R 0.018	R 2.76	R861,227
Total Pre Shipment Cost	**R 1.32**	**R 0.43**	**R 63.87**	**R19,958,34**

Source: Own calculations based on survey, 2008

3.2.2 Shipment and Transportation (port of discharge to mill cost)

The total shipment cost for greasy wool exports from Port Elizabeth (PE), Cape Town (CPT) and Durban (DBN) is estimated based on cost that incurred from shipment preparation, sea freight and adjoined charges (Bunker Adjustment Factor (BAF), Cargo Dues, Container Terminal Order (CTO), Terminal Handling Charge (at both ports), Carrier Haulage Fee, Warfage and Bill of Lading, insurance from port to mill as well as

on-carriage (transportation cost from port of discharge to mill). These activities are all discussed in more detail below with their respective estimates shown in Table 7.

The total shipment preparation cost is calculated based on the cost incurred due to countermarking, dumping (high density pressing to one third of the original size) of bales and the positioning of empty and full containers at the various brokers and ports of origin. Based on this, Table 7 reports that the weighted average shipment preparation cost amounts to R 64.4 per bale, totalling R 20.13 million for the total national greasy wool exports.

The total weighted average sea freight for exported greasy wool exports from SA is calculated as an average freight rate (including all adjoined charges) to all export destinations (i.e. China, Italy, Germany, Hungary, Spain, India, UK as well as countries in North and South America). Table 7 shows the weighted average sea freight of R 0.34 per kg greasy wool, which is equivalent to R 15.8 million for total greasy wool exported during the 2006/2007 marketing season.

Insurance from port (marine) to mill is estimated as a percentage on the total greasy value of exports and amounts to R 4.66 per bale, equating to R 1.46 million in total for SA.

The weighted average on-carriage cost (transportation cost from port of discharge to mill) is quite challenging to calculate due to the different terms on which local wool buyers sell. However, the main export destinations of greasy SA wool are: China with an average on-carriage cost per kg of R 0.16, India (R 0.26), Italy (R 0.33), Germany (R 0.60), United Kingdom (R 0.39) and the United States of America (R 0.58), and Latin America (R 0.05). Thus, the weighted average on-carriage is estimated at R 0.17 per kg greasy wool which adds up to R 7.86 million.

Table 7: Shipment Cost

Activity	Weighted Average			Total cost to RSA
	Per sheep	Per kg (greasy)	Per bale (greasy)	
Shipment preparation	R 1.33	R 0.43	R 64.43	R20,134,371
Sea freight	R 1.05	R 0.34	R 50.58	R15,806,706
Insurance (marine and port to mill)	R 0.10	R 0.03	R 4.66	R 1,457,309
On-carriage	R 0.52	R 0.17	R 25.15	R7,860,206
Total Shipment costs	**R 3.00**	**R 0.97**	**R144.83**	**R45,258,592**

Source: Own calculations based on survey, 2008

3.3 Share of total SBTM

Table 8 summarizes the total estimated SBTM cost for the SA clip during the 2006/2007 marketing season. The total cost paid to labour (including commission) accounts for 24.5% whereas the other shearing costs (electricity, rations, transport and packaging) to growers amount to an additional 21% and other selling costs (i.e. commission, wool tests, interlotting and re-handling and levies) amount to a further 28.6%. In total, growers paid on average 74.1% of the total SBTM costs during the 2006/2007 season. The remaining 25.9% of the cost is paid as pre-shipment costs (7.9%) and the actual shipment and other transportation costs (18%).

Table 8: Summary of South Africa SBTM

Activity	Total cost to South Africa	Share of total SBTM
Labour	R 61,695,732	24.5%
Total other cost to grower	R 53,043,231	21.0%
Total shearing cost	R 114,738,963	45.5%
Total other marketing cost to grower	R 72,083,003	28.6%
Total cost to grower	**R 186,821,966**	**74.1%**
Total pre-shipment cost	R 19,958,341	7.9%
Total shipment cost	R 45,258,592	18.0%
Total cost to buyer	**R 65,216,933**	**25.9%**
SBTM (Grand Total)	**R 252,038,899**	**100%**

Source: Own calculations based on survey, 2008

3.4 Comparison of the South African and Australian cost structures

Due to the different operational structure of the SA and Australian wool industries, one should bear in mind that certain figures could not be compared directly (see Appendix A). However, the comparison would reflect a good idea of production and operational advantages, and could serve as a reliable management tool as to whether current operational structures and production methods need to be changed.

