

PEAK WOOL FLOWS

THROUGH THE

MARKETING SYSTEM

by

S. K. Martin

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THE AGRICULTURAL ECONOMICS RESEARCH UNIT

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Finally, grateful thanks is due to Dr P.D. Chudleigh for helpful discussion and direction.

P R E F A C E

The current study represents part of the Agricultural Economics Research Unit's programme of research aimed at holding or reducing marketing costs for New Zealand's major agricultural export products.

It is part of the Research Unit's philosophy that cost savings to the industry as a whole may only be attained in the future if features of current marketing systems are adequately described and quantified. This Report is aimed at documenting available data on peak flows of wool through the marketing system.

J. B. Dent
Director

SUMMARY

This Report documents peak flows through the New Zealand wool marketing system, and outlines various strategies for smoothing these peaks.

Ideally, manufacturers would require a steady supply of wool over the manufacturing season. However, the actual supply of New Zealand wool is highly seasonal. Although comprehensive information is not available, sample survey data for the South Island show that the majority of wool becomes available in December and January.

The movement of wool through the marketing system reflects this supply peak, with seasonal patterns evident for auctions as well as private wool sales. Consequently, peak demands are also made on scouring and dumping facilities, and on shipping capacity.

There are additional costs associated with this pattern of wool flow, but such costs, to the knowledge of the author, have not been quantified in a comprehensive manner.

One of the smoothing strategies outlined in this Report is a system of differential charging by brokers. Under such a system brokers' charges would be higher than at present in the peak period, and lower in the off-peak period. Growers may respond to such a strategy by altering shearing patterns, or by storing wool.

The payment of a storage increment similar to the British system is examined and evidence of considerable on-farm storage capacity on South Island farms is presented. Results which suggest that growers' response to such a strategy might be quite elastic are also outlined.

An extension of the Extra Choice concept is also considered, including a system where this alternative might be instituted in conjunction with differential charging by wool brokers. Sale by separation is suggested as a method of smoothing short-term peak flows that might otherwise remain if any of the previous alternatives alone are instituted. Acquisition of the wool clip by a central marketing authority is also discussed.

Finally, areas of research which would rectify data deficiencies and allow for a more rigorous evaluation of these alternative strategies are identified.

CHAPTER 1

INTRODUCTION AND PERSPECTIVE OF CURRENT STUDY

1.1 Rationale for Present Study

Farm gate to overseas mill marketing charges for wool in 1975/76 have been estimated at \$130 m,¹ which must ultimately be paid by wool growers, either directly before wool is auctioned, or indirectly, in the form of lower prices than would otherwise prevail, after the wool is auctioned. Therefore, although wool marketing charges assume a lower proportion of overseas prices than do marketing charges for meat products,² growers must be concerned when observing that wool marketing charges have, on average,

¹ This estimate was obtained by assuming the figure of \$68.8 m for farm gate to f.o.b. charges estimated by Chudleigh, P.D. 1977, Marketing Costs for New Zealand Wool: 1970-71 to 1975-76. Research Report No. 83, A.E.R.U., Lincoln College. Total f.o.b. to mill costs of \$61.7 m were estimated using illustrative farm to mill marketing costs and total exports as shown in the New Zealand Wool Marketing Corporation (NZWMC) Statistical Handbook 1975/76. This approach results in only an approximate estimate, since firstly, the NZWMC illustrative farm to mill costs are based on the assumption of a discharge at a U.K. port and transport to Bradford, and secondly, A.E.R.U. farm gate to f.o.b. charges include some minor costs included as post-f.o.b. activities in the NZWMC estimate. However, these minor discrepancies would not substantially alter the magnitude of the estimate of total marketing charges.

² Estimates for 1975/76 indicate that, for wool, the total marketing charge as a percentage of overseas price was 20.4 per cent (based on greasy wool sold via auction and shipped to Bradford, U.K.); for carcase lamb a comparative proportion was 58.5 per cent (based on carcase lamb shipped to Smithfield Market, London); for carcase mutton, the estimate was 66.7 per cent (based on carcase mutton shipped to Japanese ports); and for cartoned beef, the proportion was estimated as 52.2 per cent (based on cartoned beef shipped to New York). Source: Chudleigh, P.D. and Young, S.L. 1978. Transport 1984: Planning Implications of the Energy Crisis, Rural and Agricultural Impacts. Presented at the Seminar on Transport 1984, Wellington, May 1978.

2.

been rising both in real and money terms over the last seven years³ at a faster rate than the highly variable prices⁴ received by growers.

If these marketing charges are to be reduced or held, it is imperative that areas of wool marketing where costs may potentially be reduced are identified. Reducing peak wool flows through the marketing chain is one such avenue where economies might be effected. It is this aspect of the wool marketing system on which the current Report concentrates.

1.2 Past Concern on the Seasonality of Wool Flows

Since no detailed quantitative studies have been undertaken on this aspect of wool marketing, it is not possible to ascertain the contribution of seasonality to total marketing charges. However, past concern suggests that the problem of peak wool flows is of considerable significance. For example, the Battelle Memorial Institute's Report to the New Zealand Wool Board on New Zealand Wool Marketing in 1971 mentioned the problem of seasonal peak flows through brokers' stores.⁵ Mention was also made in the Battelle Report of the fact that seasonality of offerings of some types of wool at auction created an inverse seasonal pattern of wool prices.⁶

³ See Chudleigh, P.D. 1978, New Zealand Wool: Towards an Improved Marketing System, Agricultural Administration (5).

⁴ See NZWMC Statistical Handbook 1976/77 for details.

⁵ See Anon. 1971. Final Report of the Marketing of New Zealand Wool. Battelle Columbus Laboratories, Ohio, p.48. Battelle point out that brokers handle a large volume of wool fairly inexpensively, even though these flows have distinctive peaks and valleys.

⁶ Ibid, p.61.

However, an earlier report disputes this contention and concludes that it would be dangerous to assume that the price for different wool types is determined by the supply of these respective wool types over the season.⁷

The related problem of short-term peak wool flows was the concern of the Report to the New Zealand Wool Board on Wool Flow in New Zealand Ports in 1968, which specifically examined the short-term movement of wool from woolbrokers' stores to dump stores and from dump to ship's side. This Report made recommendations to improve communication between centres and the co-ordination of wool flows.

More recently, concern on the general feature of seasonality has been expressed by those involved in the wool trade; the Wool Manager of one prominent broking firm has commented:⁸

Rather than take the position that the industry must cater for the peaks of wool flow firstly created by established shearing patterns and compounded by immediate despatch to store, can (the farmer) not consider how he can assist in levelling out these peaks.

Another prominent spokesman from the broking industry expressed the opinion that the only practical way of holding broking costs is to reduce the peaks of space requirements and labour inputs in brokers' stores.⁹ A further view put forward claimed that,

⁷ See Wool Marketing Study Group, 1967. Final Report Prepared for New Zealand Wool Board and New Zealand Wool Commission, p.24.

⁸ Harkness, M.J. 1976. Planning for the Future: 1, Wool, Massey Wool Association, 1976/77, p.7.

⁹ Stronach, D.J. 1976. In Search of Efficiency - The Broker's Viewpoint, Wool, Massey Wool Association, 1975/76, p.19.

4.

without the spread in general shearing times which has occurred in recent years, wool marketing cost increases would be a lot higher than they have been.¹⁰

Interest in the issues associated with seasonal wool flows has been expressed by domestic wool producer interests in the United Kingdom, South Africa and Australia;¹¹ thus the problems associated with these flows are not restricted to New Zealand.

1.3 Objectives of Present Study

Since previously published studies and reports have made mention of the issue of peak wool flows and, in one case, made specific recommendations on methods of improving the short-term movement of wool from woolbrokers' stores to ship's side,¹² it is tempting to conclude that the problem of peak wool flows has been studied in the past in some detail. However, these previous studies have not attempted to analyse in any quantitative manner, the magnitude of problems associated with short-term and seasonal peak wool flows. The actual peak flows of wool have not been identified, the magnitude of costs associated with these flows has not been estimated, and no study has been undertaken within the context of the overall marketing system, an approach which would enable total industry costs and benefits associated with specific policy options for smoothing wool flows to be evaluated.

¹⁰ McSkimming, I.M. 1976. In Search of Efficiency - A Shearing Contractor's View, Wool, Massey Wool Association 1975/76, p.11. For a further comment on seasonal wool flows, see Edmunds, A.R. 1977. Planning for the Future: 3, Wool, Massey Wool Association, 1976/77; in particular see p.17.

¹¹ See Appendices 1, 2 and 3 for details of this interest.

¹² Anon. 1968. Wool Flow in New Zealand Ports, New Zealand Wool Board, Wellington.

Since such a study would require access to greater resources than those currently available to the A.E.R.U., the present study does not purport to fulfill these requirements, and must be regarded as a preliminary investigation into peak wool flows through the marketing system. This Report documents what information is available on peak wool flows and costs associated with these flows, mentions deficiencies in the availability of relevant information, and presents alternative prescriptions which could contribute to a smoothing of wool flows, and therefore a reduction in marketing charges for wool.

1.4 Perspective of Present Study

This Report concentrates on peak wool flows through the major marketing channels; that is, those wool flows through the auction system and through the private selling system. As indicated by Table 1, the proportion of wool moving through these channels averaged 68 per cent and 16 per cent respectively over the last nine years.

The predominant flow through the auction system originates on farms, and moves to brokers' stores, and from there to scours and/or to dump stores, to wharves, overseas ports and overseas mills. Under private selling arrangements wool moves from farms to warehouses or scours, and from those points, follows a similar path to wool moving through the auction system.

TABLE 1

New Zealand Wool Disposal 1968/69 - 1976/77
(% Total Disposals^a)

Method of Disposal	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	Average
Net Auction Disposals ^b	71.1	69.3	65.9	65.9	64.6	69.0	69.0	68.3	65.1	67.6
Private Sales ^c	10.9	13.3	15.8	16.5	18.0	15.0	14.7	17.3	19.3	15.6
Slipe Wool to Freezing Co's	14.0	13.6	14.5	14.3	14.4	13.1	12.6	12.6	11.3	13.4
Grower's Shipments ^d	3.3	3.3	3.3	2.8	2.4	2.3	2.8	3.1	3.6	3.0
Sheepskins	0.6	0.5	0.4	0.5	0.6	0.6	0.8	0.6	0.6	0.6
Total Disposals ^e	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

^a Total Disposals differ from Total Greasy Production by the annual stock adjustment which varies from 0.1 per cent to 1.5 per cent of Total Disposals.

^b Excludes auction bought wool later resold by buyers and privately bought wool later sold via bins. Includes slipe wool sold at auction.

^c Includes private sales to brokers and sales to the NZWMC under the Extra-Choice Scheme in 1976/77. Sales to brokers accounted for between 2-12 per cent of the total, while Extra-Choice sales in 1976/77 made up 14 per cent of total private sales. Includes slipe wool sold privately.

^d Includes slipe wool disposed of by this method.

^e Totals may not add due to rounding.

Source: N. Z. W. C. Statistical Analysis of N. Z. Wool Production and Disposal 1970-71, 1971-72;
N. Z. W. M. C. Statistical Handbook 1972/73, 1973/74, 1974/75, 1975/76, 1976/77.

1.5 Dimensions of Temporal Wool Flows

Peak wool flows through the marketing system have two temporal dimensions. Firstly, there are regular seasonal wool flows over the year, with patterns and variations perceptible through the analysis of monthly data. Secondly, there are short-term peak flows of wool through marketing channels, where flow variations result from lumpy distribution activities associated with auction sales or shipping timetables.

This Report is concerned with both dimensions of this temporal aspect of wool flow. However, data limitations have not allowed in-depth analysis of short-term peaks, and consequently the majority of information and discussion refers to seasonal peaks.

CHAPTER 2

PEAK FLOWS OF WOOL THROUGH THE MARKETING SYSTEM

2.1 Demand for New Zealand Raw Wool

1. Overseas demand. Since approximately 93 per cent of wool produced in New Zealand is exported¹³, it is necessary to establish the pattern of demand by overseas mills.

Theoretically the optimum pattern of wool buying by these mills would be a system which allowed for continuity of machinery utilization; therefore, if total wool flows on to the market were smoothed, then overseas mills should ultimately benefit, since costs associated with process inventories and with non-optimum utilization of other resources, would be minimized. Intuitively, therefore, it would seem reasonable to conclude that smoothing wool flows would be beneficial for overseas mills.

However, the degree to which this theoretical optimum would be facilitated by smoothing New Zealand wool flows under current international wool marketing conditions is difficult to ascertain since some relevant details are not easily available. For example, information relating to the end use of many New Zealand wool types is unknown, including details of the types of wool used in different blends, the temporal availability of these types and variations in demand for the final product. It is therefore difficult to determine

¹³ Average export component of total wool disposed 1969/70 to 1976/77.

Source: N. Z. W. C. Statistical Analysis of New Zealand Wool Production and Disposal 1970-71, 1971-72; N. Z. W. M. C. Statistical Handbook 1972/73, 1973/74, 1974/75, 1975/76, 1976/77.

the degree to which smoothing total New Zealand wool flows would reduce the costs associated with mill inventories. It would also be necessary to determine the composition, magnitude and interest cost of mill inventories, and to differentiate between current wool stocks, and wool bought forward in anticipation of future requirements or for speculative reasons. The role and motivation of international wool buyers would also require investigation, as would the degree to which relative demand and supply conditions for wool are reflected by the price mechanism.

If research was initiated into these issues, the magnitude of costs and benefits associated with smoothing New Zealand wool flows could be made explicit. These costs or benefits could then be evaluated in association with those identified at other points in the wool marketing pipeline.

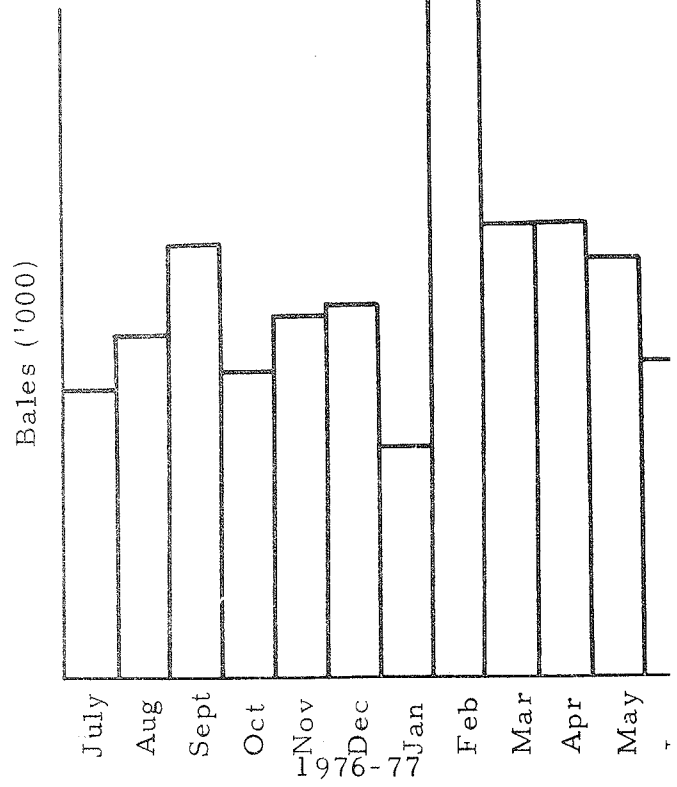
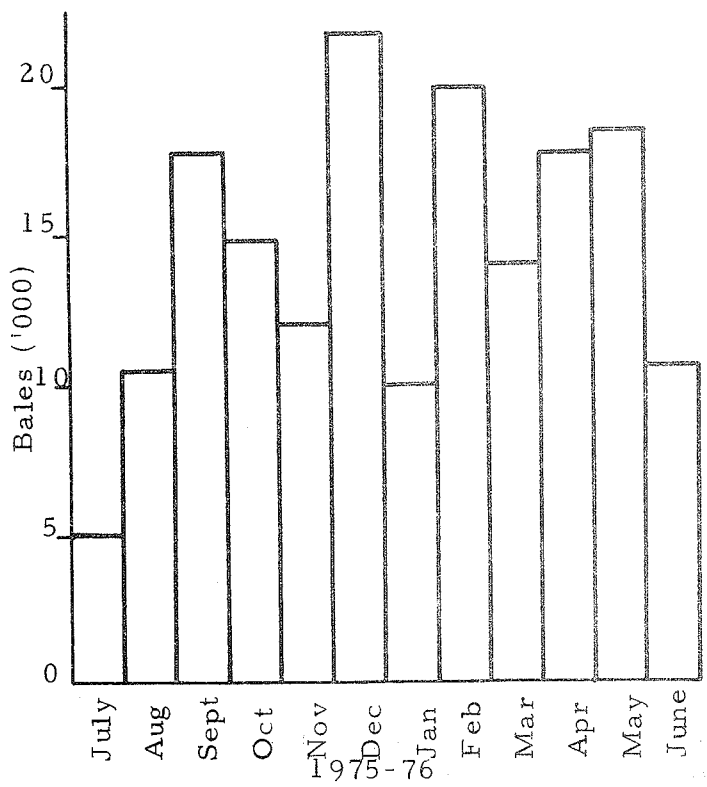
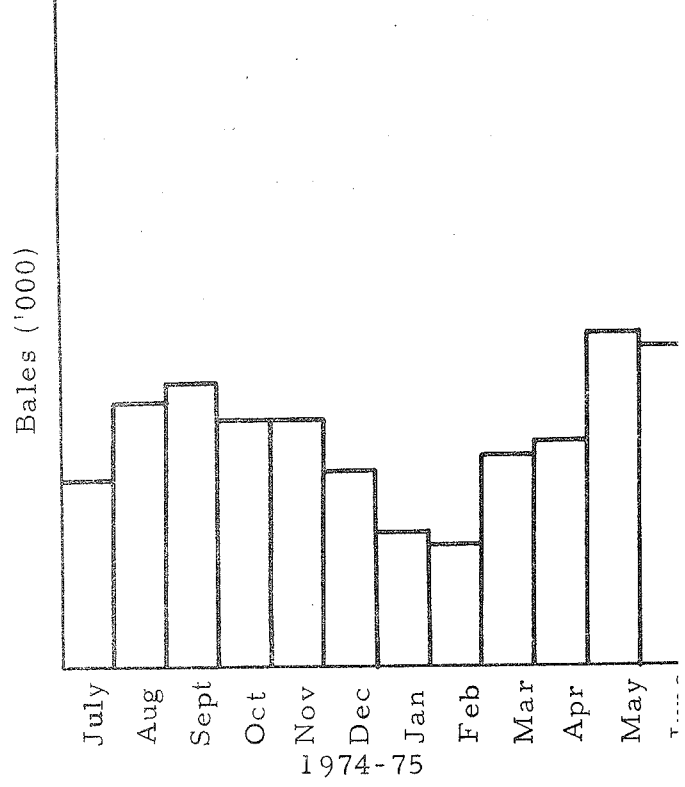
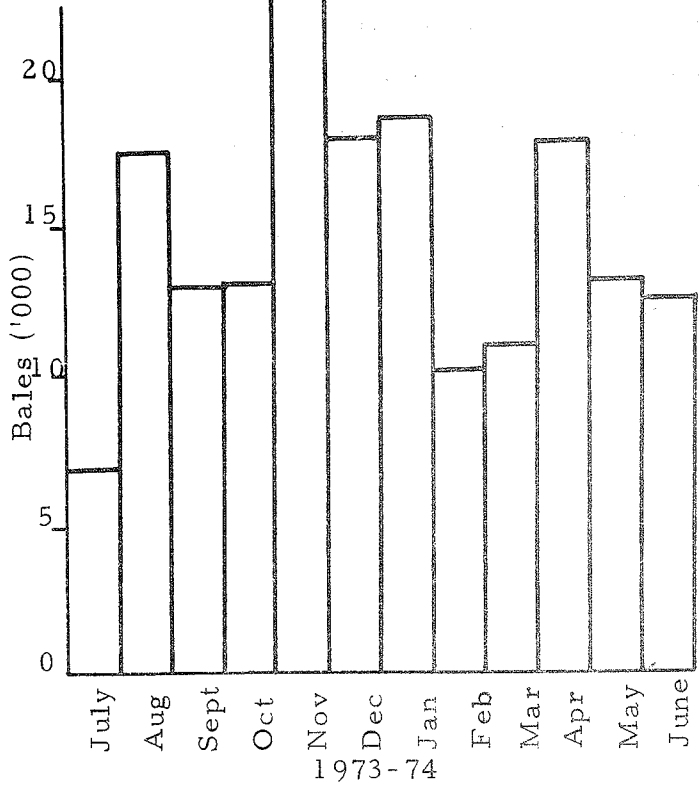
2. Local demand. Figure 1 outlines the monthly pattern of wool purchases by New Zealand mills for the years 1973-74 to 1976-77.

For each of the years considered, no distinct seasonal buying pattern emerges that coincides with supply. In fact, local mill purchases do not appear to follow any discernible trend, and both within-year and between-year variations appear to be quite volatile. However, the Manufacturers' Monthly Levy Returns on which this information is based, do not clearly state whether the details furnished in returns relate to original purchase date, or to the date of repurchase from stocks, in the case of wool bought under the scheme to assist local mills in financing wool purchases.¹⁴

¹⁴ Stocks held by the NZWB under this scheme have varied between 3 per cent and 13 per cent of annual requirements since the initiation of the scheme in late 1974.

FIGURE 1

New Zealand Mills Wool Purchases 1973-74 to 1976-77



Source: NZWMC Statistical Handbooks 1973/74, 1974/75, 1975/76, 1976/77.

No simple relationship appears to exist between these statistics on the monthly purchases by New Zealand mills, and the average monthly greasy price for all types of wool sold at auction.¹⁵ However, such a relationship might be obscured by the data problems described, and by aggregation. For example, the purchase of specific wool types by local mills may be related to the availability of these types, their prices, or to price expectations.

¹⁵ See New Zealand Wool Marketing Corporation Statistical Handbooks 1973/74, 1974/75, 1975/76, 1976/77, for price data.

2.2 Supply of New Zealand Raw Wool

1. Shearing patterns. No comprehensive data on time of shearing in New Zealand are currently available. Therefore, it is not possible to analyse complete regional shearing patterns and trends. These problems will be alleviated to a large extent in the near future, since the New Zealand Meat and Wool Boards' Economic Service is currently processing information from survey farms, on shearing patterns and wool volume and disposal.

However, data from a sample survey conducted by the Agricultural Economics Research Unit make it possible to describe shearing patterns for the South Island for the 1974-75 season. These patterns are shown in Figure 2 for 19 South Island regions. Appendix 4 shows the local authority areas which comprise each region, and the number of observations on which the regional data are based.

All regions displayed a distinct major seasonal shearing peak with secondary peaks also being observed in all regions except Gore, Invercargill and Wallace. For fourteen of the regions the major shearing peaks occur in December and January, and for the remaining regions this peak occurs between August and October. Minor peaks tend to be more variable, but are concentrated between December and February, and August and September.

For the West Coast regions (West Coast and Nelson), major peaks occur in December and January, with minor peaks between June and August. In the Northern half of the eastern regions (Marlborough North Canterbury, Rangiora and Christchurch), these major peaks tend to occur in January, while minor peaks tend to vary, occurring in July, August-September and October. The Malvern region departs from this pattern with a major peak in September, and a minor peak in December.

FIGURE 2

Monthly Percentage of Total Wool Shorn in South Island Regions 1974-75

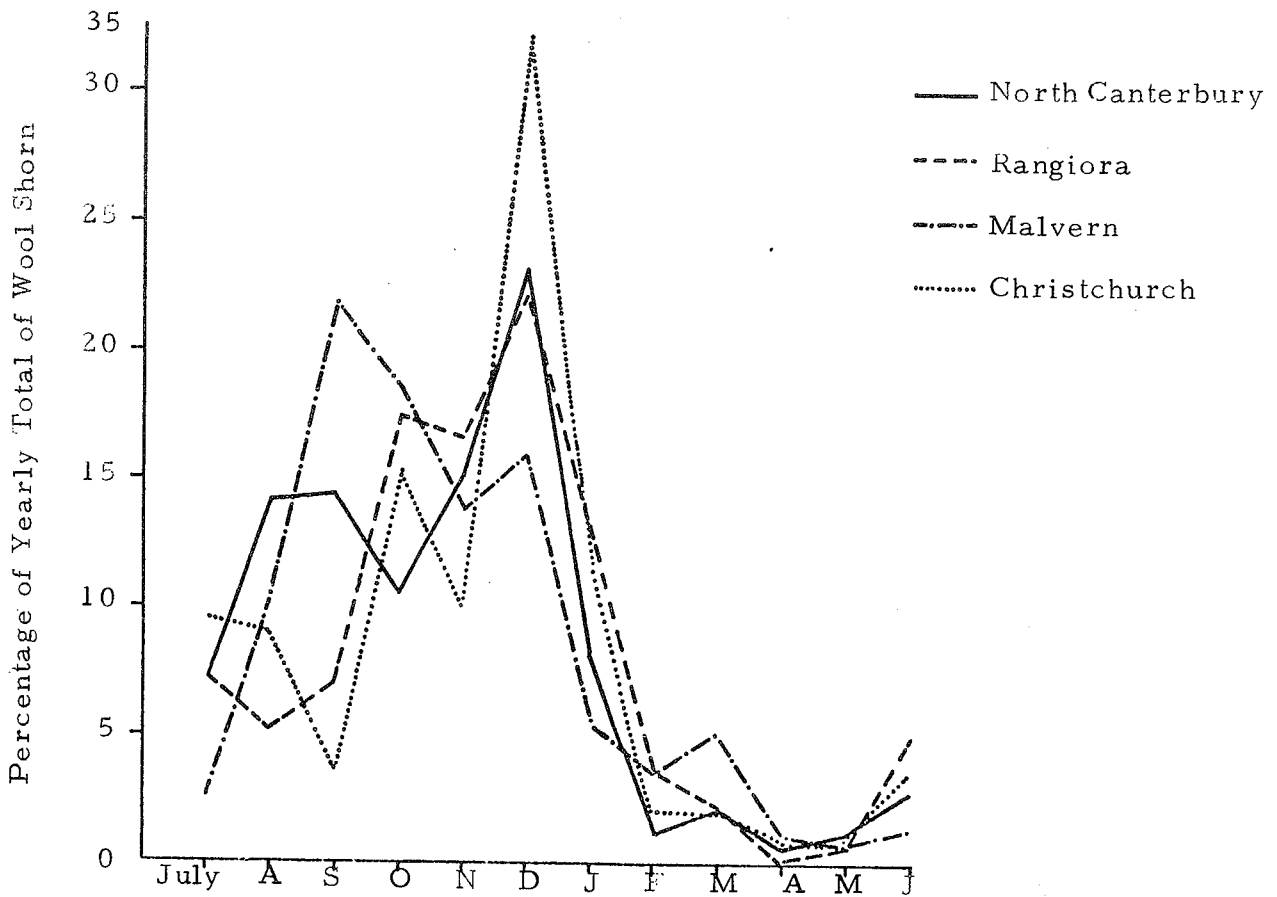
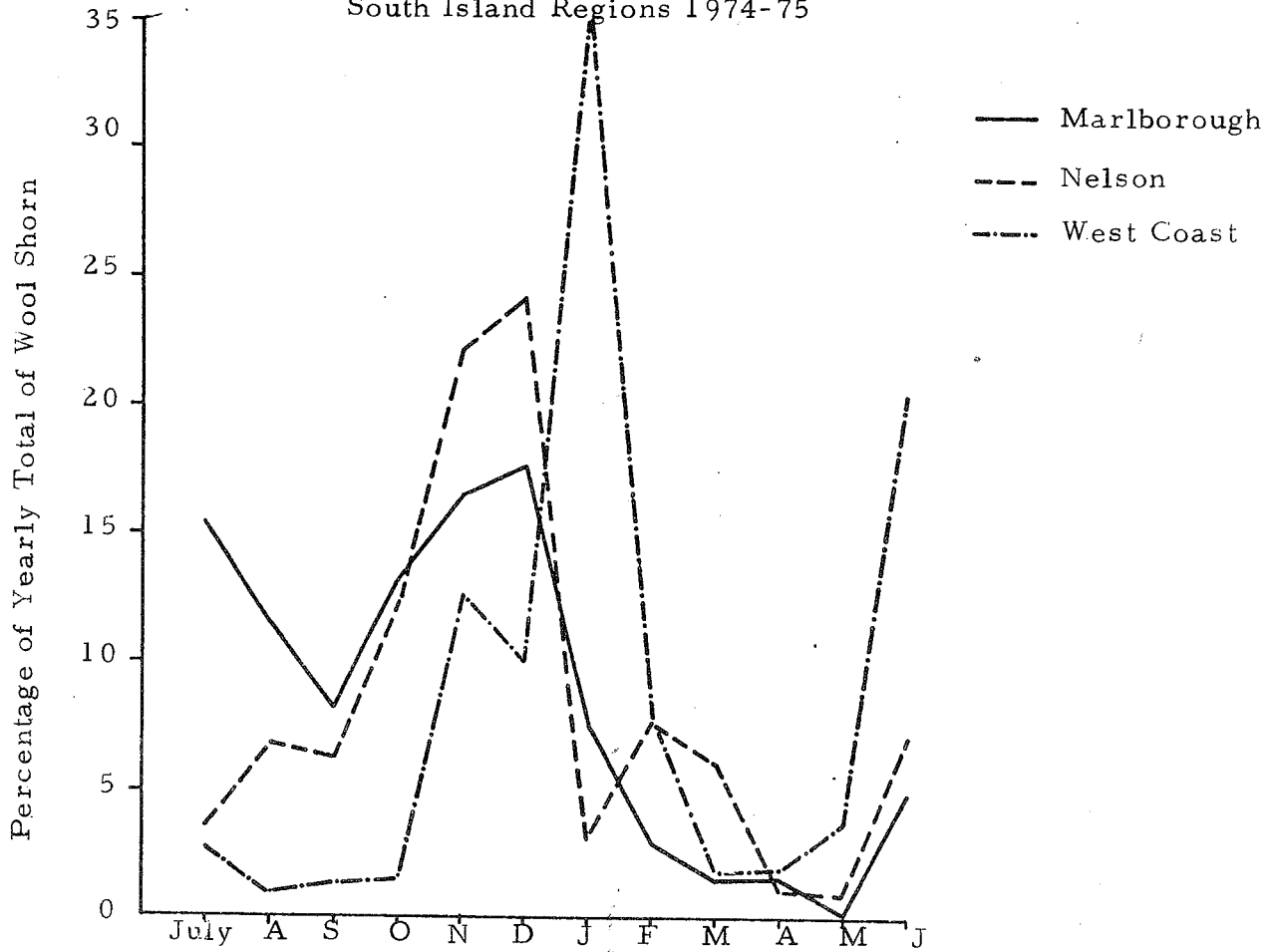


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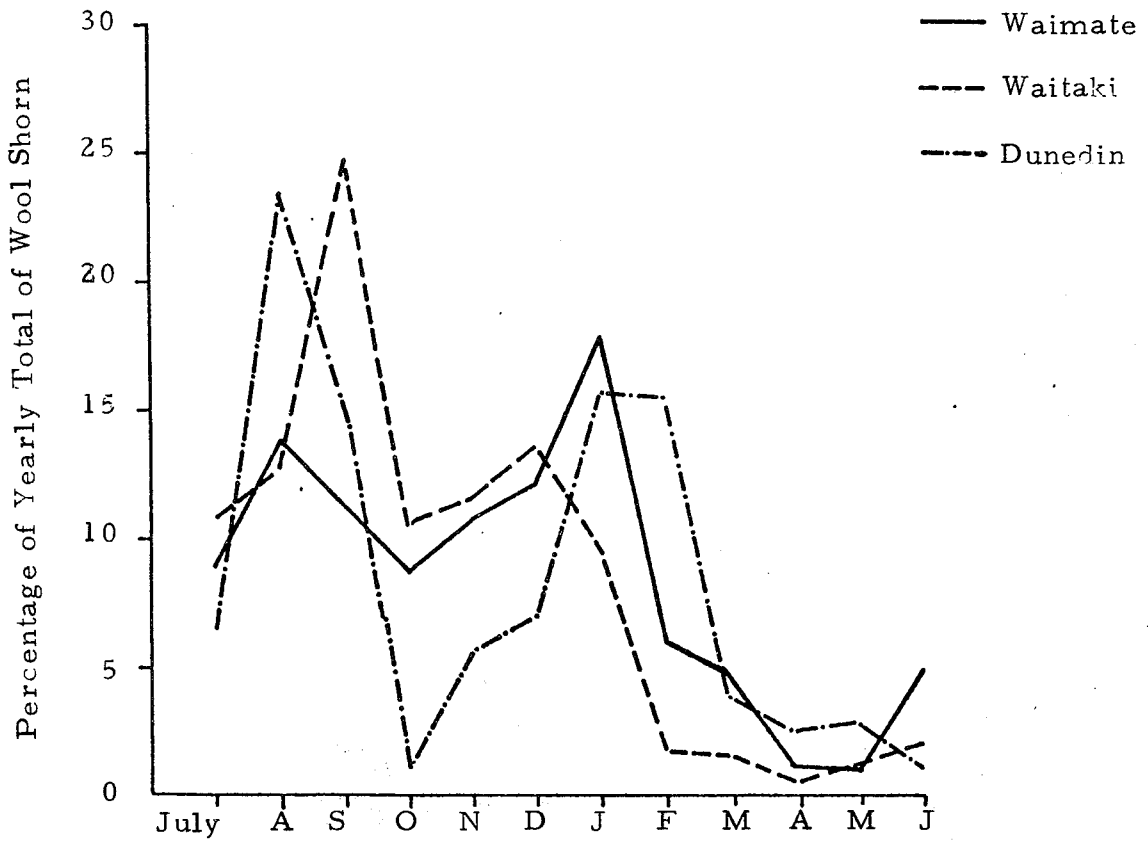
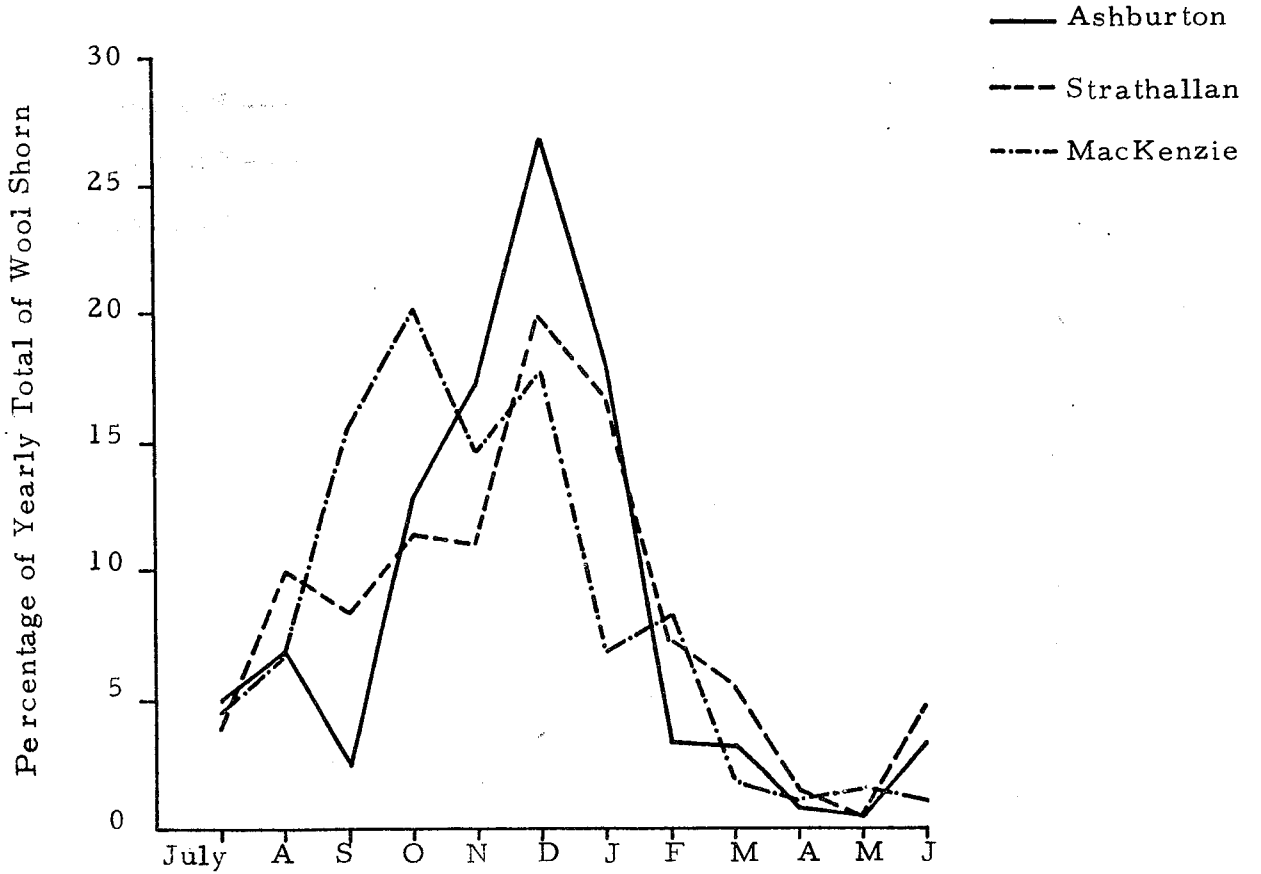
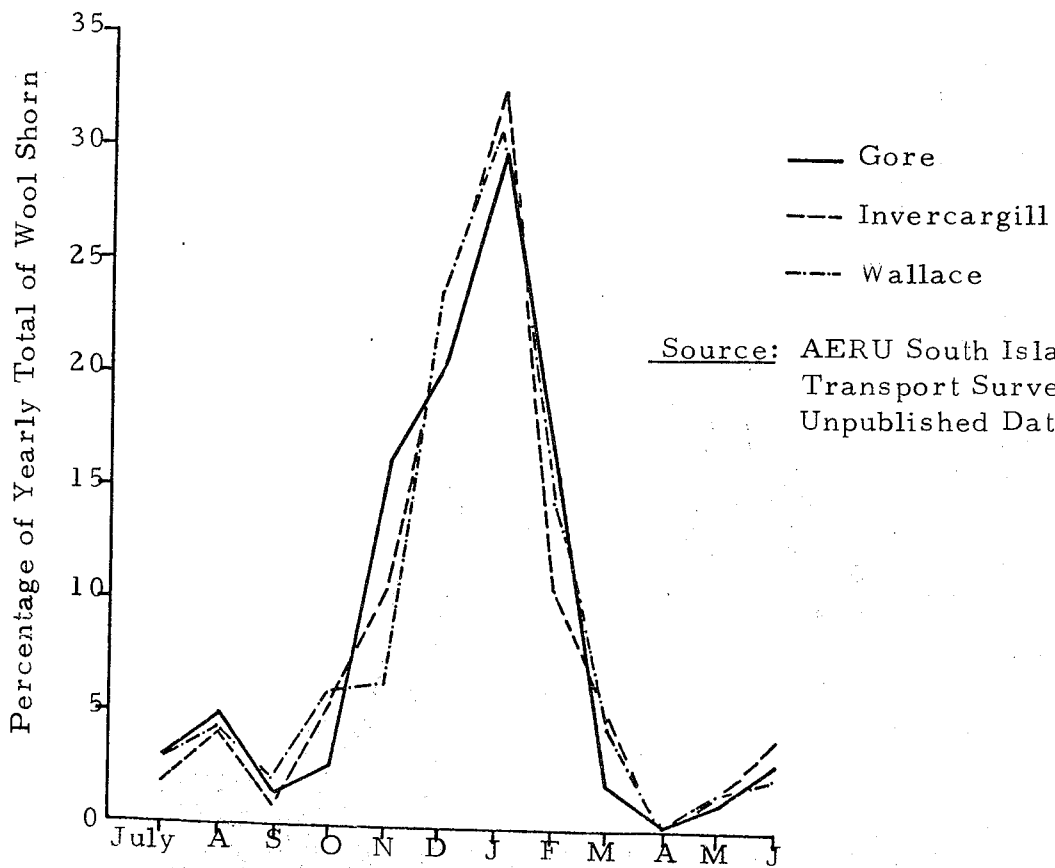
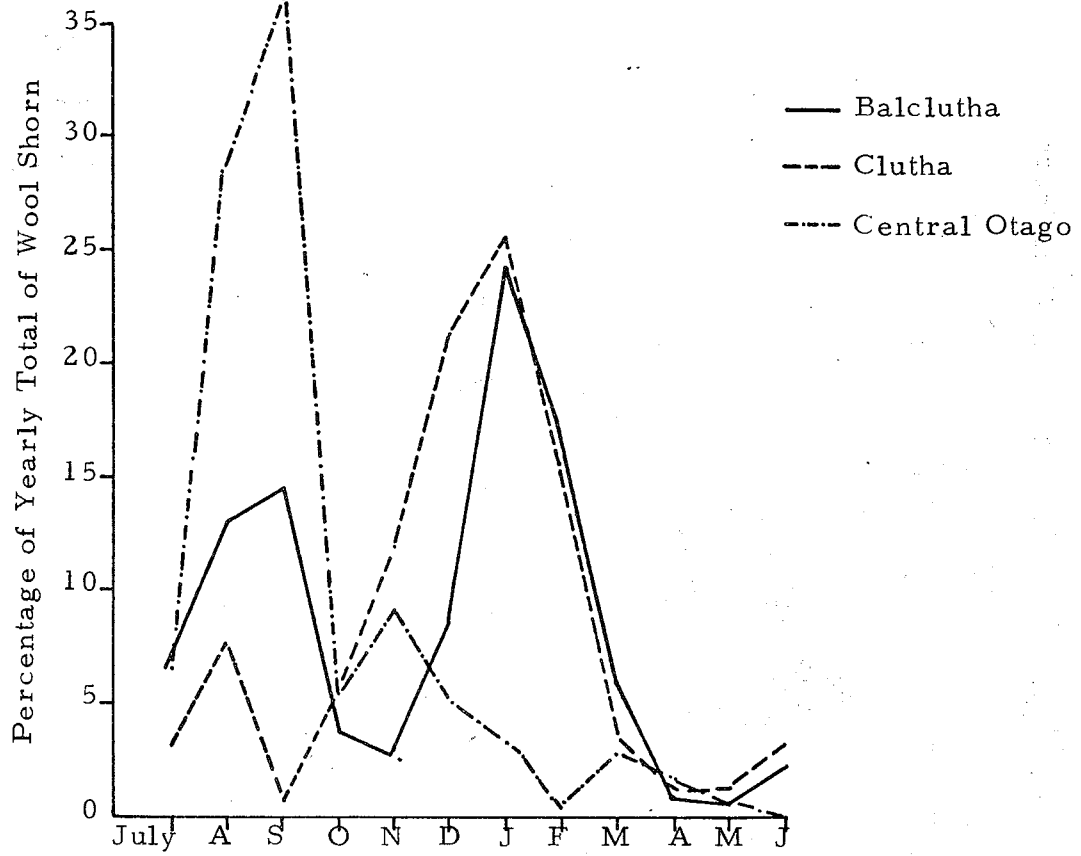


FIGURE 2 (cont'd)



Source: AERU South Island Transport Survey, 1975, Unpublished Data.

The pattern in South Canterbury tends to be more variable. Ashburton and Strathallan peak in December with minor peaks in August. Although Waimate also displays this August minor peak, the major peak tends to be later, occurring in January. MacKenzie departs from the general trend for these areas, with a major peak in October and a minor peak in December.

In Otago, the majority of shearing is much earlier, with Dunedin displaying an August peak, and Waitaki and Central Otago a September one. Dunedin has quite a significant minor peak in January and February, while the other regions have lesser peaks in November and December.

Southland regions are remarkably uniform, with a sharp peak occurring in January in each of the three regions of Gore, Invercargill and Wallace.

Although these shearing data are limited to the extent that they are available for one year only, and apply to South Island regions rather than to the whole of New Zealand, they demonstrate that shearing patterns are highly seasonal, and that the degree and timing of this seasonality varies quite markedly between regions. The cost ramifications of these patterns are uncertain; to determine such ramifications detailed investigation would be necessary to determine the patterns of shearing and the nature and operation of shearing contracting (including the degree to which the demand for shearers is peaked and the effect of any such peaking on the cost of the operation).

2. On-farm storage of wool. There is a paucity of detailed information on on-farm storage of wool. However, a reconciliation of A.E.R.U. sample survey shearing data with survey information on the temporal movement of wool off farms suggests that some on-farm wool storage occurred in 1974/75, although further investigation would be necessary before the prevalence of, and rationale for, this practice could be determined.

3. Slipe wool. A further source of raw wool, slipe wool, has accounted for nearly 13 per cent of total wool production in recent years.¹⁶ In 1976/77, 38,000 tonnes of slipe wool were available.¹⁷

Since sliping is undertaken immediately after slaughtering, the peak in sliping activity can be inferred from the monthly pattern of sheep and lamb slaughterings shown in Figure 3. In general, a marked peak in sliping operations appears to occur between January and March. A lag of approximately two months occurs before the majority of this wool reaches the port of export, as illustrated in Figure 3.