Labour cost for the SA clip (24.5%) is significantly lower than their Australian counterparts with 61% (see Table 9). This can be explained by the fact that the weighted average SA cost of shearing (R1.03) for example, was more than three times lower compared to the Australian weighted average shearing cost of R 3.76 in the specific year. Moreover, the crutching cost for the SA clip is significantly lower than that of the Australian due to the fact that 80% of the Australian sheep were crutched during 06/07 compared to the less than 2% in the SA case. The cost of classing, as well as the rest of the labour in the shearing shed is significantly lower compared to Australia.

Furthermore, the cumulative share of the costs to SA wool grower's amount to 74.1% compared to the corresponding 82.2% of the Australian counterparts. These differences can be explained by the relative higher labour costs in Australia, which is obviously more important on the growers' side and secondly by the fact that Australia's main wool export destination China is closer in distance, and therefore their shipping costs will be lower.

Table 9: Comparison of South Africa and Australia cost structures

Activity	Share of SA SBTM	Share of Australia SBTM
Labour	24.5%	61.0%
Total other cost to grower	21.0%	6.4%
Total shearing cost	**45.5%**	**67.4%**
Total other marketing cost to grower	28.6%	14.7%
Total cost grower	**74.1%**	**82.2%**
Total pre-shipment cost	7.9%	8.8%
Total shipment cost	18.0%	9.0%
Total cost to buyer	**25.9%**	**17.8%**
SBTM (Grand Total)	**100%**	**100%**

Source: Own calculations based on survey, 2008

In terms of the total costs, the SA SBTM cost (R5.58/kg greasy wool) amounts to less than half of the Australia with R 12.03/kg grease (converted with an average exchange rate of R 5.73:1Aus$). Cognisance should however, be taken of the exchange rate changes on these comparable figures. The exchange rate of R 5.73, depreciated with 18.6% from the 2005/2006 season and is currently (August 2008) a further 18.5% weaker at R 6.79

4 Conclusion

In this article the SA SBTM cost elements are estimated for the 2006/2007 wool marketing year based on the methodology used by Australian Wool Innovation Limited.

It's evident from the study that labour activities carry a higher weight on cost in Australia, whereas some marketing activities carry a higher cost in South Africa. However, in general the cost structure does not differ substantially between Australia and South Africa. It might be appropriate to conclude that despite South Africa being able to produce high quality wool at a lower cost than the Australians counterparts, the distance to markets remains a stumbling block in getting a competitive edge. The high quality of the South African clip may increase the opportunity for niche markets. It might also be appropriate to again investigate the possibility of local processing of wool and possibly the manufacturing of wool products. This holds promise to create jobs and increase export earnings. Government support can thus also be defended.

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Appendix A

Table 1: Comparison between SA and Australian SBTM (06/07)

Item/activity	SA SBTM (Rand per greasy kg)	Aus costs (Aus cents per greasy kg)	Australian SBTM (R @ R5.73:Aus$)
Shear (body)	R 1.03	77.81	R 4.46
Crutching	R 0.01	22.38	R 1.28
Classing	R 0.14	13.96	R 0.80
Thrower, skirter, worker and cook	R 0.15	24.51	R 1.40
		12.83	R 0.74
Wool pack	R 0.48	6.31	R 0.36
Transport of wool (grower to auction)	R 0.41	8.67	R 0.50
Broker's commission	R 1.01	6.41	R 0.37
Core test facility	R 0.27	3.82	R 0.22
Staple strenght & length certificate	R 0.03	2.28	R 0.13
Interlotting	R 0.05	0.12	R 0.01
Rehandling or Bulkclassing	R 0.16	1.50	R 0.09
NWGA membership fees	R 0.01	n/a	n/a
	n/a	10.78	R 0.62
Buying cost	R 0.02	6.33	R 0.36
Post service charge	R 0.06	10.88	R 0.62
Buyer finance	R 0.32	4.30	R 0.25
Buyer storage cost	R 0.02	0.48	R 0.03
Shipment preparation	R 0.43	10.98	R 0.63
Sea freight	R 0.34	5.88	R 0.34
Insurance (marine to mill)	R 0.03	0.50	R 0.03
Transport to mill (oncarage)	R 0.17	5.50	R 0.32
Total cost to grower	R 4.00	204.64	R 11.73
Total cost to mill	R 1.39	44.4	R 2.54
Total cost SBTM	R 5.39	249.04	R 14.27
Greasy wool value	R 26.05	526	R 30.14
Grower cost: Greasy wool value	15.7%		38.9%

Source: Own calculations based on survey, 2008

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