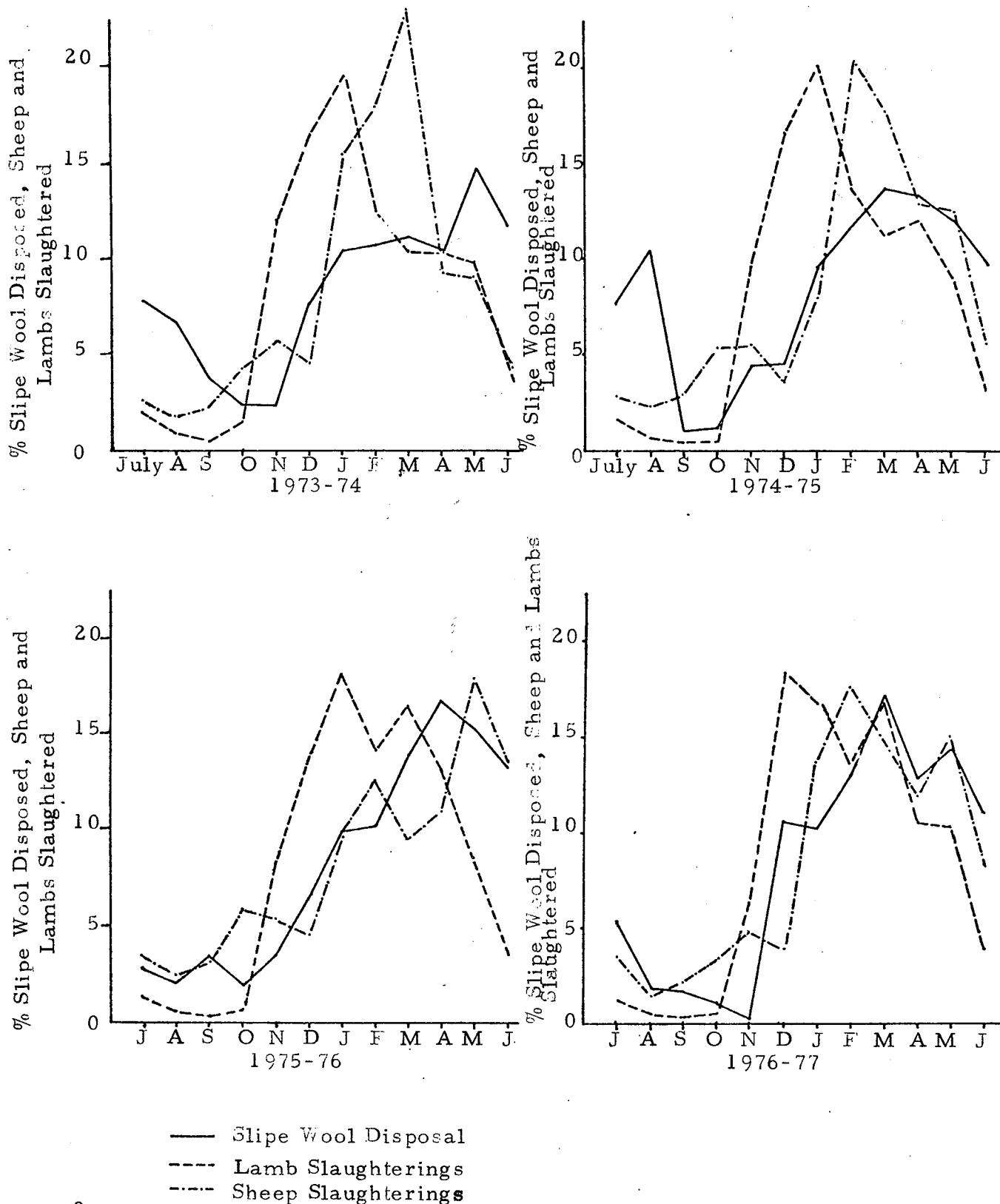
Some costs of under-utilization of sliping equipment will be associated with this seasonal throughput of slipe wool. However, because of the by-product nature of sliping, it is unlikely that freezing companies could be induced to smooth slipe wool flows unless some incentive was offered to them.

¹⁶ Slipe wool production for the years 1974-75 to 1976-77 averaged 12.6 per cent of total wool production, where all calculations were made on a greasy equivalent basis.
Source: NZWMC Statistical Handbooks 1974/75, 1975/76, 1976/77.

¹⁷ Source: NZWMC Statistical Handbook 1976/77.

FIGURE 3

Monthly Pattern of Sheep and Lamb Slaughtering and Slupe Wool Disposal 1973-74 to 1976-77^a



^a Slupe Wool Disposals measured at point of export.

Source: Monthly Abstract of Statistics.

NZWMC Statistical Handbooks 1973/74, 1974/75, 1975/76, 1976/77.

2.3 Distribution and Processing of New Zealand Raw Wool

1. Transport from farm. Figure 4 shows the monthly percentages of the yearly total of wool moving out of South Island counties for 1974/75. This gives some indication of the demand placed on transport facilities by the movement of wool from farms.

The degree of peaking of wool movement off farms tends to differ slightly from shearing patterns probably because of on-farm storage. However, these wool movement peaks still tend to occur in those months in which shearing takes place, although in approximately one-quarter of the regions there is a lag of one month. Therefore, the greatest demand for rural transport by wool growers in 1974/75 occurred between December and February, with a lesser demand from August to October.

This peak transport demand tends to coincide with the peak demand for sheep transport, where South Island data indicated that a seasonal rise in demand occurred from mid-November through to mid-June with a peak in February.¹⁸ Although comprehensive data on the seasonal demand for transport for all purposes associated with rural freight are not available, data for Ashburton County show that the heaviest demand for transport by farmers occurs from November to March in that County, with a moderately heavy demand in August.¹⁹ More specifically, the seasonal movement of all livestock tends to peak in January and February, with a lesser peak in November, and smaller peaks again in August and March.²⁰

¹⁸ See Ambler, T.I., Filan, S.J. and Young, S.L. 1979, A Transport Survey of South Island Farmers, Research Report No. 90, AERU, Lincoln College.

¹⁹ Ambler, T.I. 1975. Use Made of Transport by Farmers: A Pilot Survey with Findings Relating to Ashburton County, New Zealand. Discussion Paper No. 30, AERU, Lincoln College.

²⁰ _____, 1975. Ibid.

FIGURE 4
 Monthly Percentage of Total Wool Moving out of South Island
 Regions 1974-75

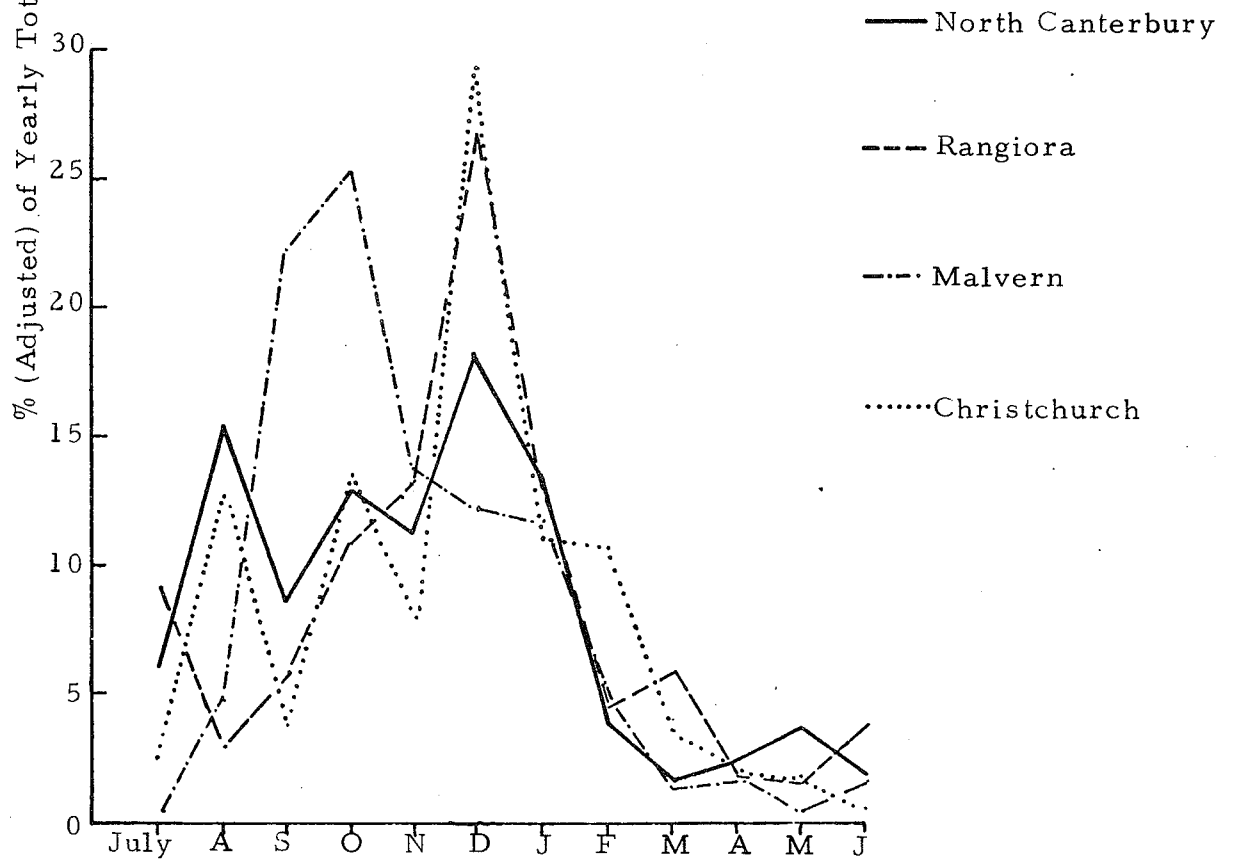
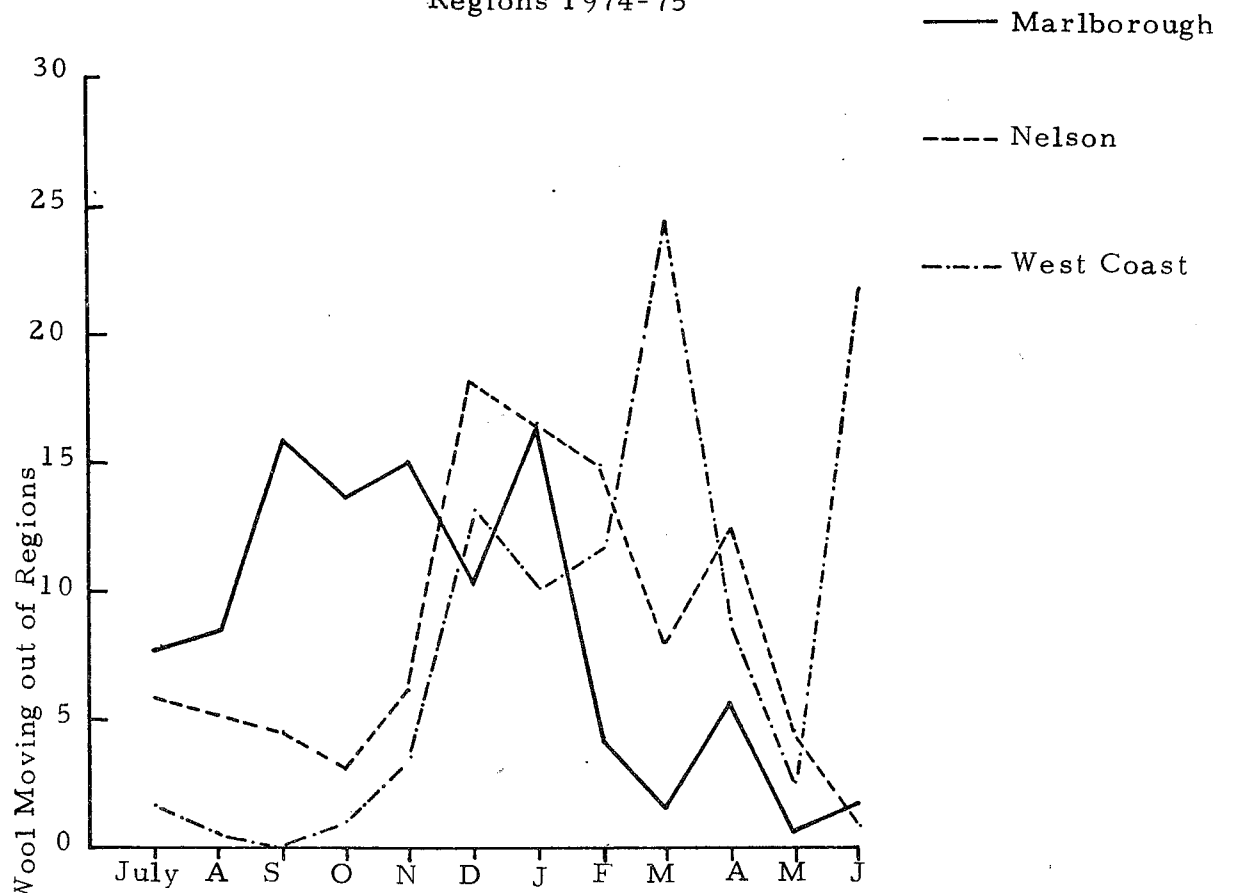


FIGURE 4 (cont'd)

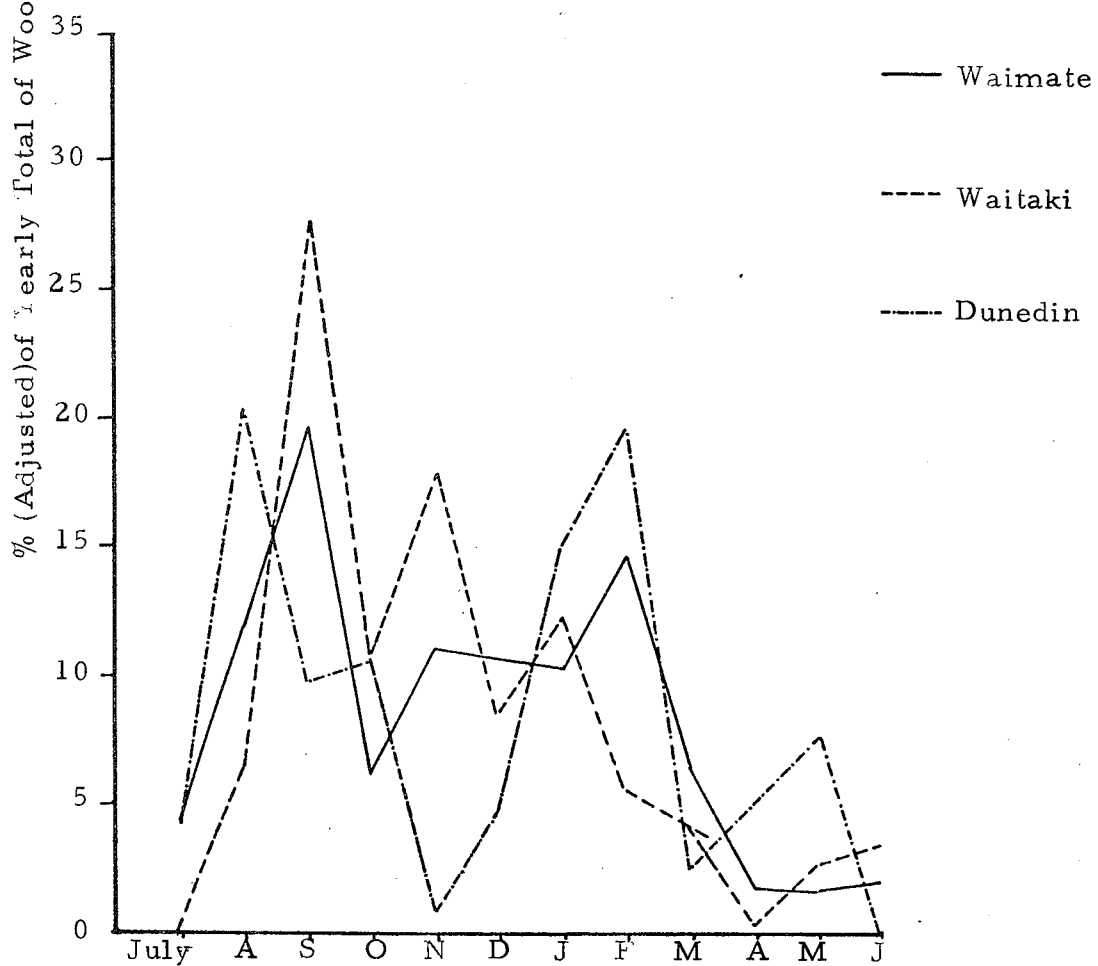
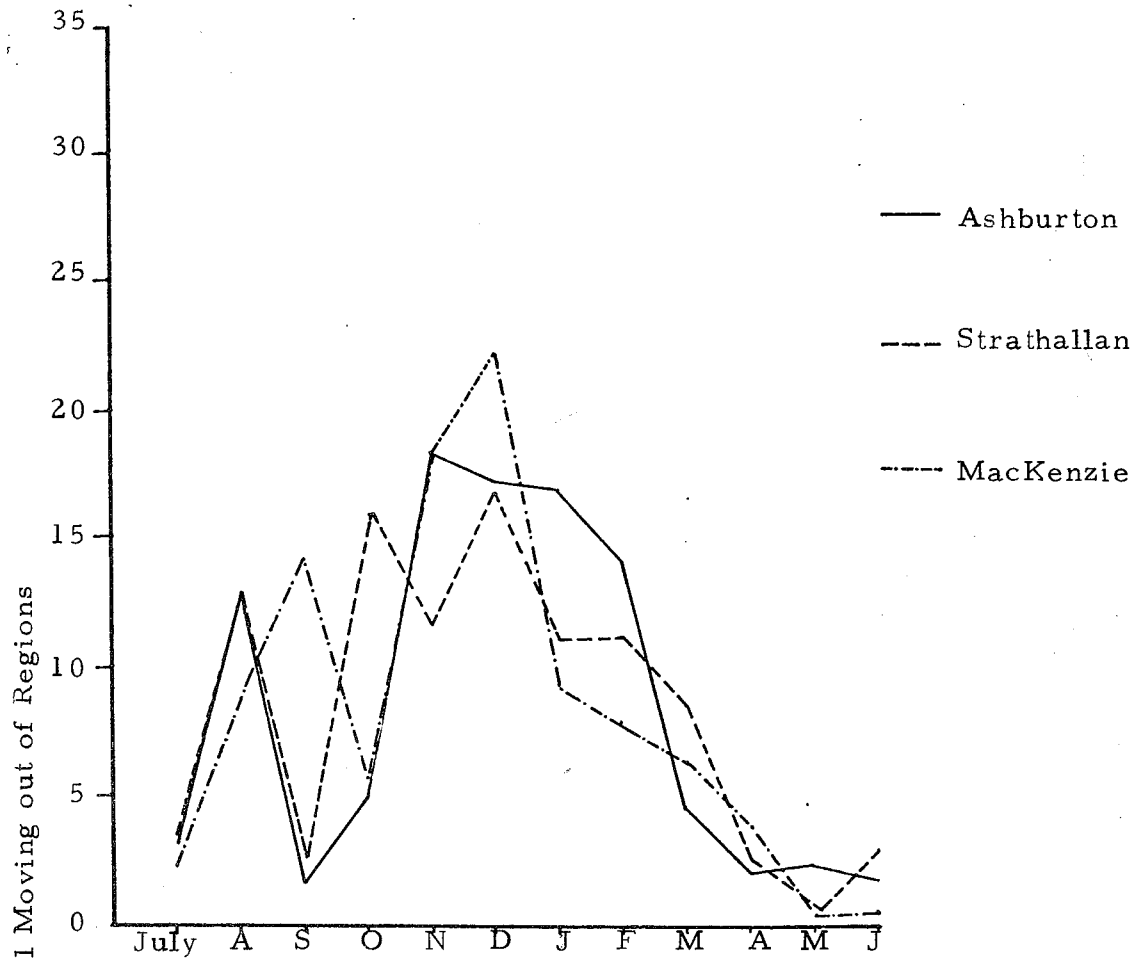
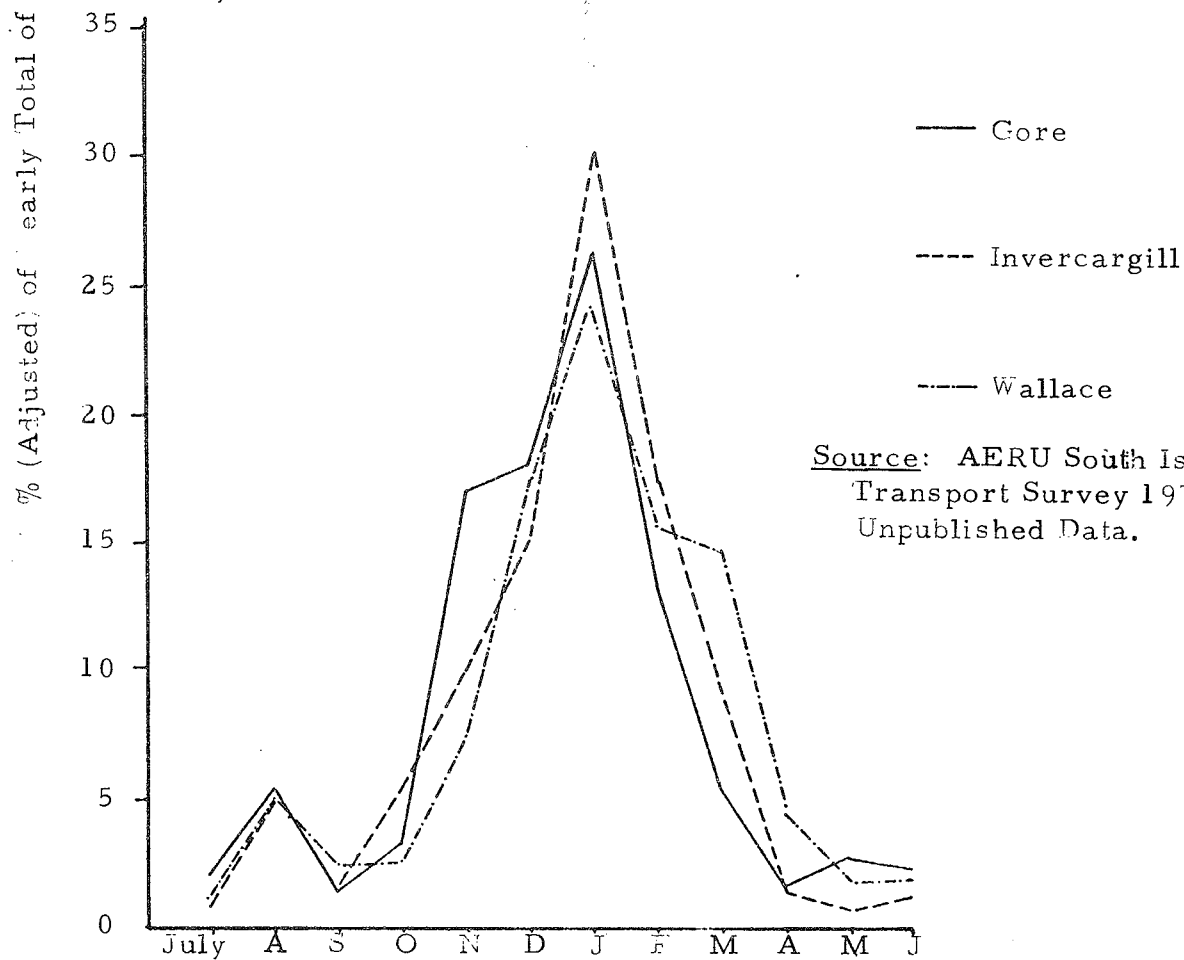
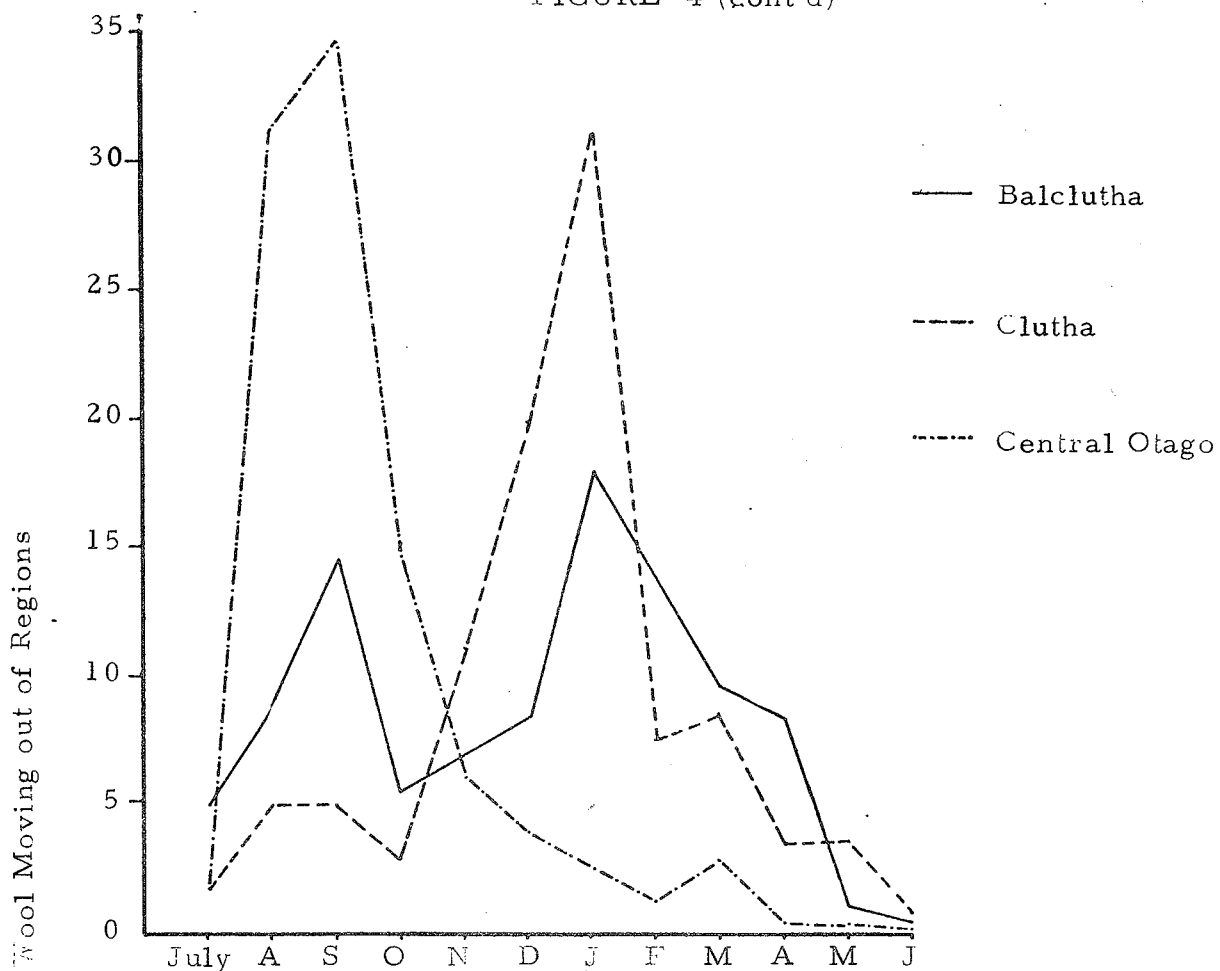


FIGURE 4 (cont'd)



Source: AERU South Island Transport Survey 1975, Unpublished Data.

For all commodities, transport demand is high from January to March, with a lesser peak from July to August.²¹

Therefore, it seems probable that the demand for wool transport in the South Island coincides with the demand for rural transport for other uses. Since there are likely to be costs associated with this peak demand, and with the consequent under-utilization of capacity in the off-peak period, it is possible that costs associated with transporting wool from farms could be reduced if the demand for wool transport could be evened out.

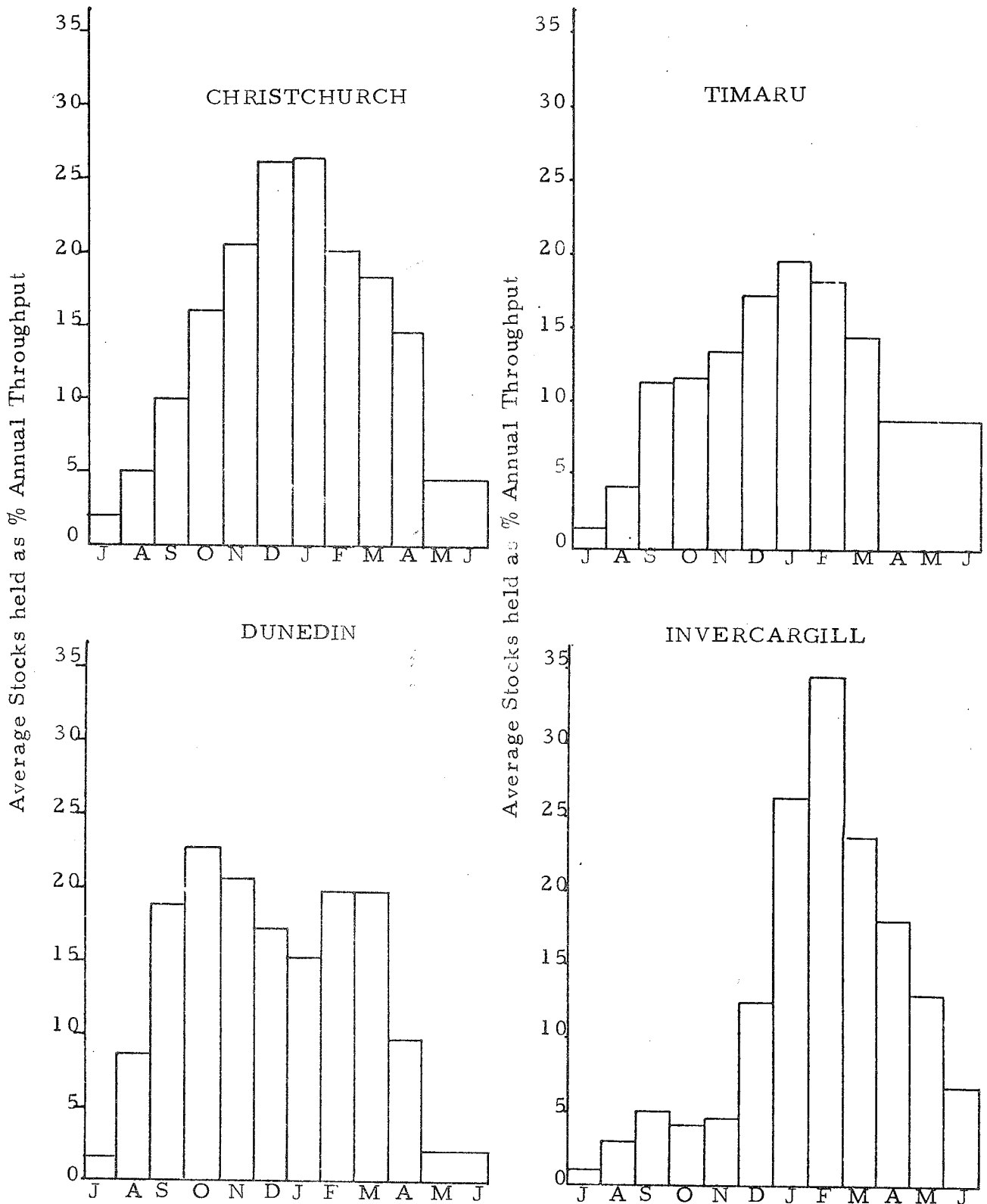
2. The auction system.

(i) Pre-sale storage of wool.

Figure 5 gives some indication of the degree of pre-sale storage undertaken by woolbrokers in South Island centres in 1974/75, the only season for which data are available. This storage followed a seasonal pattern which is related to the movement of wool from farms and the volume of wool sold at auction. In all centres, high levels of stocks were held at the peak of the shearing and wool selling season.

²¹ Ambler, T.I., 1975. Use Made of Transport by Farmers: A Pilot Survey with Findings Relating to Ashburton County, New Zealand, op.cit.

Average Stocks of Wool Held as a Percentage of Annual Throughput^a- South Island Selling Centres 1974-75



^a The sum of average stocks held as a percentage of annual throughput exceeds 100 per cent as wool stocks are often held for longer than one month.

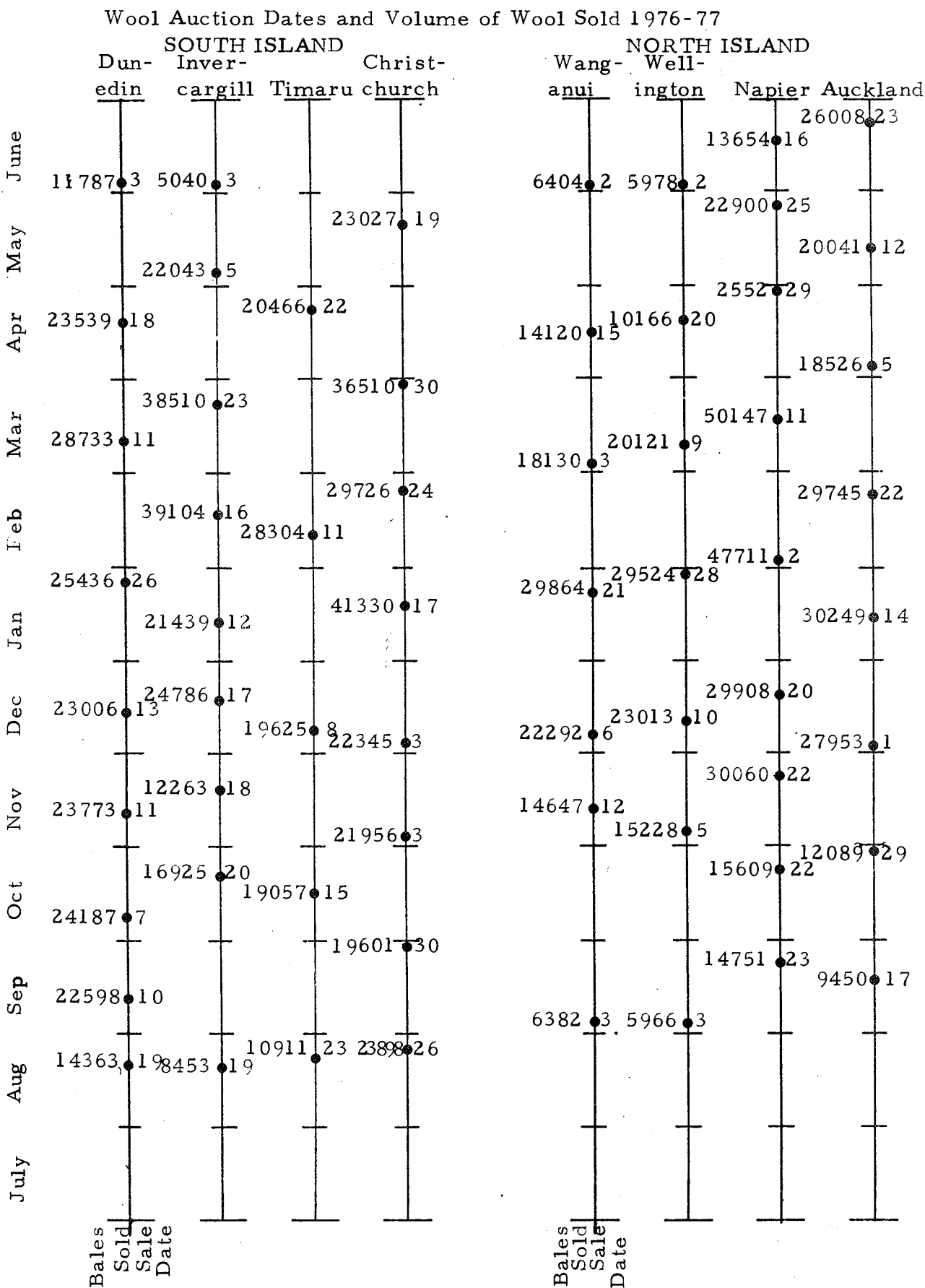
Source: Derived from NZWMC News Sheets; South Island Transport Survey 1975, unpublished data.

(ii) The pattern of auction sales.

A roster of auction sales is drawn up each year by the Wool Auction Sales Committee, which consists of representatives of woolbuyers, woolbrokers, and the New Zealand Wool Board. This roster sets out dates for sales and the maximum quantities of wool to be offered at each sale. These decisions are based on a number of factors; for example, the necessity for buyers to move between selling centres will act as a constraint when setting sale dates, and the volume of wool which can conveniently be handled in each centre will partly determine the size of sales. The 1976/77 schedule of sales and the volume of wool actually sold in these sales is shown in Figure 6.

Figure 7 displays details of the seasonal volume of wool sold at auction over the period 1973-74 to 1976-77. Over this four year period a broad seasonal peak in wool sales occurred from October to April, though the actual peak tended to vary from year to year. This peak does not appear to be significantly different in 1975/76, when the NZWMC was selling stocks, as opposed to the remaining three years when it was accumulating stocks. Figure 8 disaggregates this data according to individual selling centres for 1976-77, and demonstrates the considerable variation in selling patterns between these centres.

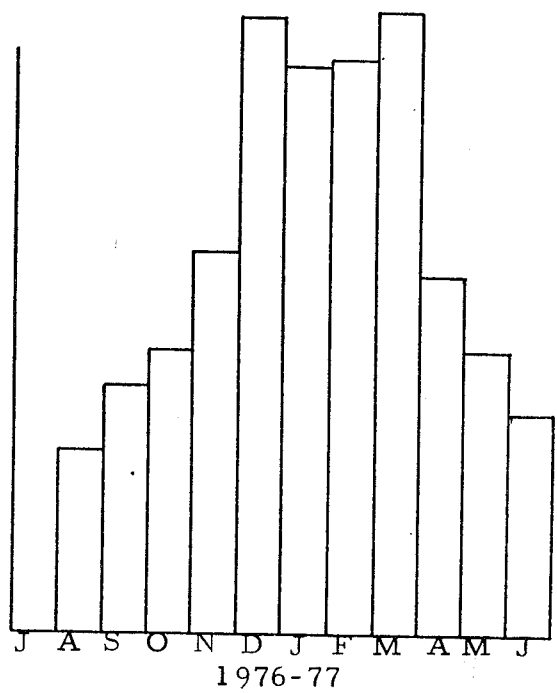
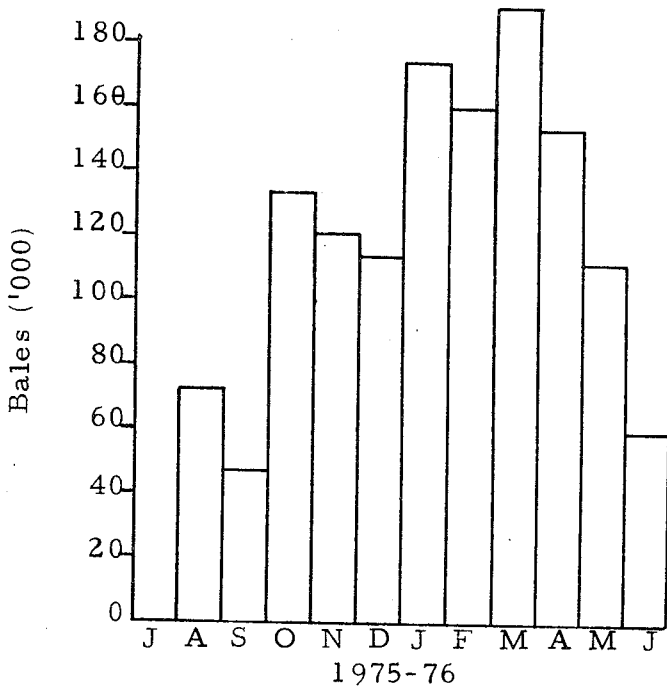
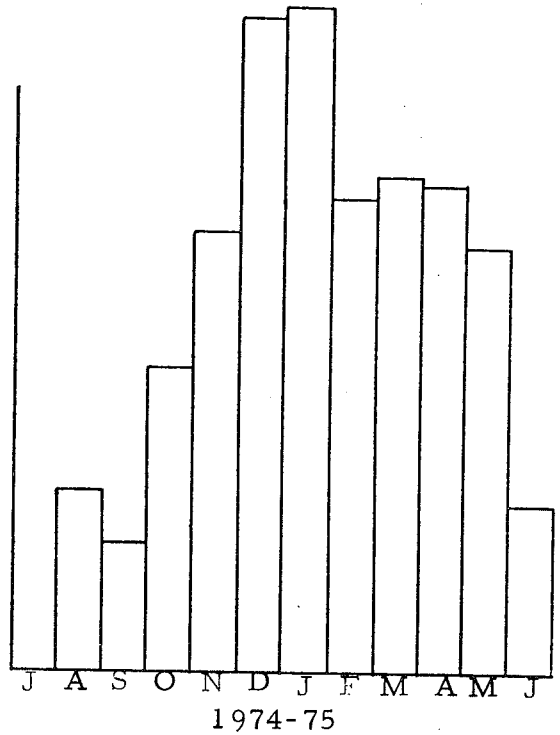
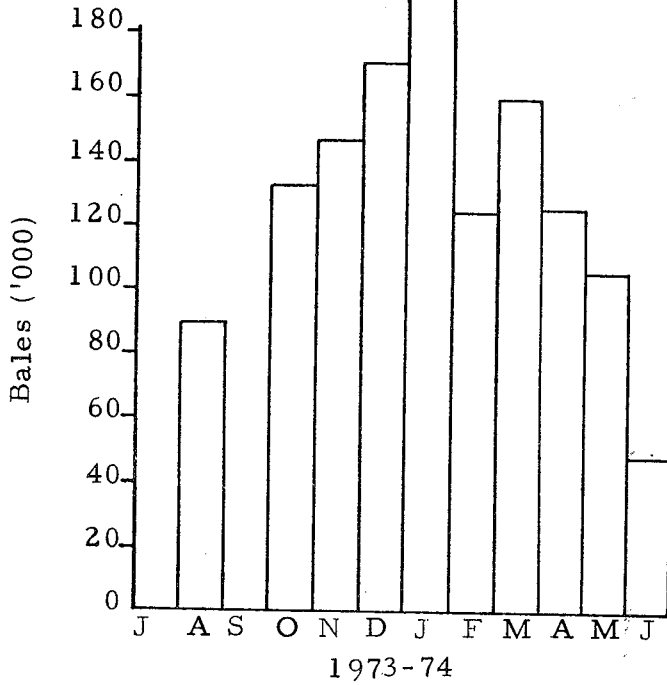
FIGURE 6



Source: NZWMC Statistical Handbook 1976/77.

FIGURE 7

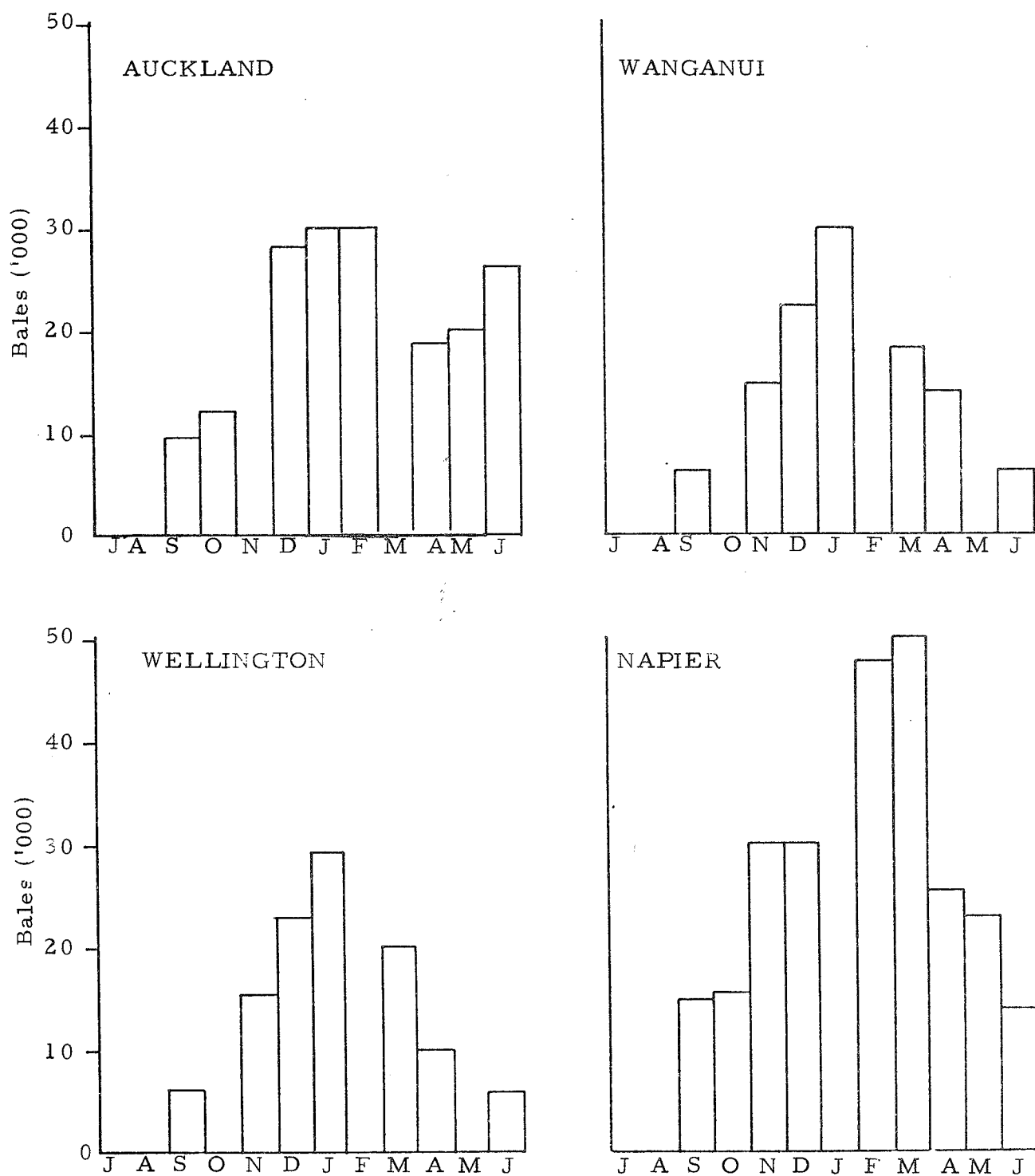
Wool Sold at Auction 1973-74 to 1976-77



Source: NZWMC Statistical Handbooks.

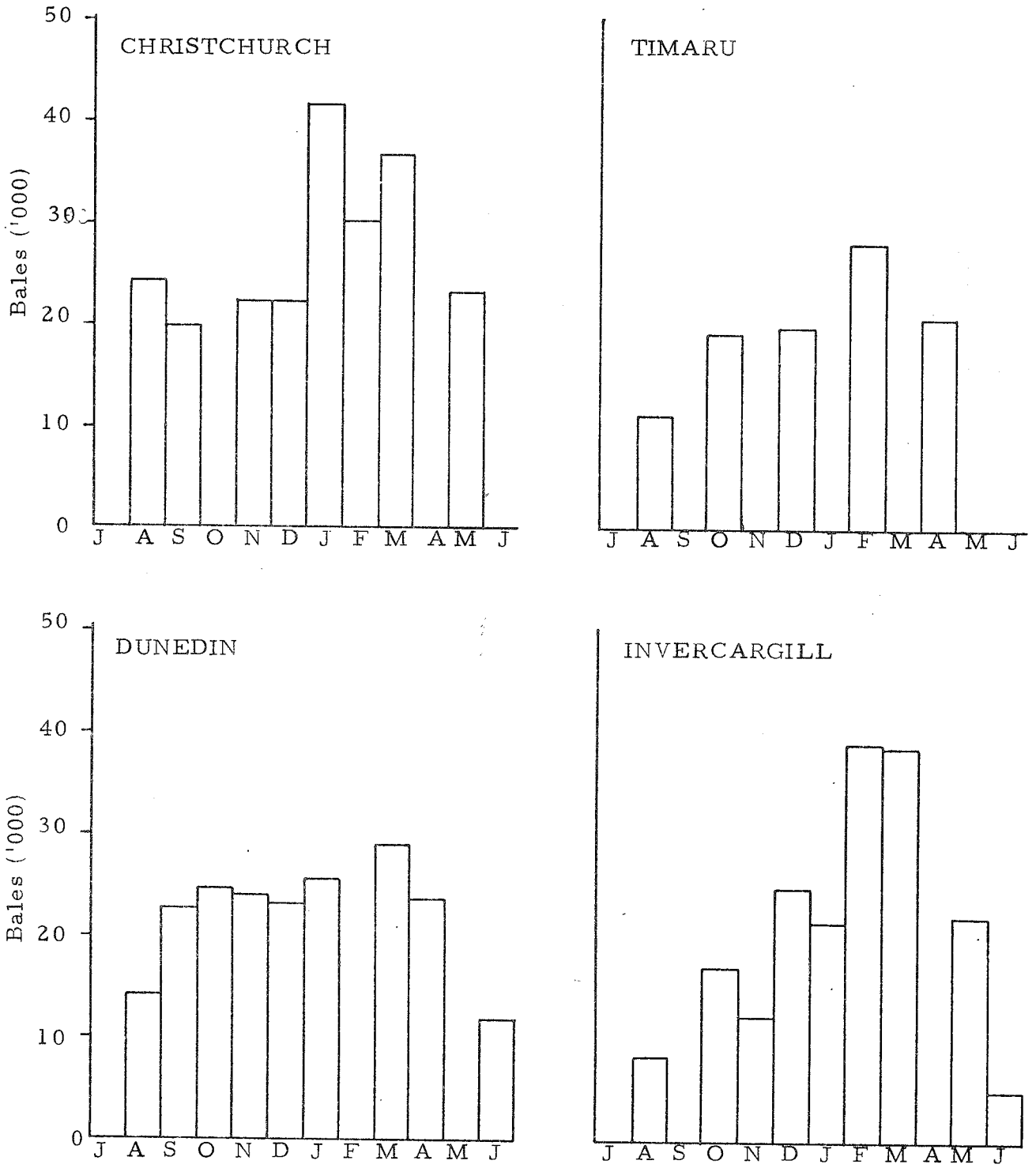
FIGURE 8

Wool Sold at Auction in North Island Centres
1976-77



Source: NZWMC Statistical Handbook 1976/77.

FIGURE 8 (cont'd)



Source: NZWMC Statistical Handbook 1976/77.

(iii) Short-term peak outflows.

After sale, the majority of wool is either dumped or scoured and then dumped, and then shipped to overseas mills. Short-term congestion of these post-auction wool flows tends to occur, with the result that brokers' peak labour requirements are often very short-term, and there can be slack periods even in the busiest months. Therefore, short-term peak outflows of wool constitute a significant problem which is exacerbated by seasonal peak wool flows.

(iv) Costs associated with peak wool flows.

No comprehensive information on the costs associated with peak wool flows through brokers' stores is available. However, a theoretical costing exercise which has been undertaken,²² estimates that potential cost savings of the magnitudes outlined in Table 2 are possible, if it is assumed that facilities handle a maximum of only 10 per cent of total annual arrivals in the busiest month.²³

²² K. Woodford, Lincoln College, unpublished information.

²³ This would be an improvement over the current situation where approximately 20 per cent of wool currently arrives in the busiest month.

TABLE 2
Potential Cost Savings by Smoothing Wool Flows
Through Brokers' Stores

Savings From	% Total Annual Costs of Complexes		
	Wool Selling & Dumping Complex	Wool Selling Complex, no Dumping	Container Packing Facility
Improved Plant Utilisation	1.6	1.2	6.5
Reduced Storage Space	19.3	22.3	17.0

Source: K. Woodford, Lincoln College, op.cit.

As indicated above, potential savings are estimated at approximately 22 per cent of the total annual costs of a broking complex if both seasonal inflows and outflows are smoothed to the specified degree. However, it must be stressed that these savings from improved plant utilisation and reduced storage space represent an upper limit on potential savings on these activities, and that actual savings may be less. However, for some centres, additional savings might be made through improved labour utilisation and reduced bale handling.

3. The private selling system. Nearly 16 per cent of total New Zealand wool disposals flow through the private selling system.²⁴

²⁴ Private sales as a percentage of New Zealand wool disposals averaged 15.6 per cent over the period 1968-69 to 1976-77. See Table 1 for further details.

Over the period 1973-74 to 1976-77 a general seasonal peak in private sales occurred from November to April, with the greatest volume being sold in either December or January (see Figure 9). The lowest point in the corresponding trough tended to occur in September.

This pattern is similar to that of wool sold at auction, with the exception that private buyers purchase a quantity of wool in July when auctions are not held. As with total wool sold at auction, there does not appear to be any strong relationship between the total private sales of wool by month and the average monthly greasy price for all types of wool sold at auction. However, the degree of aggregation employed may disguise any obvious price relationship. The overall conclusion is that private sale activity is related to wool availability.

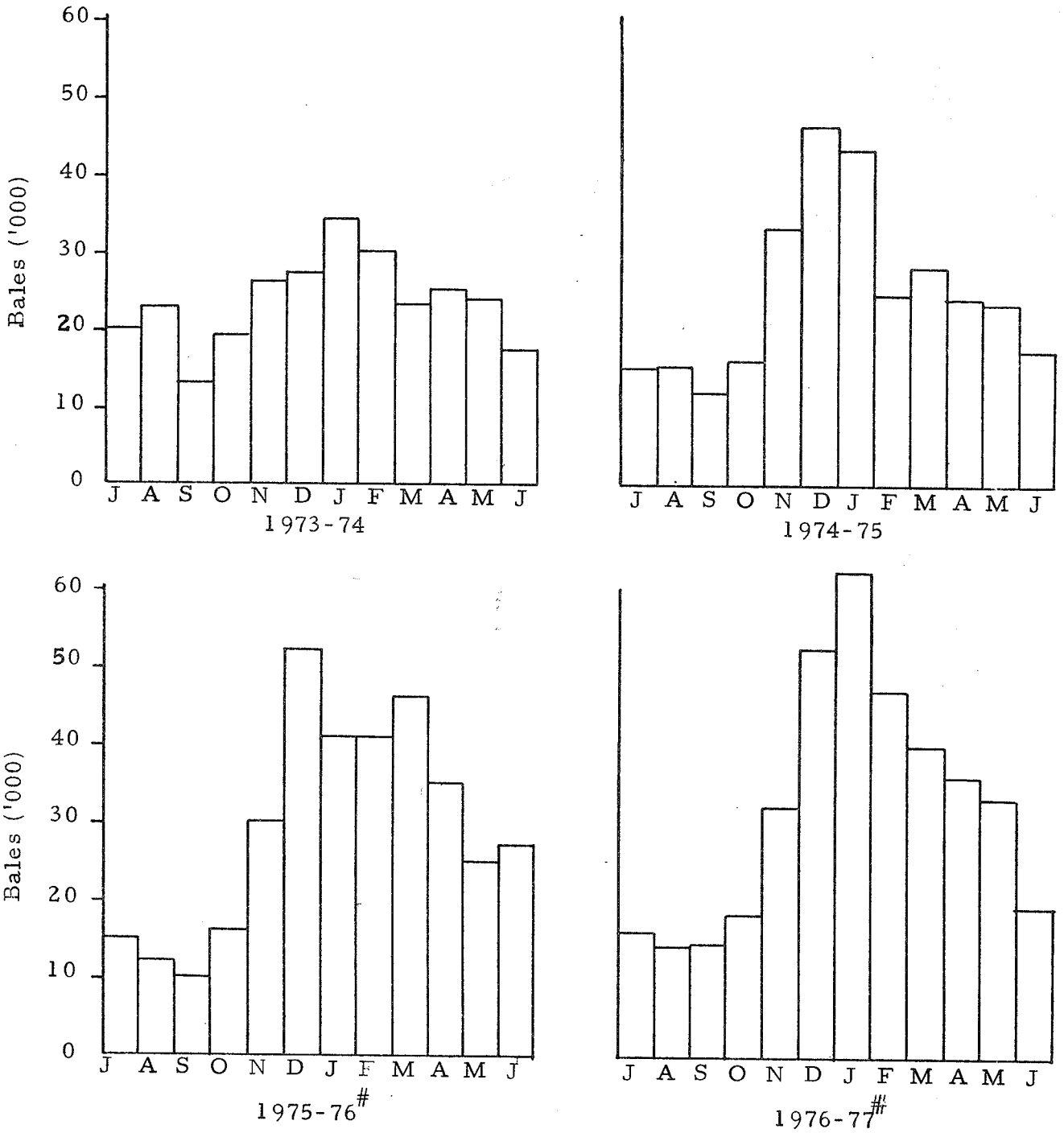
4. Scouring patterns. The predominant scouring activity is conducted on behalf of overseas concerns, and only 14 per cent of wool scoured by members of the Woolscourers' Association in 1976/77 was on account of local mills.²⁵

Scourers experience problems associated with both short-term and seasonal peak flows of wool. Short-term peaking problems are created when a large volume of auctioned wool must be scoured quickly in order to meet shipping deadlines.

²⁵Source: New Zealand Woolscourers' Association (Inc.).

FIGURE 9

Total Private Sales of Wool 1973-74 to 1976-77



[#] Statistical Bales of 152 kg greasy per bale

Source: NZWMC Statistical Handbooks.

Figure 10 demonstrates that a general seasonal scouring peak occurs from approximately January to July. This pattern does not correspond precisely with peak auction or private sales, though it does tend to follow the broad pattern of summer activity and winter lull, with scouring activity tending to lag behind selling activity.

Although no comprehensive study has been undertaken to estimate what cost savings in scours would result from ironing out the seasonal wool flow, there is no doubt that any measure which contributes to evening out peaks and troughs must inevitably reduce scourers' costs.

5. Patterns of wool testing. In 1977/78 approximately 39 per cent of wool sold at auction was post-sale yield tested,²⁶ and 96 per cent of scoured bales exported were condition tested,²⁷ and, in recent years, a significant number of bales have been pre-sale tested.²⁸

Both short-term and seasonal peaks in the demand for testing facilities present problems for testing houses. For example, the pattern of wool deliveries from growers to brokers' stores means pre-sale tests from a particular centre tend to reach a sharp peak several days before the deadline set down for issuing results, thereby creating short-term pressure on staff and equipment.

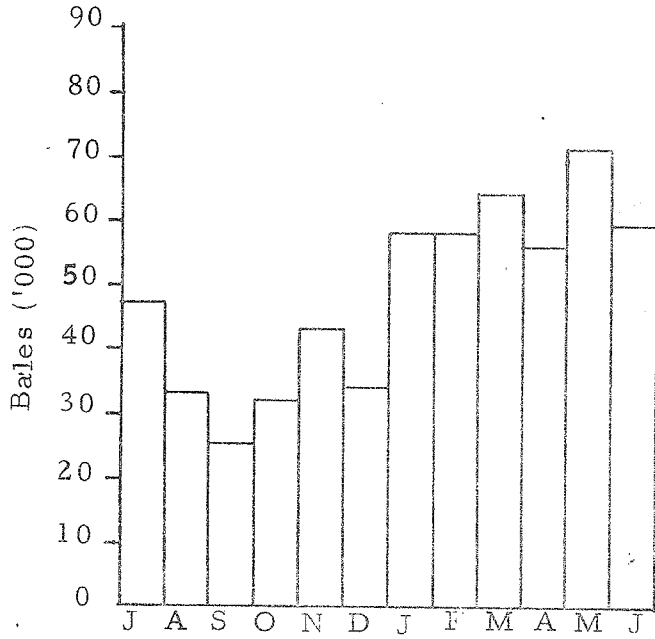
²⁶Source: New Zealand Wool Testing Authority.

²⁷Ibid.

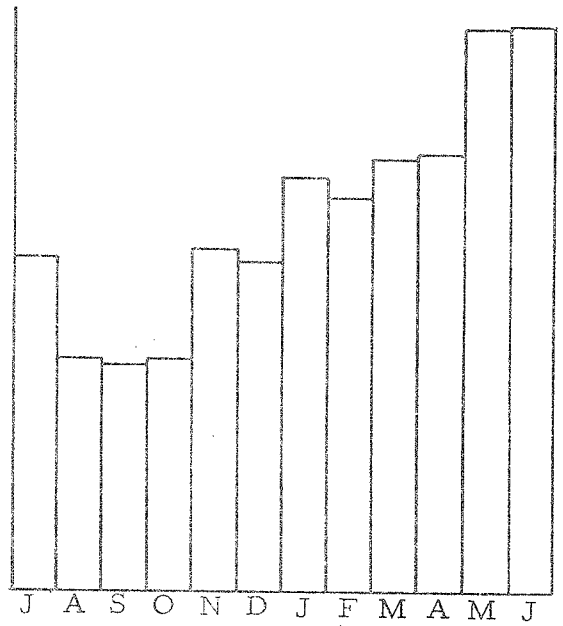
²⁸New Zealand Wool Testing Authority estimated that 176,000 bales were pre-sale tested in 1977-78.

FIGURE 10

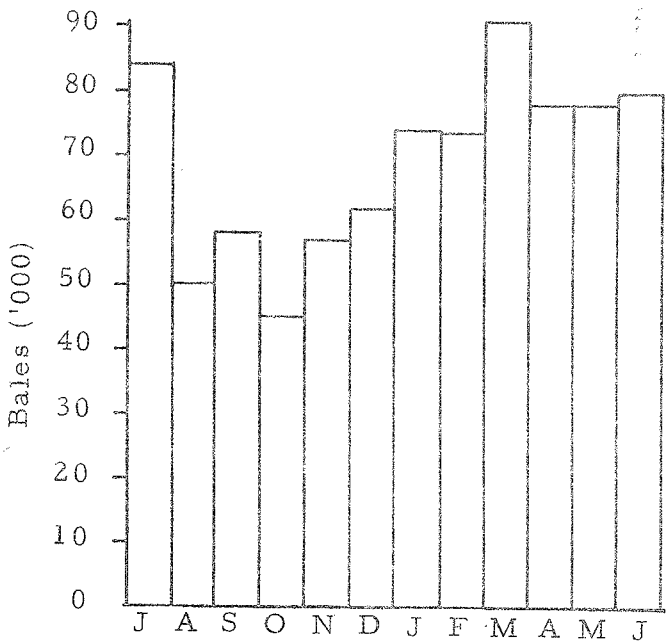
Wool Scoured in New Zealand 1973-74 to 1976-77



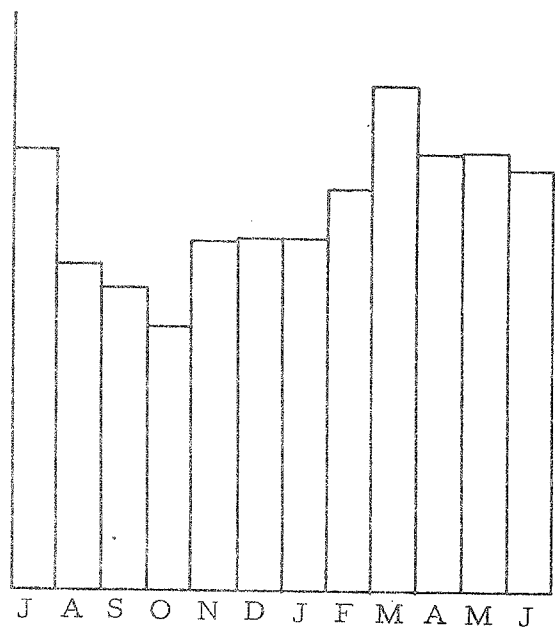
1973-74



1974-75



1975-76



1976-77[#]

[#] Statistical Bales of 152 kg greasy per bale

Source: NZWMC Statistical Handbooks

Seasonal peak demands on wool testing facilities occur from January to April, with pre-sale testing peaks coinciding with auction peaks, while post-sale testing peaks slightly later.²⁹

Because of this pattern, testing houses face difficulties in staffing and equipping laboratories in order to retain a balance between extremes of work load. For example, if they staff and equip to cover seasonal peaks, much under-utilised capacity will result in the off-season. Alternatively, if they attempt to maximize utilisation of equipment, stresses may arise in peak periods through continuous use of machinery operated by a predominantly temporary workforce. Smoothing seasonal wool flows would alleviate this problem, and, consequently, reduce costs associated with wool testing.

6. Dumping patterns. Information on the seasonal distribution of wool dumped is not currently published. However, since the volume of wool auctioned peaks from October to April, and that scoured from January to July, respectively, it seems reasonable to assume that a seasonal dumping peak exists which would coincide with such supplies for dumping. A high seasonal demand for shipping from January to June with an actual peak from March to May, confirms this, as dumping usually immediately precedes shipping.

Problems associated with short-term dumping peaks are more acute than those posed by seasonal requirements, and these short-term peaks will be accentuated by the seasonal wool flow through dumping facilities since, at the height of the season, larger volumes of wool will be making short-term peak demands on dumping facilities. These peak demands must inevitably increase dumping costs, although the extent to which they could be reduced by smoothing wool flows is unknown.

²⁹Source: Wool Testing Services New Zealand Ltd.

7. Shipping patterns. Figure 11 shows total wool exported from New Zealand by month for the four years 1973/74 to 1976/77. These statistics illustrate a trough in wool exports from September to November, with a rise following this, culminating in a peak normally from March to May.

The 1976/77 statistics are disaggregated in Figure 12 according to the major regions of destination.³⁰ United Kingdom/Eire, Western Europe and Eastern Europe tend to conform with the seasonal pattern for total exports. In that particular season exports to East Asia tended to peak earlier, while for the East Mediterranean and the Indian Ocean/Persian Gulf region aggregate flows are much smaller and a seasonal pattern is not easily discernible.

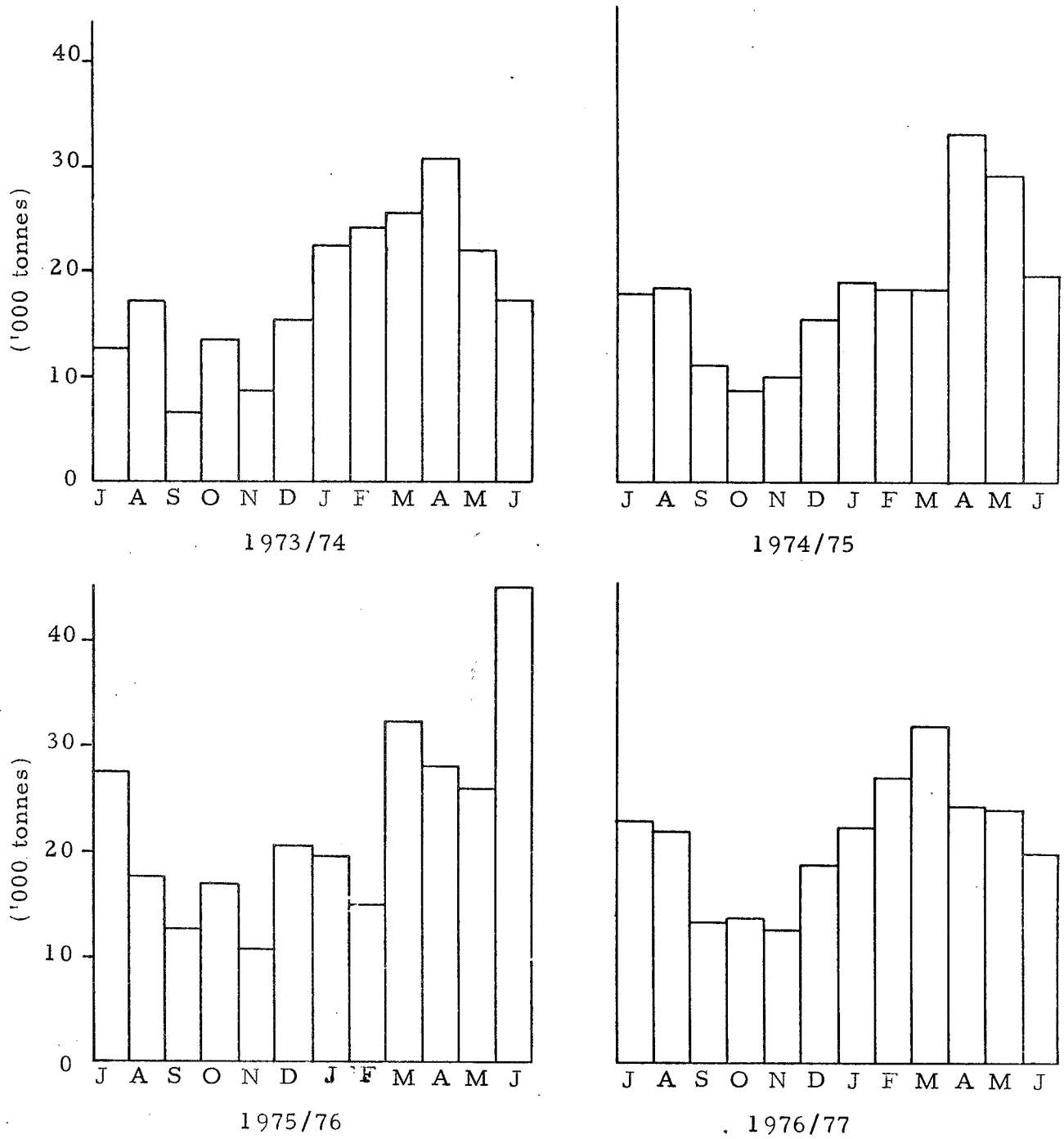
The 1976/77 data are also disaggregated in Figure 13 according to New Zealand port of despatch. Exports from major North Island ports show a predominantly seasonal pattern, but those from South Island ports tend to be more variable, although a seasonal peak is discernible for Timaru and Bluff.

Therefore, although aggregate data confirm that shipping patterns follow the predominantly seasonal flow established by shearing patterns, it is probable that the cost ramifications of this will vary according to region of destination and port of despatch. Analysis of disaggregated shipping flows for a number of years, and of the cost implications of seasonal and variable throughput would be necessary to confirm this.

³⁰ These regions accounted for 85 per cent of total wool exported from New Zealand in 1976/77.

FIGURE 11

Total Wool Exported from New Zealand 1973/74 to 1976/77



Source: NZWMC News Sheets.

FIGURE 12 ..

Wool Exported to Selected Regions 1976/77

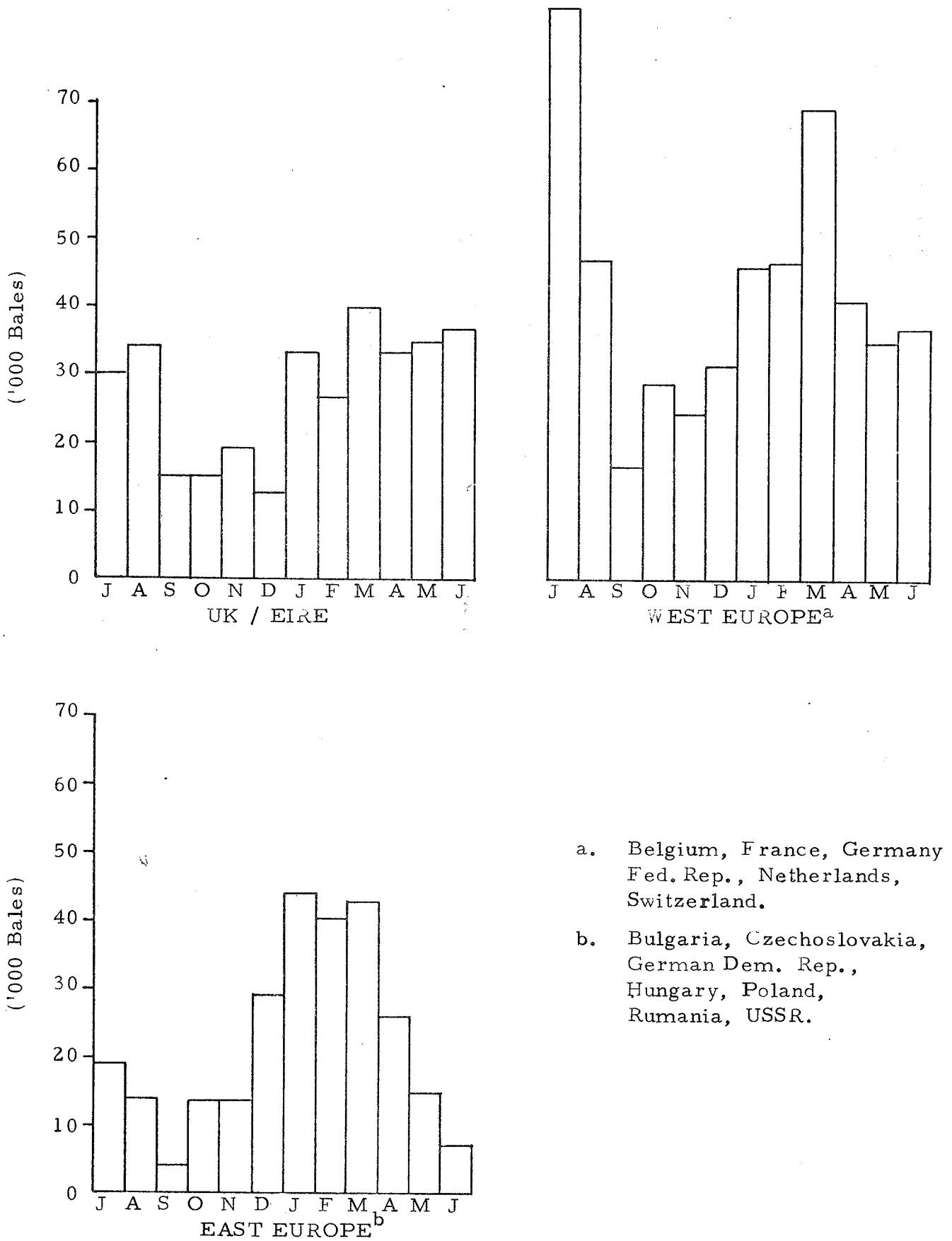
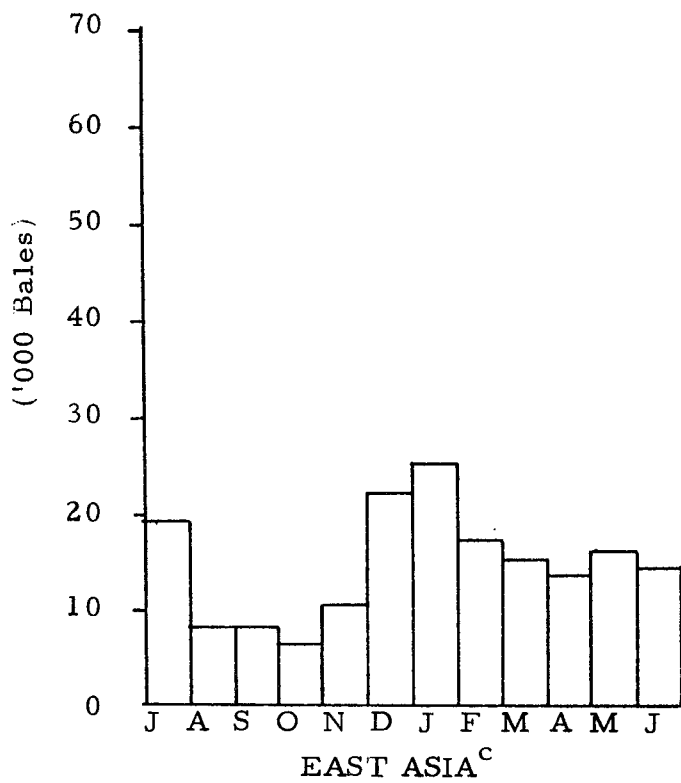
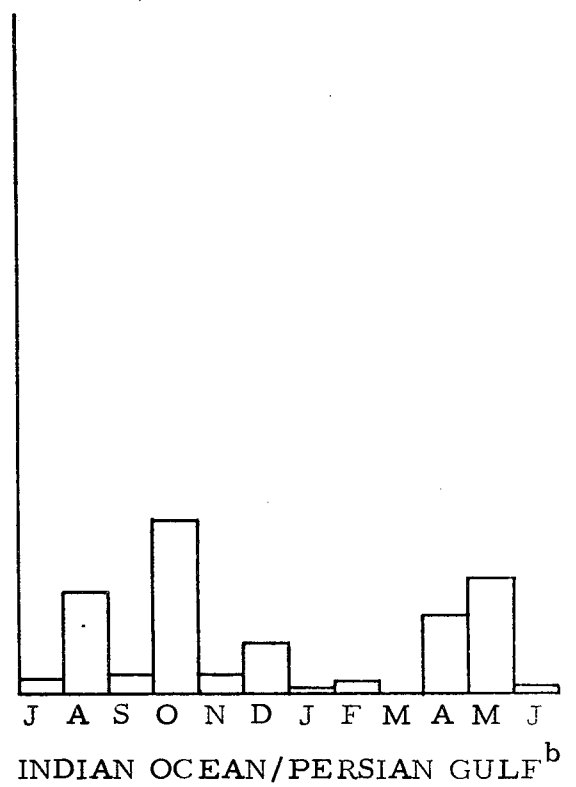
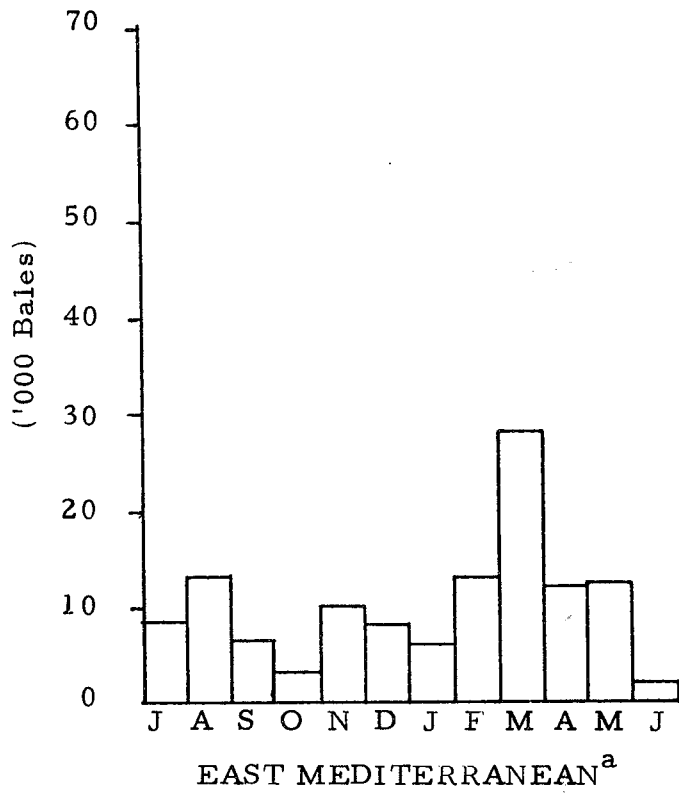


FIGURE 12 (cont'd)



a. Egypt, Greece, Syria, Turkey, Yugoslavia, Israel.

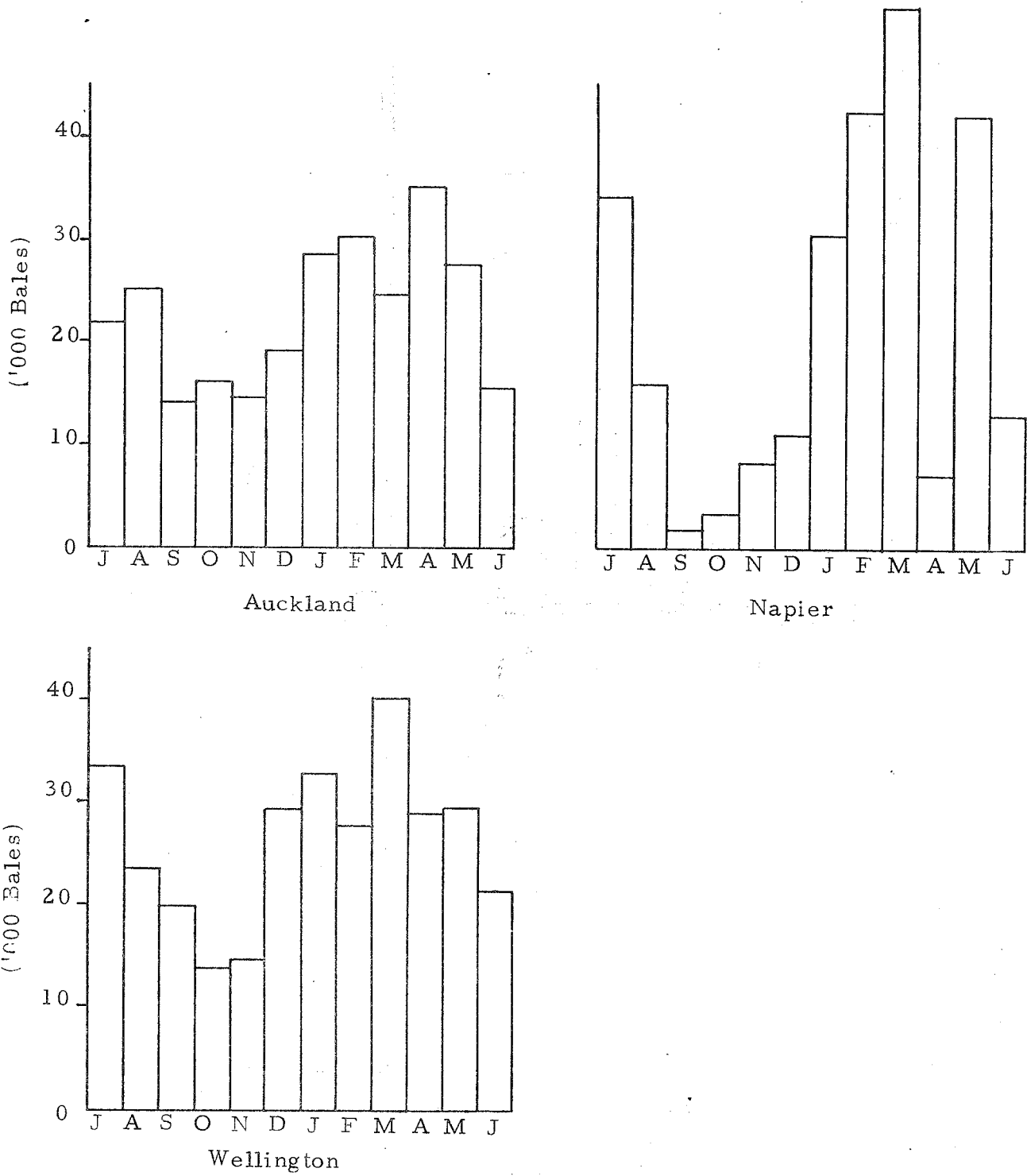
b. India, Iran, Mauritius, Pakistan.

c. Taiwan, Hong Kong, Japan, South Korea, Macao, Malaysia, Thailand.

Source: Transport Division, NZWB.

FIGURE 13

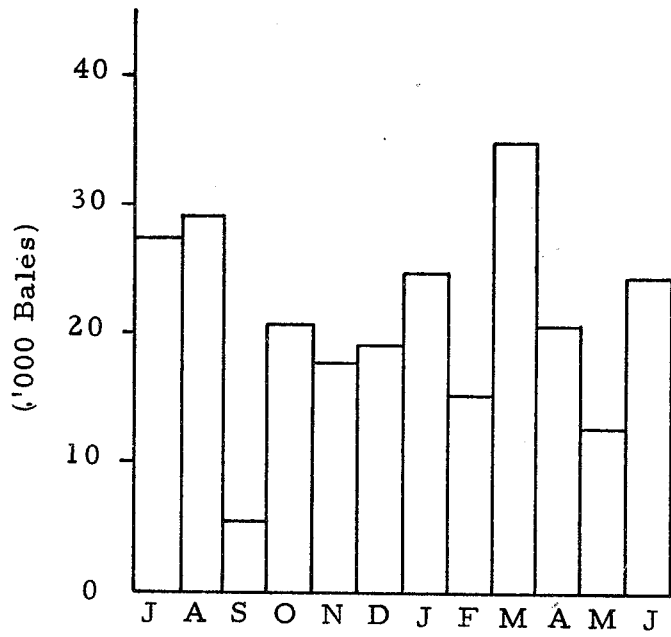
Wool Exported from Major North Island Ports 1976/77



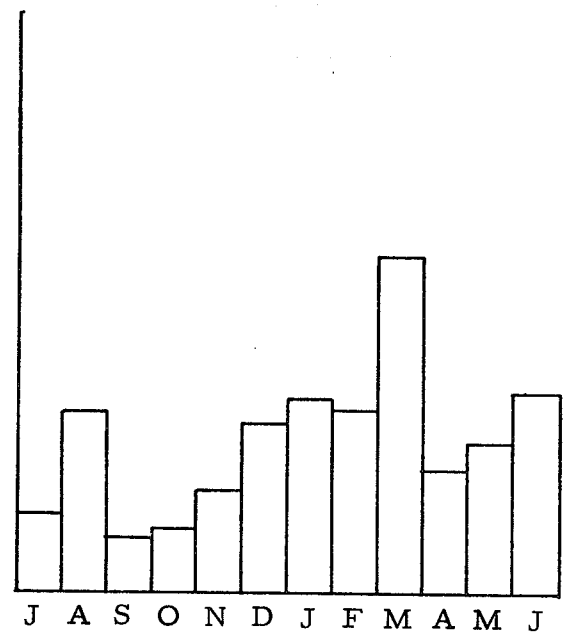
Source: Transport Division, NZWB.

FIGURE 13 (cont'd)

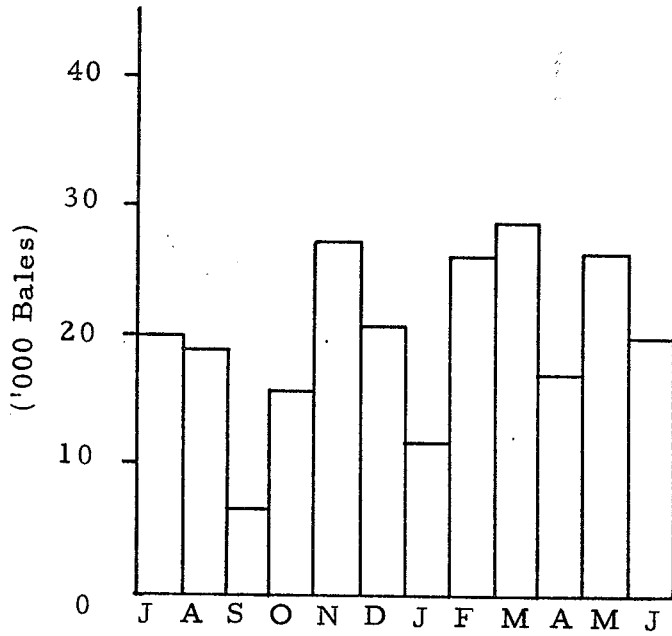
Wool Exported from Major South Island Ports 1976/77



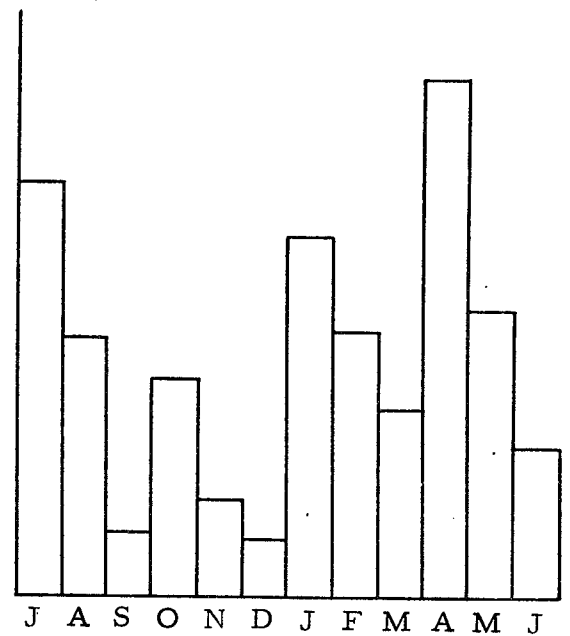
Lyttelton



Timaru



Dunedin



Bluff

Source: Transport Division, NZWB

2.4 Potential for Cost Savings

This chapter has outlined the magnitude and effect of peak wool flows through the marketing system. Some important information is unavailable, and some data could be obtained for one year only. Nevertheless, seasonal wool flows associated with all major marketing activities have been documented, although it has not been possible to estimate, in any depth, the costs associated with these peak flows. This makes it difficult to identify directly those areas in which the greatest cost savings would accrue if wool flows were smoothed, and to assess the magnitude of savings necessary if a smoothing exercise is to be effective.

However, if it is assumed that smoothing seasonal wool flows has a proportionate effect on each broad activity area, the savings shown in Table 3 could have been postulated for 1975-76.

If these postulated magnitudes in reductions are feasible, cost savings in 1975/76 could have totalled \$3 m. with a conservative reduction in charges of 2.5 per cent and ranged up to \$23 m. if a reduction of 20 per cent was achieved. The areas in which the greatest savings could be made would be in selling and shipping, given that the assumption of a proportionate effect on each activity is justified.

A rough estimate of the minimum savings necessary to finance a smoothing exercise may be made in the following manner. If an interest charge of 0.4223 ¢/kg/wk³¹ is imputed to cover the delay in the movement of wool because of a smoothing operation, and a charge of 0.1118 ¢/kg/wk³² is made for holding this wool, then

³¹ Calculated by allowing an interest rate of 10 per cent (the approximate rate of interest on overdraft in 1976/77) on the actual average price of wool sold at auction, which was 219.68 ¢/kg.gsy. in 1976/77. Source: NZWMC Statistical Handbook 1976/77.

³² This was equivalent to the charge for extra storage by brokers in 1976/77.

TABLE 3
 Magnitude of Savings to the Wool Industry in 1975/76
 Assuming a Range of Reductions in Charges

Broad Activity Area	Reduction in Charges ^a (\$)			
	2.5%	5%	10%	20%
Transport ^b	166,145	332,291	664,582	1,329,164
Selling ^c	623,142	1,246,284	2,492,569	4,985,138
Scouring ^d	365,321	730,642	1,461,285	2,922,569
Preshipment ^e	233,348	466,695	933,390	1,866,780
F. O. B. to Mill	1,542,500	3,085,000	6,170,000	12,340,000
Total Saving	2,930,456	5,860,912	11,721,826	23,443,651

^a Estimated reductions based on farm gate to f.o.b. charges calculated by Chudleigh, P.D., 1977. Marketing Costs for New Zealand Wool: 1970/71 to 1975/76, op.cit. Total f.o.b. to mill costs based on illustrative farm to mill marketing costs and total exports as shown in the NZWMC Statistical Handbook 1975/76. The charges exclude on-farm charges associated with the marketing of wool. If these were included, postulated savings would be even greater.

^b Includes estimates of all transport charges from farm gate to port for greasy, scoured and slipe wool.

^c Includes auction activities (except dumping), testing charges and buyers' commission.

^d Excludes wool scoured by local mills.

^e Includes dumping, unitising, containerising, wharf handling, wharfage and part of loadings and stowing charges.

the total charge for withholding wool becomes 0.5341 ¢/kg/wk. For example, it would be necessary to meet the costs shown in Table 4 if it was desired to store wool for the periods shown.

Also shown in Table 4 are the savings in total farm to mill costs³³ necessary to cover these costs. For example, it would be necessary to save, on average, five and a half per cent of total farm to mill costs³⁴ to finance a smoothing exercise which involved storing wool, on average, for four weeks. Any reduction in costs beyond this would represent net savings to the system.

TABLE 4
Cost of Storing Wool for Specified Periods and Savings
Necessary to Cover these Costs for 1976/77

	Period of Storage			
	2 wks	4 wks	6 wks	8 wks
Cost of Storage (¢/kg)	1.0682	2.1364	3.2046	4.2728
Farm to Mill Cost per kg wool (¢/kg)	38.97	38.97	38.97	38.97
Reduction in Farm to Mill Costs necessary to cover storage (%)	2.7	5.4	8.2	11.0

³³ Total farm to mill marketing cost for one kg of wool was 38.97 ¢ for 1976/77. This figure excludes the Wool Board Levy of 6.6 ¢/kg in that year.

Source: NZWMC Statistical Handbook, 1976/77.

³⁴ A bale of wool would need to be stored approximately four weeks on average if wool flows through auction centres were to be completely smoothed. This was estimated by comparing the actual distribution of wool auctioned for 1975/76 and 1976/77 with a 'smoothed' distribution, and estimating the number of bale months of storage required to convert the actual distribution to this smoothed distribution.

CHAPTER 3

POSSIBILITIES FOR SMOOTHING WOOL FLOWS

3.1 Scope for Alternative Smoothing Strategies

In order that any future research effort might be more efficiently channelled, Chapter Three reports an examination of a number of alternative methods or policies for smoothing wool flows.

Since shipping schedules are currently set to service the auction system, it would be expected that the benefits of smoothing would 'flow through' the different marketing activities to overseas ports, if seasonal wool flows were smoothed prior to, or at, the point of selling. Given also that significant cost savings might be associated with selling, it seems reasonable to conclude that smoothing seasonal wool flows would be most effective if undertaken as early as possible in the marketing pipeline; namely at, or before, auction.

The policies reviewed, therefore, consist of differential seasonal charges for distribution and processing services, use of storage increments, an extension of the Extra-Choice concept currently operated by the New Zealand Wool Board, and acquisition of the wool clip by the New Zealand Wool Board. Since its adoption would assist in ironing out short-term peak flows, a policy of sale by separation is also briefly outlined.

3.2 Differential Charging

1. Concept of peak-load pricing. Since existing charges for various wool marketing services do not vary with respect to time of year, and demand for these services varies cyclically, a case might be made for differential charging where wool producers or buyers are forced to face different charges according to the time of year in which they utilise marketing facilities.

Economic theory suggests that peak-load pricing could be appropriate under conditions where demand for a good or service fluctuates over a given time period, despite constant prices, and where a good or service cannot be stored or storage costs are high.

Much economic literature has been devoted to this topic following the pioneering studies of Boiteux and Steiner, whose general results are presented here for illustrative purposes.³⁵

Assume two demand periods with independent demands, one technology which produces output, continuously divisible plant capacity, constant marginal capacity costs and constant marginal running costs. The concept of economic welfare to be maximized takes account of both consumer valuation of the service and the opportunity cost of providing it.

Given these conditions, optimal prices may be calculated once optimal plant capacity for a given demand has been determined by investment policy which is, in turn, determined by long-run costs, long-run demand, and, perhaps, by the pattern of fluctuation in demand.

³⁵ Boiteux, M. 1960 . Peak Load Pricing, The Journal of Business, Vol. 33, No.2, pp 157-179.
Steiner, P.O. 1957 . Peak Loads and Efficient Pricing, Quarterly Journal of Economics, Vol. 71, No.4, 585-610.

Under certain demand and cost conditions, the solution which maximizes the concept of welfare adopted requires that off-peak consumers pay marginal running costs and peak consumers pay marginal running plus marginal capacity costs for a unit of the good or service consumed. However, if this solution were applied under a different set of demand conditions (illustrated by Boiteux), application of the above solution would result in a shifting peak and hence a non-optimal solution. The optimal solution in this case requires that both peak and off-peak consumers pay marginal running costs and differing proportions of marginal capacity costs.

Following workers have criticised the concepts and approaches employed by Boiteux and Steiner, and have refined these in conjunction with more realistic assumptions.³⁶ This has resulted in a series of more elegant solutions which involve, in general, more rigorous analysis, but are, consequentially, less practically applicable.³⁷

³⁶ For example, see Hirschliefer, J. 1958. Peak Loads and Efficient Pricing: Comment, Quarterly Journal of Economics, Vol. 72, No. 3, 451-468, for consideration of short-run as opposed to long-run solutions; Williamson, O.E. 1966. Peak Load Pricing and Optimal Capacity under Indivisibility Constraints, American Economic Review, Vol. 56, No. 4, Part 1, 810-827, for inclusion of unequal demand periods and plant indivisibility; Crew, M.A. and Kleindorfer, P.R. 1975. On-off Peak Pricing, Kyklos, Vol. 28, Fasc. 1, 80-93, for the inclusion of diverse technologies; Weintraub, S. 1970. On-off Peak Pricing: an alternative solution, Kyklos, Vol. 23, Fasc. 3, 510-519, on the need for idle capacity; Panzar, J.C. 1976. A Neoclassical Approach to Peak Load Pricing, Bell Journal of Economics, Vol. 7, No. 2, 521-530, for a more generalised production function; and Turvey, R. 1968. Peak Load Pricing, Journal of Political Economy, Vol. 76, No. 1, 101-113, for considering problems associated with non-constant marginal running and plant costs.

³⁷ See Joskow, P.L. 1976. Contributions to the theory of marginal cost pricing, Bell Journal of Economics, Vol. 7, No. 1, 197-206, for some of these practical problems.

In general, however, the following principles of peak-load pricing emerge from the literature.³⁸ Given that the conditions of peak-load pricing are satisfied:

- (i) Prices should be set according to time periods (e.g. by season), in accordance with the pattern of demand.
- (ii) High prices are set when consumption of a good or service exceeds capacity, while any dips in demand are filled in by charging low prices. After efficient pricing, the load curve is horizontal for peak periods and may have dips in off-peak periods.
- (iii) No responsibility for capacity costs is imputed to those customers where demand does not press on capacity. That is, optimal pricing requires that off-peak consumers are charged only with meeting marginal running costs, while peak consumers face marginal running and capacity costs.

2. Differential charging in New Zealand wool marketing. The first point in the wool marketing chain where some concept of differential charging might apply, would be at woolbrokers' stores. Until recently, the New Zealand Woolbrokers' Association set a minimum scale of charges for wool received for sale at auction. However, the Commerce Commission has now ruled that the Association may set maximum charges only, and that brokers are free to compete via charges. In practice, however, these charges

³⁸Bailey, E.A. 1972. Peak Load Pricing under Regulatory Constraint, Journal of Political Economy, Vol. 80, No.4.

have not varied between centres or over time, despite the fact that woolbrokers face differing demand schedules for their services at different times of the year. Therefore, the first condition of peak-load pricing - that demand for a good or service fluctuates over a given time period despite constant prices - applies to the woolbroking industry. Similarly, the second condition - that a good or service cannot be stored or storage costs are high - also applies, since woolbroking is a service industry, and, as such, the services provided cannot be stored.

Therefore, brokers could charge off-peak consumers an amount based largely on the variable cost component of the service, and peak consumers an amount related to fixed and variable costs. For example, if it is assumed that the ratio of fixed to variable costs is approximately 1:1, then charges for woolbroking services in 1976/77 could have fallen within the range of 2.25c/kg in the off-peak season to 6.75c/kg in the peak season, as opposed to the actual charge of 4.50c/kg over the whole season.³⁹

A practical variation of this could involve charging on a basis of three (or more) periods, where high charges could operate in peak months while charges similar to those operating at present would prevail in the middle of the season, and low charges would operate in the off-peak months. An efficient pricing system could then transfer some peak activity to the middle of the season, and, in turn, some mid-season activity to the off-peak. Therefore, those farmers who can readjust the timing of their woolbroking services would benefit from such a scheme.

³⁹ Since marginal costs are not available, average charges have been used as an estimate of these.

3. Ramifications of differential charging. The ramifications of differential charging by brokers could be quite complex. As outlined below, both benefits and costs are associated with such an option, and these benefits and costs will fall on different sections of the wool industry.

(i) Pre-auction activities.

Implications for growers would include the decision on whether to shear earlier or later in the season, or whether to shear at the normal time and store wool, either on the farm, or in low cost storage facilities operated on behalf of a number of farmers, or whether to accept higher peak broking charges.

(a) Shearing patterns. If growers opted for a greater incidence of pre-lamb shearing, they would face a number of advantages and disadvantages. Productive performance may be improved since increased lamb survival may result from improved mothering by ewes, and wool quality may be higher since any break in the wool would be at the tip of the staple. Managerial advantages may accrue through the need for less shepherding and general labour in the spring and summer period. A liquidity advantage may also occur since wool proceeds would be deposited in the bank before the peak overdraft level is reached.

On the other hand, extra costs would be incurred through additional feed requirements after shearing (a period in which severe feed constraints already exist), and the risk of increased stock loss under severe weather conditions would be heightened.

As an alternative to pre-lamb shearing, a grower might consider double shearing in November and April or May. This practice is quite widespread in the North Island, as indicated in Appendix 5. Growers find that it confers a management advantage through a reduction in the number of cast ewes,

and that it confers significant liquidity flexibility, since overdraft requirements are drastically reduced.

However, any benefits must be balanced against additional costs incurred, such as those associated with two shearings per year. The preliminary results of experiments currently being undertaken by the Ministry of Agriculture at Whatawhata Hill Country Research Station showed that, in 1977, fleece weights for twice-yearly shorn sheep are not significantly greater than those for once-yearly shorn sheep.⁴⁰ However, second-shear wool shorn in May was of superior quality to both second-shear and annually shorn November wool. Although all second-shear wool was of average or good length, the November second-shear suffered a price discount relative to November annual shear, although this was offset by higher prices received for second-shear in May 1977.⁴¹

A variation of double shearing, eight-monthly shearing, might also be considered. This system incorporates both the costs and benefits associated with double shearing, but includes the additional management and taxation problems associated with a two-yearly income cycle.

Late annual shearing in March and early autumn is a further alternative open to growers. This may allow improved utilisation of farm labour but must be counterbalanced by the reduced liquidity resulting from the delayed wool income.

⁴⁰ Wool crutched prior to lambing is included in fleece weights for once-yearly shorn ewes.

⁴¹ Details of these experiments appear in New Zealand Ministry of Agriculture and Fisheries, Agricultural Research in the New Zealand Ministry of Agriculture and Fisheries, Annual Report of the Research Division, 1977-78. (in press.)

(b) Storage. An alternative response would be for growers to shear according to the present pattern, and store wool until the off-peak period. Such a response is likely only if the marginal cost of holding wool until the off-peak period is less than or equal to the marginal benefit (in reduced broking charges) from holding wool. The costs involved would include the interest cost associated with foregone liquidity on wool stored, depreciation charges on storage space and on the wool itself (if applicable), risk associated with price change and other factors, and any handling additional to that required if wool is despatched immediately after shearing. As indicated in Section 3.3, growers appear to have substantial storage capacity available, and are therefore in a position to take advantage of any incentive to store wool.

Growers might also consider low cost bulk storage. The costs and benefits associated with this alternative are similar to those outlined above, although the magnitudes may differ. For example, handling costs may be greater, since farmers may wish to sell at different times, in which case a 'pooled' wool stack would have to be broken down and rebuilt.

(c) Unaltered wool flows. If peak-load pricing was not efficient, then growers would accept higher charges in peak periods and wool flows would remain unaltered; the farming sector would then incur increased brokers' charges overall and the broking sector would initially increase its revenue without altering costs.

(d) Private buying patterns. If on-farm storage is undertaken, a further uncertainty may be introduced into the system, since growers may sell to private wool buyers if they face a liquidity problem or wish to be relieved of storage charges and price uncertainty. The extent of this possibility would depend on the degree to which growers are committed to sell through brokers because of tied financing arrangements with their stock and station agents.

If private buyers increased their purchases the ramifications and the implications for the overall system of wool marketing would be complex. A market response by brokers to avoid such an expansion of the share of the market by private buyers could be to lower charges within a differential charging framework, or to abandon this system altogether; that is, brokers may accept the cost of peak inflows as a necessary cost of retaining their market share. If this were the response, then growers would ultimately face these additional costs associated with a dual marketing system. It is also possible that private buyers might submit purchased wool for auction at a later date, in which case a further series of costs and benefits would be incurred.

(ii) Auction activities. If the seasonal flow to brokers' stores is smoothed by differential charging of the magnitudes previously suggested for equal peak-off-peak periods, the total revenue to brokers could remain unchanged initially but considerable cost reductions may ensue through better utilisation of capacity.

In the short run, savings to brokers would include fuller utilisation of labour where labour is employed on a permanent basis to meet peak seasonal wool flows. If high quality casual labour is used to meet peak demands, no overall labour savings may be made by smoothing wool flows. However, if the quality of casual labour is poor, there may be a cost advantage associated with fully utilising higher quality permanent labour. Short-run cost advantages will also arise where brokers are forced to hire additional storage during peak periods. In the longer run, further cost savings could also result from a reduced floor area requirement.

In a competitive environment, one would expect some of these cost savings to be passed on to growers via lower broking charges. Under these circumstances, brokers' revenue would then fall to a level compatible with the lowered costs achieved. In a non-competitive environment, however, full benefits will accrue to

broking interests and any transfer of benefits seen as socially desirable must be accomplished by legislative means.

Differential charging may be introduced by brokers in two ways. All brokers may choose to adopt this method of charging, and set agreed maximum rates for peak and off-peak periods. Alternatively, one or more brokers might choose to institute differential charging unilaterally. Under such circumstances one might find that these brokers lose some of their peak custom, but gain wool in off-peak periods. The effect of this could be to smooth wool flows through the stores of those brokers practising differential charging while exacerbating peaks in those stores where single charging prevails. Such a situation might induce these latter brokers to introduce differential charging to attract custom back and to reduce peak wool flows.

(iii) Post-auction activities. Similar cost savings could be expected at other processing and distribution centres. For example, dumping, testing, scouring, port and shipping facilities may be more fully utilised. Any such cost savings would presumably result in lower charges for these activities which, if market imperfections are not severe, should result in higher prices offered to growers. The magnitude of these cost savings, and the degree to which benefits would accrue to different parties, could be established if detailed studies on these sectors were undertaken.

(iv) Short-term peak wool flows. If differential charging was adopted by brokers, and responses by the various parties were quite marked (that is, relatively elastic), then seasonal peak flows of wool through the marketing system could be evened out. However, this policy would not completely smooth short-term peak wool flows and further action could be necessary in this area.

4. Industry reactions to differential charging. Since there is no differential charging on a seasonal basis by brokers at present and there is no pressure to introduce such a practice, it is reasonable to assume that this proposal does not enjoy industry support.

However, the recent decision by the Commerce Commission on collective pricing by woolbrokers means that schedules of brokers' charges are now regarded as the maximum charges which may be set by brokers. This may introduce a further competitive element into broking activities and, in such an environment, measures such as differential charging might be more acceptable to the wool industry.

3.3 Storage Increments

1. Storage increments in New Zealand wool marketing. An alternative method of smoothing seasonal peak flows of wool would be the payment of a storage increment to growers. Such a system has been successfully operated by the British Wool Marketing Board⁴² for 10 years and appears to have reduced peak period intakes, and consequently costs.

Before a similar system could be introduced in New Zealand it would be necessary to determine whether growers are likely to respond to such an incentive, and if so, who would pay the increment, and finally, what the magnitude of an increment would have to be, and over what period it would apply.

2. Availability of storage capacity. The AERU transport survey previously referred to attempted to assess how South Island growers would react to a storage increment. Respondents were asked whether they would sell wool promptly to get cash quickly, store all wool to get the full storage increment, or store as much wool as cash needs permitted. The results are presented in Table 5.

⁴² See Appendix 2 for further details.

TABLE 5

Growers' Response to a Storage Increment - by region

Region	Sell for Cash (%)	Store to Get Full Increment (%)	Store Subject to Cash Needs (%)	No. of Respondents
Marlborough	42.5	15.1	42.5	73
Nelson	26.1	33.8	40.0	65
West Coast	36.2	32.8	31.0	58
North Canterbury	39.1	11.5	49.4	87
Rangiora	32.2	14.9	52.9	87
Malvern	28.4	28.4	43.3	67
Christchurch	45.1	20.9	34.1	91
Ashburton	35.0	17.5	47.5	80
Strathallan	40.4	9.0	50.6	89
MacKenzie	33.7	8.4	57.8	83
Waimate	34.0	13.8	52.1	94
Waitaki	37.5	12.5	50.0	80
Dunedin	46.8	19.3	33.9	62
Balclutha	43.9	17.1	39.0	83
Clutha	38.4	19.2	42.4	99
Central Otago	48.8	12.8	38.4	86
Gore	46.9	13.3	39.8	98
Invercargill	29.3	20.8	50.0	72
Wallace	42.6	19.4	38.0	108
South Island	38.6	17.3	44.1	1561

Source: AERU South Island Transport Survey 1975, unpublished data.

Thirty-nine per cent of total respondents said they would sell wool promptly for cash with this proportion varying from 26 per cent to 49 per cent in different counties. Those who claimed they would store to obtain the full increment amounted to 17 per cent (with variation ranging from 8 per cent to 34 per cent) while the remainder, 44 per cent, said they would store subject to cash needs; this last estimate varied from 31 per cent to 58 per cent. Appendix 6 presents these responses according to type and size of farm, as opposed to the above classification by region. Although these results should be treated with caution, since responses may vary according to the magnitude of the storage increment, and North Island data are not available, they do indicate that the response of growers to a storage increment could be quite elastic.

Growers were further asked in this survey how many bales of wool they could store under cover if they were to take advantage of a storage increment, and the results are outlined in Table 6. Although mean estimates are somewhat variable, it appears that many growers are in a position to store quite a large proportion of wool shorn for considerable periods. In the case of West Coast and Waimate regions, growers were in a position to store a greater quantity of wool than was shorn on average. For further details on storage estimates according to type of farm and farm size, see Appendix 7.

TABLE 6
Storage Capacity of Wool - by region

	Mean Bales Shorn/Farm ^a	Storage Capacity (Mean No. of Bales) ^a				No. of Respond- ents
		1 mth	1-3 mths	2-3 mths	3 mths	
Marlborough	66.6 (65.3)	43.8 (26.2)	42.1 (27.1)	37.5 (27.1)	34.1 (27.9)	64
Nelson	23.6 (22.1)	22.1 (18.5)	20.9 (19.0)	19.4 (19.3)	14.4 (17.9)	60
West Coast	22.4 (63.1)	41.9 (141.3)	41.7 (141.3)	40.6 (142.5)	37.4 (143.1)	49
North Canterbury	73.9 (40.7)	46.8 (35.4)	43.8 (37.5)	38.5 (37.0)	33.2 (38.0)	83
Rangiora	50.4 (53.3)	35.2 (33.0)	33.4 (33.9)	30.0 (34.9)	26.0 (35.2)	83
Malvern	63.0 (59.3)	53.7 (44.2)	50.9 (44.7)	46.5 (46.7)	36.4 (49.2)	60
Christchurch	37.3 (34.2)	34.1 (35.7)	32.8 (36.4)	31.4 (36.7)	26.9 (37.7)	83
Ashburton	57.7 (39.4)	45.6 (40.9)	42.3 (41.8)	39.5 (42.1)	34.2 (43.7)	71
Strathallan	46.3 (48.0)	46.6 (75.5)	45.4 (76.0)	41.5 (74.8)	32.8 (70.0)	76
MacKenzie	86.0 (60.3)	47.4 (36.3)	43.1 (38.5)	39.2 (40.0)	31.7 (40.9)	80
Waimate	55.8 (55.5)	70.6 (224.8)	68.1 (225.3)	64.2 (226.1)	59.0 (226.6)	79
Waitaki	58.3 (47.5)	55.3 (61.9)	52.4 (60.7)	50.4 (61.8)	47.7 (63.0)	77
Dunedin	57.8 (51.9)	51.9 (73.8)	47.6 (74.5)	46.3 (74.6)	41.3 (75.9)	55
Balclutha	76.0 (54.7)	50.1 (52.1)	46.0 (53.6)	43.7 (54.6)	36.4 (56.7)	75
Clutha	67.8 (42.8)	51.1 (39.5)	47.7 (40.1)	45.3 (41.6)	38.9 (42.9)	87
Central Otago	97.7 (66.4)	64.5 (48.8)	61.3 (50.6)	54.7 (49.5)	46.2 (50.6)	69
Gore	63.5 (47.8)	54.5 (48.8)	51.4 (50.8)	46.0 (50.1)	36.2 (51.6)	90
Invercargill	48.2 (35.4)	51.7 (87.3)	50.3 (87.7)	46.9 (87.5)	39.4 (89.0)	73
Wallace	62.5 (45.6)	48.2 (41.6)	43.6 (42.0)	42.2 (42.9)	33.0 (44.4)	98
Total South Island	59.8 (53.8)	48.4 (76.2)	45.7 (76.7)	42.4 (76.9)	36.1 (77.5)	

^a Standard deviations shown in brackets below means.

^b AERU South Island Transport Survey 1975, unpublished data.

3. Payment and magnitude of an increment. The decision as to who would pay for such an increment would depend on where the costs and benefits associated with the strategy would fall. These would be similar to those outlined for differential charging, with the exception that farmers would face fixed broking charges, and receive a payment for a storage increment.

Since brokers, scourers, dumpers and shippers would receive the benefits of cost reductions associated with reduced peak wool flows, then one possible answer to the problem would be for brokers to pay the storage increment, while retaining the present level of their charges, and for other parties to remit part of their benefits to the buyers through reduced charges. Buyers could, in theory, remit these to the growers via higher prices. However, if brokers' cost savings amount to less than the storage increment they would be required to pay growers, there would be no incentive for them to support such a scheme. Under these circumstances, administration of a storage increment might prove quite difficult since, although the entire wool marketing system might benefit in aggregate from smoothed wool flows, no one party will initiate change if the cost which they alone incur is greater than the benefit which they personally receive.

The question of the magnitude and length of the increment could be solved if information on the benefits of smoothing were available. Such benefits or cost savings could then be related to the elasticity of grower response. One severe administrative difficulty would be that growers' responses to a storage increment would vary according to price expectations, as growers would be reluctant to store wool in periods of falling prices, but may require only a small storage incentive when prices are rising.

4. Short-term peak flows. Although problems associated with short-term peaks could be alleviated by the disappearance of seasonal peaks, some short-term peak flows will still remain if a storage increment were paid and may need to be smoothed by other means.

5. Industry reactions. Industry reaction to the concept of a storage increment is uncertain, with the question of who would pay an increment being a potentially contentious issue. As with differential charging, the pricing uncertainty faced by farmers who store wool could, in a falling market, lead to their foregoing the storage increment and selling in peak periods either at auction, or to private buyers.

3.4 Extension of an Extra-Choice Concept

1. The Extra-Choice scheme. A further policy option would be a scheme which utilises the present Extra-Choice concept operated by the New Zealand Wool Board.

The Extra-Choice scheme has recently been extended, and under this amendment growers may sell all wools direct to the Wool Board under Extra-Choice between selling seasons - that is, between 1 July and 17 August. At the beginning of the new season, Extra-Choice reverts to crutchings, lambswool, second shear and oddments, with the number of sale days being restricted, and the time for receipt fixed to make a clear distinction between auction and Extra-Choice.

Prices offered for Extra-Choice wool are based on the last sales with appropriate allowance made for the cost of reselling through the auction system. Wool purchased by the New Zealand Wool Board may remain in brokers' stores until it is to be auctioned, or, alternatively, may be held by the Wool Board as part of their stocks.

2. Incentives necessary to extend scheme. If the Extra-Choice concept was extended, the New Zealand Wool Board could withhold more wool from auction during peak periods, and re-submit this wool for auction in the off-peak period. However, to be effective, a far greater proportion of wool sold off farms would need to be channelled through the scheme. In 1976-77 the Extra-Choice scheme accounted for 2.6 per cent of total wool disposals.⁴³

⁴³ NZWMC Statistical Handbook 1976/77.

Therefore, growers would require some incentive to utilise this channel.

One possibility would be for the New Zealand Wool Board to extend the range of wools accepted under Extra-Choice to include all wools during the selling season.

If such an incentive is insufficient, further possibilities could be contemplated. For example, the Wool Board could pay growers prevailing auction prices less a charge which is lower than that ruling at brokers' stores. This wool could then be submitted for auction in the off-peak period. Since seasonal peaks would be smoothed at no expense to themselves, brokers and post-auction wool handlers and processors would gain from such a system and the New Zealand Wool Board would lose an amount equivalent to the volume of wool passing through the scheme multiplied by the difference in charges for wool despatched to brokers and wool despatched to the Wool Board, plus any additional storage and transport costs.

An alternative strategy, which would avoid a continual loss to the Wool Board, would involve the introduction of differential charging by brokers in conjunction with an extension to the Extra-Choice scheme. For example, if differential charging was introduced by brokers in the manner previously outlined, then

$$P_{OP} = b + (1-a)\beta \quad 0 \leq a \leq 1$$

$$P_P = b + a\beta$$

where P_P is the peak brokers' charge

P_{OP} is the off-peak brokers' charge

b is the marginal running cost

β is the marginal capacity cost

a is the proportion of marginal capacity cost attributed to peak consumers.

The New Zealand Wool Board could then attract wool into the Extra-Choice scheme in the peak period by paying the price for wool currently prevailing at auction, less

$$P_{EC} = b + a \cdot \beta - z \quad z > 0$$

where P_{EC} = charge to sell under Extra-Choice
 z = inducement necessary to divert wool to Extra-Choice

This wool could then be submitted for auction in the off-peak period. In this way the Wool Board would not incur any tangible costs if

$$C_{S+T} \leq P_{EC} - P_{OP}$$

where C_{S+T} = cost of wool storage to NZWB plus cost of movement from NZWB facilities to brokers' stores for sale in off-peak season.

Under such a scheme, brokers' costs would be reduced, since seasonal peak flows would be smoothed. The effect on brokers' revenue is not easy to determine, but one would expect it to remain at present levels (approximately) if wool flows were completely smoothed in the manner previously outlined. Post-auction processors and distributors would benefit through reduced seasonal peaks, and these benefits could accrue to growers via increased prices offered by buyers.

If wool appraised for purchase under the Extra-Choice scheme was despatched by growers to brokers' stores rather than to Wool Board facilities, and remained in those stores until resale via auction in the off-peak period, then the scheme would be self financing if

$$C_S \leq P_{EC} - P_{OP}$$

where C_S = cost of storage to NZWB

To determine the feasibility of an extended Extra-Choice scheme in conjunction with differential charging by brokers, it would be necessary to assemble details of storage costs, costs associated with peak outflows, and the importance of other constraints, such as tied financing arrangements, which might affect the elasticity of growers' response to any incentive, including this one.

3. Effect on Short-term Peak Flows. As with previous alternatives considered, an extension of the Extra-Choice scheme will smooth short-term peaks to some extent, but further action might be necessary if this problem is to be alleviated entirely.

4. Industry reaction to extension of an Extra-Choice concept. Industry reaction to this proposal is uncertain, but some interests might be dubious about a proposition which would effectively extend the market share of a quasi-Government authority at the expense of existing channels of private enterprise.

Although such a scheme should cover costs associated with storage and resale (though this point is still subject to empirical verification), the New Zealand Wool Board would still be faced with problems associated with price uncertainty, and may wish to be assured that the benefits accruing to the industry from reduced seasonal flows are significant enough to warrant the associated price risk incurred by them.

3.5 Sale by Separation

1. Sale by separation in New Zealand Wool Marketing. The policy alternatives considered so far have concentrated on smoothing seasonal peak flows, while leaving short-term peaks unaltered. Although a number of improvements at various parts of the marketing chain could smooth short-term peaks at each of these points, one measure which could result in reduced peaks at a number of centres simultaneously would be sale by separation.

At one extreme, application of sale by separation could involve radical change to the current marketing system by incorporating computerised buying where sale by specification is utilised. At the other extreme, few marketing changes would be necessary if the spatial and temporal pattern of sales remained unchanged, but growers had the opportunity of selling by sample at a centre other than that where the wool is physically located.

However, given current technology, a system which would more fully exploit cost economies, including those associated with short-term peak flows of wool, could involve a reduction in the number of selling centres, and variation in both the frequency and timing of sales, and the number and location of regional storage centres. It is with this view in mind that the implications of sale by separation on peak wool flows is discussed.

2. Implications of sale by separation. Under sale by separation, a more orderly inflow and outflow of wool from brokers' stores is likely to occur. Under the present system, a large quantity of wool is consigned to stores for preparation for the next sale. In many cases, this wool may be stored for one or two months, a situation which necessitates a large space commitment on the part of brokers. After sale, the wool must be despatched from store rapidly, a situation requiring a peak labour input. Under sale by separation, where smaller, more frequent sales could be held at another centre, the volume of wool flowing into these stores for any one sale would be smaller, thus allowing space economies. In addition, more continuous utilisation of labour would result, since store activities would be geared to a smaller volume of wool flowing in and out at more frequent intervals.

As outlined in the previous chapter, testing houses at present experience severe peaking problems as a result of the current pattern and timing of sales. With smaller, more frequent sales, problems caused by this peaking would be removed to a large extent, and more rational and economic use made of these testing facilities.

Similarly, dumping activities could become more orderly, since the present system whereby urgent dumping is required in the few days subsequent to a sale in a particular centre, could be avoided to some extent. Scours may also experience more orderly inflows of wool, which could lead to cost reductions.

3. Industry reaction to sale by separation. The New Zealand Wool Board has actively encouraged the introduction of sale by sample by paying for test certificates for the last five years, though this practice has been discontinued recently with growers now paying for pre-sale test certificates. In the 1978/79 season, the Wool Board intends to set up sampling equipment in its Napier store and to sell a quantity of sampled stock wools 'by separation' at sales throughout the country, with these sales being handled by brokers. Therefore, the concept of sale by separation is being actively promoted by the New Zealand Wool Board.

Further industry reaction to this proposal has not been ascertained. However, if buyers were persuaded to accept sale by sample, one would expect them to endorse the concept of sale by separation, since considerable cost and inconvenience could be avoided by them if this alternative was adopted.

3.6 Acquisition of the Wool Clip

1. Operation of an acquisition system. As outlined previously, uncertainties exist as to the degree to which methods so far proposed would actually smooth peak flows of wool. However, many of the problems outlined could be solved if the wool clip was acquired and marketed by central authority. This type of arrangement tends to have greater administrative appeal than reliance on a possibly imperfect market mechanism.

Under such circumstances, this central authority could remove price uncertainty associated with holding wool by publishing an annual wool price schedule for different types and classes of wool. The incentive to withhold wool during peak flow periods through storage increments or differential charging, would therefore be far more powerful.⁴⁴

⁴⁴ A storage increment in conjunction with a Wool Price Schedule is the method operated by the British Wool Marketing Board (see Appendix 2).

The flow of wool from brokers' stores to end users could then be regulated in a manner such that short-term and seasonal peak wool flows are smoothed to effect cost economies.

2. Industry reaction to an acquisition scheme. Such an approach was advocated by the New Zealand Wool Board in 1971, when the establishment of the New Zealand Wool Marketing Corporation was approved. This body was to have power to purchase, market and process all wool, and to engage in handling and transport activity as appropriate. These recommendations were endorsed by the New Zealand Wool Marketing Corporation Establishment Company in 1972, with the added proposal that such an acquisition scheme should not have to 'prove itself' against existing market outlets, as originally envisaged by the New Zealand Wool Board.

Although this proposal was initially supported by the NZWB and other grower representatives, pressure from an anti-acquisition woolgrower group resulted in the 1972 Wool Marketing Corporation Act stipulating that acquisition was to be subject to a referendum of growers and could be introduced only if 60 per cent of growers favoured such action. This provision was amended in 1974, thus allowing the NZWMC to acquire the national wool clip without a referendum of growers, although grower support still needed to be manifest. Although the 1972 Act and subsequent amendments have since been repealed with the introduction of the Wool Industry Act 1977, the power of acquisition of the national wool clip by the NZWB still remains.⁴⁵

⁴⁵ For a further discussion of the acquisition debate, see Chudleigh, P.D., 1978. 'New Zealand Wool: Towards an Improved Marketing System, Agricultural Administration (5) : 31-43.

Despite the fact that the NZWB has the statutory authority to acquire and market the New Zealand wool clip, it is highly unlikely that such action would be taken without overwhelming grower support. A recent Lincoln College survey⁴⁶ found that, on average, 41 per cent of sheep farmers would vote in a referendum for a system which required the Board to purchase all wool produced in New Zealand and to market it in various ways, if it were demonstrated that marketing costs could be reduced significantly by a New Zealand Wool Board operation.

⁴⁶Pryde, J.G., 1978. Survey of New Zealand Farmer Intentions, Expectations and Opinions June-August 1978. Research Report No. 96, AERU, Lincoln College, p. 55. See Appendix 8 of the current Report for details of this statistic by region.

CHAPTER 4

DISCUSSION AND IMPLICATIONS

4.1 Data Limitations

As pointed out previously, this Report does not purport to be an in-depth quantitative study which identifies all peak wool flows and then estimates the magnitude of costs associated with such flows. If such a study is desired then research into the following topics will be necessary to rectify currently existing data deficiencies.

1. Demand. No data are available on the purchasing patterns of overseas mills, on the nature of mill inventories, the structure of mill costs (and how these might be influenced by peak wool flows), and on the wool flow requirements of these mills. Such information is necessary for a detailed study of temporal wool flows, and could offer valuable insights for other research into the New Zealand wool industry.

2. On-farm operations. More comprehensive and comparative information on shearing patterns in different regions is required. Such data should include the rationale for these patterns, their role in current production systems and farmers' attitudes to time of shearing. The current degree of, and physical potential for, on-farm storage, requires more detailed investigation.

3. Wool brokers' operations. Since the postulated smoothing strategies involve considerable readjustment of wool flows either before or at brokers' stores, then handling and storage operations within stores should be investigated to establish where savings in costs might be achieved with different patterns of inflow and outflow.

4. Post-auction activities. Wool flows and cost structures in all post-auction wool activities need to be evaluated. These include testing, scouring, dumping and shipping activities.

4.2 Alternative Smoothing Strategies

In this Report, several alternative smoothing strategies have been presented, but no one strategy has been supported as a more preferable method for smoothing wool flows. Such a decision can be made only after certain aspects of these strategies have been quantified.

1. Differential charging. It is necessary to determine the elasticity of demand for woolbroking services at different times of the year, since this information would assist in making an assessment of whether different combinations of on-off peak charges could result in an efficient solution, and therefore smooth wool flows to brokers' stores.

2. Storage increment. Further information is required on the magnitude of a storage increment necessary to induce farmers to store wool for a specified period. It would then be possible to assess whether such a storage increment could be generated from cost savings.

3. Extension of an Extra-Choice concept. Once again, the elasticity of growers' response to such a strategy must be determined. If this concept is implemented without differential charging by brokers, then the optimal method of financing the resulting loss to the New Zealand Wool Board must be investigated. If differential charging is introduced in addition to an extension of the Extra-Choice concept, then storage costs must be estimated to ascertain whether the scheme would be self-financing.

4. Sale by separation. Sale by separation has economic implications for the wool industry which are far wider than the effect on short-term peak flows of wool. Consequently, this strategy is worthy of detailed study in its own right.

4.3 Systems Approach

When such information is available, it will be possible to quantify the economic costs and benefits to each marketing activity for each policy alternative, or with combinations of different policy alternatives. In this way, the total savings to the entire wool marketing system can be calculated, and the net savings to each particular marketing sector can be examined.

Such a comparison of the relative savings to each sector could illuminate potential implementation problems associated with different strategies. For example, it might be contemplated that brokers pay a storage increment to growers and that a high proportion of post-auction cost savings are remitted to growers via the market mechanism. If however the cost of the storage increment to brokers was greater than the benefit which would accrue to them, then there is no incentive for them to introduce the scheme.

An example previously used illustrates this point. If it is necessary to store wool for four weeks to smooth wool flows to the required degree, then the cost of storage would be approximately 2.1 ¢/kg.⁴⁷ To cover this cost, total farm to mill costs would need to be reduced by approximately five and a half per cent.⁴⁸ However, if brokers alone were expected to cover storage costs, they would be required to reduce costs by approximately 26 per cent,⁴⁹ which is beyond the upper limit to potential reductions in brokers' costs previously suggested. Therefore, since there is no existing mechanism whereby a proportion of post-auction savings through smoothing could be remitted to brokers, there would be no incentive for them to institute such a policy, despite the fact that total net savings to the industry might result from smoothing wool flows.

⁴⁷ See Table 4.

⁴⁸ Ibid.

⁴⁹ Brokers' charges taken as an estimate of cost for the purposes of this calculation. They include brokers' selling charge, reclassing, binning, interlotting, blending, extra renumbering, extra storage, delivery out of store and coring estimated to be incurred for each kilogram of wool on average.
Source: Chudleigh, P.D., Marketing Costs for New Zealand Wool: 1970/71 to 1975/76, op. cit.

However, a systems analysis would make such problems explicit, and would give indications as to what measures might assist policy implementation. For example, if it were found that total savings were high, and that most post-auction savings could be remitted to growers, then the New Zealand Wool Board might place a small levy on growers and pass this on to brokers on the condition that they pay a storage increment to growers. In this way the total savings to the system could be realised and could be distributed between growers and those involved in marketing in an equitable manner.

Furthermore, such an analysis would mean that if any strategy was rejected on non-economic grounds, decision makers would be fully aware of the economic costs associated with such a decision. Conversely, it would be possible to make explicit the full economic benefits deriving from any strategy consequently adopted.

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APPENDIX 1

AUSTRALIAN CONCERN WITH SEASONAL WOOL FLOWS

Australian studies have recognised the problems associated with peak wool flows through the marketing system. Concern has been expressed about the effect of a limited shearing season on the cost structure of the shearing sector of the wool industry,⁵⁰ and on the ramifications of this limited season and other institutional factors for the efficiency of operations of selling brokers, buyers and processors.⁵¹ The consequences of the seasonal supply of wool on price fluctuations have also been noted,⁵² as has the result of irregular flows of wool from brokers to dumpers.⁵³ In fact, it has been recommended that

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- ⁵⁰ See Anon. 1970. Wool Handling (Sheep's Back to Store). National Materials Handling Bureau. Department of National Development, p.17.
Anon. 1973. The Marketing of Australian Wool. Australian Wool Corporation, p. 85.
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- ⁵¹ See Chislett, G.D'A. 1959. An Investigation into Wool Marketing. Australian Woolgrowers' Council, p.9.
Anon. 1962. Report of the Wool Marketing Committee of Enquiry. Department of Primary Industry, p.100.
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- ⁵² Anon. 1962. Report of the Wool Marketing Committee of Enquiry, *op.cit.*, p.18.
- ⁵³ See Skinner, J. 1970. Wool Handling Developments in Australia and New Zealand. Wool Technology and Sheep Breeding, Vol.17, No.1, p.105.

studies be carried out in Australia to determine the best means of achieving a more economic and even movement of wool to brokers' stores.⁵⁴

In 1976, a study⁵⁵ of available data on wool store receival variability in Australia found that a high level of variation in receivals exists, with this variability being greater in regional than in metropolitan centres. It was also found that a close relationship existed between this pattern of receival and shearing patterns. The study also cited and discussed briefly, reference material^{55a} concerned with the impact of receival variability on wool store costs and surveys of on-farm wool storage potential.^{55b} A brief discussion of the potential for smoothing shearing patterns was also undertaken and the authors concluded that on-farm storage of wool was the more practical method of smoothing wool store receivals.

⁵⁴ Anon. 1970. Wool Handling (Sheep's Back to Store), op. cit.

⁵⁵ Bureau of Agricultural Economics, Wool Receivals at Australian Wool Selling Centres: Existing Patterns and Some Implications of Changing them. Australia, 1976 (working draft).

^{55a} Australian Wool Corporation, Objective Measurement of Wool in Australia, Melbourne, October 1973, Chapter 47; Australian Wool Corporation, Appendices to the Marketing of Australian Wool, op. cit., p 15.

^{55b} Australian Wool Corporation, Objective Measurement of Wool in Australia, op. cit.; Bureau of Agricultural Economics, Survey of Charleville Woolgrowers (unpublished), 1975.

APPENDIX 2

THE BRITISH METHOD OF SMOOTHING WOOL FLOWS

Concern over problems associated with peak wool inflows to merchants' stores prompted the British Wool Marketing Board to introduce a storage premium with the aim of smoothing these flows.

From 1967 until 1973, the incentive payment took the form of an interest payment based on the value of the clip; this was changed in 1974 to a storage payment based on the weight of the clip being held back, with an interest payment no longer being made. Table 7 outlines the basis for payment from 1972/73 to 1978/79.

More specifically, for 1977/78 and for the coming season 1978/79, the incentive offered to producers to spread their deliveries was 0.212c (NZ) per kg per week for wool delivered to handling warehouses in the off-season; that is, between 22 August and 30 November. The payment is backdated to 30 June and paid on the day the Board despatches the producer's wool cheque, or 31 October, whichever is the earlier. For example, one kilogram of wool shorn on 2 August and delivered on 23 August, subsequently graded and then paid for on 22 September, would attract a payment for 12 weeks; that is, $12 \times 0.212\text{c (NZ)} = 2.544\text{ c (NZ)}$. The 2.544 cents is a payment for storing the wool for three weeks; the annual rate would work out at 44.095 cents (NZ) or 25.6 per cent of the average price of 172.42 cents (NZ) that was being paid for each kilogram of wool in 1977/78.⁵⁶

⁵⁶ If an interest payment is imputed for time incurred from despatch to store to final payment, the appropriate return would be 10.5 per cent of the average price.

TABLE 7

British Wool Marketing Board
Storage Premium Payments 1972-73 to 1978-79

Year	Basis	Actual Payment ^a (\$NZ)
1972/73	7.0% ^b	184,000
1973/74	8.5% ^b	225,000
1974/75	.157 ^c	277,000
1975/76	.166 ^c	279,000
1976/77	.155 ^c	266,000
1977/78	.212 ^c	346,000
1978/79	.212 ^c	327,000

^a All estimates converted to New Zealand currency at the average annual mid-point exchange rate for each year. The 1977/78 rate was used for 1978/79.

^b Rate of interest paid per annum on the value of the wool from 30 June to despatch of payment advice on 31 October, whichever was the earlier.

^c Cents (NZ) per kg per week from 30 June to day payment advice cheque sent out or 31 October, whichever is the earlier.

Source: British Wool Marketing Board.

This storage increment currently being paid to producers is five times that paid to merchants for storing wool. It tends to favour Scottish hill wool producers since few of these growers would shear their sheep by 30 June and many of them would not ordinarily deliver their wool until the latter half of August. Therefore, many of them are receiving their cheques from the Board three weeks after delivering their wool, and are receiving a storage payment of approximately ten weeks for having held their wool back for no more than two or three weeks. For lowland farmers on the other hand, the storage increment is not so favourable, since many producers are shearing sheep in May or early June, and the current payment for holding their wool back for ten or eleven weeks provides only a modest incentive, in terms of interest on the value of the clip. Producers, in general, do not have to bear any risk associated with the possibility of falling wool prices (as would be the case if a similar storage increment was paid in New Zealand without acquisition), since the British Wool Marketing Board produces an annual schedule of prices for different types and grades of wool at the beginning of each season.

There appears to be no doubt that the incentive payments have smoothed the intake of wool into the handling units and has reduced the intake at peak periods, as all handling merchants agree on this, and are of the opinion that the present level of incentive seems to be effective. The main saving to merchants results through a reduction in the need for temporary warehouse men at the peak period.

However, as is the case in New Zealand, these obvious benefits, and any possible costs, have not yet been quantified in either a partial or a complete 'systems' context.

APPENDIX 3

SEASONAL WOOL FLOWS IN THE REPUBLIC OF SOUTH AFRICA

Peaks in wool production in South Africa add significantly to costs associated with shearing, handling and objective measurement. For example, 70 per cent of these costs are fixed, and therefore facilities are only partly utilised in the off season.⁵⁷

It has been calculated that a 20 per cent saving on handling costs is possible⁵⁸ if peaks could be equalised by controlled offerings over a nine to ten month period. However, given present shearing patterns, it is possible that additional storage and finance costs could exceed this saving. It is felt that altering shearing schedules is not a viable alternative, since a research survey indicated that it is not possible to change the peaks easily because of climatic conditions and other practical farming considerations.

⁵⁷ Source: South African Wool Board.

⁵⁸ Ibid.

APPENDIX 4

TABLE 8

AERU South Island Transport Survey 1974-75

Definition of Regions

Region		No. Shearing Obs.
1. Marlborough	Marlborough, Awatere, Kaikoura	80
2. Nelson	Golden Bay, Waimea	69
3. West Coast	Buller, Inangahua, Grey, Westland	69
4. Nth Canterbury	Amuri, Cheviot, Waipara	94
5. Rangiora	Ashley, Rangiora, Eyre, Oxford	97
6. Malvern	Malvern, Tawera	71
7. Christchurch	Paparua, Waimairi, Heathcote, Mt Herbert, Akaroa, Waiwera Ellesmere	101
8. Ashburton	Ashburton	85
9. Strathallan	Strathallan	96
10. MacKenzie	MacKenzie	85
11. Waimate	Waimate	97
12. Waitaki	Waitaki	83
13. Dunedin	Taieri, Dunedin, Peninsula, Waihemo, Waikouaiti	64
14. Balclutha	Bruce, Tuapeka	85
15. Clutha	Clutha	103
16. Central Otago	Maniototo, Vincent, Lake	93
17. Gore	Northern Southland	102
18. Invercargill	Invercargill	80
19. Wallace	Wallace, Fiordland	110

APPENDIX 5

TABLE 9

Second Shear Bodywool as a Proportion of Total
Wool Sold at Auction^a 1976-77

Sale Centre	% Second Shear Bodywool ^b
Auckland	75
Napier	45
Wanganui	50
Wellington	33
Christchurch	10
Timaru	11.5
Dunedin	10
Invercargill	16

^a Growers' Greasy wool sold at auction and Corporation Extra-Choice purchases.

^b Excludes lambswool, crutchings, skirtings, clothing oddments, second pieces and locks, miscellaneous oddments.

Source: NZWMC Statistical Handbook 1976-77.

APPENDIX 6

TABLE 10

Growers' Response to a Storage Increment -
By Type of Farm

Type of Farm	Sell for Cash (%)	Store to Get Full Increment (%)	Store Subject to Cash Needs (%)	No. of Respond- ents
High Country	36.2	8.5	55.3	47
Foothills	42.7	18.2	39.1	143
Fattening/Breeding	37.4	16.2	46.4	671
Intensive Fattening	41.3	23.9	34.8	92
Mixed Crop/Fattening	39.7	15.8	44.5	549
Other	30.5	37.3	32.2	59

Source: AERU South Island Transport Survey 1975, unpublished data.

TABLE 11

Growers' Response to a Storage Increment -
By Size of Wool Clip

	Sell for Cash (%)	Store to Get Full Increment (%)	Store Subject to Cash Needs (%)	No. of Respond- ents
< 20 Bales	41.5	17.1	41.5	41
20-39 Bales	37.7	12.6	49.7	175
40-59 Bales	40.5	13.1	46.4	321
60-79 Bales	35.0	11.4	53.6	220
80-99 Bales	39.0	24.7	36.3	336
100-199 Bales	37.4	20.8	41.9	289
> 199 Bales	40.3	13.1	46.6	142

Source: AERU South Island Transport Survey 1975, unpublished data.

APPENDIX 7

TABLE 12

Storage Capacity of Wool by Type of Farm

Type of Farm	Mean Bales ^a Shorn/Farm	Storage Capacity (Mean No. of Bales)				No. of Respond- ents
		1 mth	1-2mths	2-3 mths	3 mths	
High Country	136.4 (81.0)	90.0 (59.9)	82.6 (65.9)	73.8 (66.7)	65.7 (70.8)	49
Foothills	69.3 (66.6)	52.0 (43.2)	50.4 (44.5)	45.0 (43.7)	37.7 (44.0)	128
Fattening/Breeding	63.9 (55.9)	52.3 (95.8)	49.8 (96.1)	46.5 (96.5)	38.9 (97.0)	615
Intensive Fattening	48.8 (34.2)	38.1 (40.0)	32.9 (39.6)	32.2 (39.9)	25.3 (37.9)	87
Mixed Crop/Fattening	39.2 (32.7)	41.4 (43.7)	38.9 (44.4)	36.0 (45.4)	31.3 (46.6)	484

^a Standard deviations shown in brackets below means.

Source: AERU South Island Transport Survey 1975, unpublished data.

TABLE 13

Storage Capacity of Wool by Size of Wool Clip

Size of Wool Clip	Mean Bales ^a Shorn/Farm	Storage Capacity (Mean No. of Bales) ^a				No. of Respond- ents
		1 mth	1-2 mths	2-3 mths	3 mths	
< 20 Bales	9.0 (5.4)	23.0 (69.2)	22.0 (69.4)	20.7 (69.3)	18.7 (69.5)	236
20-39 Bales	29.8 (5.5)	32.8 (26.4)	30.9 (27.1)	28.8 (28.1)	25.1 (29.7)	266
40-59 Bales	49.4 (5.8)	42.3 (39.3)	39.3 (40.8)	36.8 (41.7)	30.8 (43.3)	288
60-79 Bales	68.3 (5.5)	51.9 (35.5)	49.5 (36.8)	46.2 (38.9)	36.9 (41.7)	205
80-99 Bales	87.2 (5.2)	64.2 (48.9)	59.9 (50.9)	54.5 (53.8)	43.9 (56.4)	110
100-199 Bales	131.4 (25.3)	96.0 (169.6)	91.0 (171.0)	86.0 (172.6)	74.2 (174.1)	163
> 199 Bales	259.0 (62.0)	124.4 (78.9)	119.6 (84.1)	96.9 (88.0)	90.6 (90.7)	40

^a Standard deviations shown in brackets below means.

Source: AERU South Island Transport Survey 1975, unpublished data.

APPENDIX 8

TABLE 14

Attitudes of Sheep Farmers to Acquisition
of the Wool Clip by the NZWB

Question:

"If it were demonstrated that marketing costs could be reduced significantly by a New Zealand Wool Board operation, would you, if a referendum were held, vote for a system which required the Board to purchase all wool produced in New Zealand and to market it in various ways, or would you vote for a continuation of the wool marketing arrangements as they operate at present?"

	No. of Valid Observat- ions	Wool Board Purchase %	Present Arrange- ments %
<u>North Island</u>			
1. Northland	44	50	50
2. Central Auckland	13	54	46
3. Sth Auckland-Bay of Plenty	110	43	57
4. East Coast	29	38	62
5. Hawkes Bay	75	37	63
6. Taranaki	28	39	61
7. Wellington	105	46	54
<u>South Island</u>			
8. Marlborough	19	26	74
9. Nelson	15	67	33
10. Westland	5	60	40
11. Canterbury	160	45	55
12. Otago	116	36	64
13. Southland	131	34	66
	850	—	—
New Zealand Average		41	59

Source: Pryde, J.G., 1978, op.cit.

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